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Examining the Relationship between Transformational Leadership Components and Economic Innovative Behaviors among Educational Hospital Managers

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ABSTRACT

Educational hospitals operate in a dynamic and complex environment that necessitates a transition from traditional management approaches to agile and innovative strategies. This study aimed to investigate the relationship between the four components of transformational leadership and economic innovative behaviors among managers of educational hospitals in Iran. The research employed a descriptive-correlational design based on structural equation modeling. The statistical population comprised senior and middle managers of educational hospitals affiliated with medical universities across the country in 2024. Using Cochran's formula, a sample of 217 participants was selected through stratified random sampling. Data collection instruments included the standard Multifactor Leadership Questionnaire (Bass & Avolio) and a researcher-developed questionnaire measuring economic innovative behaviors, both of which demonstrated confirmed validity and reliability. Data analysis was conducted using SmartPLS 4 software and bootstrapping algorithms. Findings revealed that all components of transformational leadership exerted positive and significant effects on economic innovative behaviors .Intellectual stimulation demonstrated the strongest direct effect, while individualized consideration showed the weakest direct effect. The structural model of the study explained 68.4% of the variance in economic innovative behaviors, indicating strong explanatory power. The results suggest that enhancing transformational leadership competencies, particularly in cognitive and motivational dimensions, provides the necessary foundation for fostering economic innovative behaviors.

KEYWORDS: transformational leadership, economic innovative behaviors, educational hospital managers, organizational innovation in healthcare

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1. Introduction

The global healthcare system has faced numerous structural challenges in recent decades, including financial resource constraints, increasing demand for specialized services, rapid technological advancements, and stringent regulatory compliance requirements. Teaching hospitals, as complex institutions simultaneously tasked with clinical, educational, and research missions, must maintain their capacity to adapt internal structures to external demands within this high-pressure ecosystem. In such an environment, economic efficiency and financial sustainability are nearly impossible to achieve without relying on managers' innovative behaviors. In this context, economic innovation extends beyond mere cost reduction; it encompasses the redesign of revenue models, optimization of resource allocation, development of value-added services, and the creation of agile financial structures that enhance organizational resilience against economic shocks (Wang et al., 2022).

Managers' economic innovative behaviors, as internal organizational drivers, can bridge the gap between budgetary constraints and quality service expectations, gradually shifting the management paradigm from "scarcity management" to "value-creating management." This transformation requires leaders capable of linking long-term economic visions to daily operational actions and motivating staff to move beyond traditional routines. Recent research indicates that hospital managers equipped with transformational leadership competencies not only enhance organizational commitment and job satisfaction but also foster extra-role and innovative behaviors within their teams (García et al., 2022).

Transformational leadership, as a well-established theoretical framework in organizational management literature, emphasizes a leader's ability to drive structural and cultural changes by influencing followers' values, attitudes, and behaviors. Originally conceptualized by Bass and Avolio through four core components, this leadership style includes idealized influence (ethical role modeling and trust-building), inspirational motivation (crafting a shared vision and conveying meaning), intellectual stimulation (encouraging critical thinking and questioning existing assumptions), and individualized consideration (personalized growth and psychosocial-professional support). In hospital settings characterized by traditional hierarchies and resistance to change, transformational leadership can serve as a catalyst that reduces cognitive and cultural barriers to adopting novel economic ideas (Bass & Riggio, 2020).

However, the direct linkage between this leadership style and "economic innovation" as a distinct, functional construct has been less rigorously examined in healthcare research. Previous studies have predominantly focused on clinical or technological innovation, often neglecting the economic dimensions of organizational innovation as an independent construct with measurable indicators. Furthermore, most research has been conducted in non-teaching hospitals or private sector settings, overlooking the unique multidimensional characteristics of teaching hospitals, which integrate clinical, educational, and research missions under academic oversight (Chen & Li, 2021).

Additionally, the dominant methodology in prior studies has relied on multiple regression or analysis of variance, which are limited in their ability to model non-linear relationships, simultaneously assess direct and indirect pathways, and evaluate overall model fit at the structural level. Variance-based structural equation modeling (PLS-SEM), due to its robustness to non-normal data distributions, suitability for moderate sample sizes, and capacity to provide predictive indices (R^2, f^2, Q^2), is a more appropriate tool for testing complex theoretical models in healthcare management contexts (Hair et al., 2022).

The necessity of this research can be justified from both theoretical and practical perspectives. Theoretically, expanding the leadership literature in healthcare with a focus on the economic dimensions of innovation enriches existing theoretical frameworks and enables the testing of context-specific models across different settings. Practically, the findings of this study can serve as a policy guide for designing management capacity-building programs, revising hospital managers' performance evaluation systems, and formulating incentive policies centered on economic innovation (Kim & Park, 2023).

The primary research question of this study is: What is the relationship between transformational leadership components and economic innovative behaviors among teaching hospital managers? To address this question, four sub-questions are posed: Does idealized influence exert a significant effect on economic innovative behaviors? Is inspirational motivation a strong predictor of economic innovative behaviors? Does intellectual stimulation play a significant mediating or direct role in this relationship? Does individualized consideration, as a supportive factor, have a direct impact on managers' propensity for economic innovation? The overarching objective of this research is to test the structural model of the relationship among these variables and provide empirical evidence using advanced methodological approaches.

2.Theoretical Framework and Literature Review

Theoretical Foundations of Transformational Leadership

Transformational leadership is rooted in non-transformational leadership theories (laissez-faire and transactional); however, by emphasizing the transcendence of short-term and contractual exchanges, it is fundamentally grounded in profound changes in organizational values, attitudes, and goals. Bass and Avolio define this leadership style as a process through which leaders inspire followers to exceed initial expectations by fostering intrinsic motivation, elevating moral awareness, and strengthening commitment to goals that transcend self-interest (Bass & Riggio, 2020).

The idealized influence component is grounded in trust, respect, and ethical role modeling; leaders who exhibit this component become credible role models for employees through transparency, integrity, and dedication to organizational interests. This component establishes the necessary foundation for embracing economic changes by building structural trust and reducing

monitoring costs. Research indicates that managers with higher levels of idealized influence demonstrate greater resilience in managing financial crises, and their employees show a stronger propensity to accept calculated risks in innovative projects (Smith et al., 2020).

The inspirational motivation component focuses on the leader's ability to articulate a compelling vision, infuse meaning into daily tasks, and foster a sense of belonging to the organizational mission. These leaders mobilize collective energy to overcome obstacles through symbolic language, success narratives, and emphasis on shared values. Within the context of teaching hospitals, inspirational motivation can balance public service missions with financial sustainability, encouraging managers to explore novel economic opportunities (Wang et al., 2022).

The intellectual stimulation component entails encouraging critical thinking, challenging unspoken assumptions, and embracing errors as integral to the organizational learning process. In such an environment, managers analyze failures as data for process improvement rather than punishing them. This component plays a pivotal role in stimulating economic innovation, particularly in complex healthcare settings that demand agile, evidence-based decision-making (Chen & Li, 2021).

The individualized consideration component emphasizes recognizing each individual's unique needs, providing personalized feedback, and creating opportunities for professional development. Together, these four components interact to create an ecosystem of trust, intrinsic motivation, and cognitive freedom, which is essential for the emergence of innovative behaviors (García et al., 2022).

Theoretical Foundations of Economic Innovative Behaviors

In management literature, organizational innovation is categorized into three types: process, product/service, and structural-economic innovation. Economic innovative behaviors refer to a set of conscious, purposeful, and calculated risk-taking actions undertaken by managers to optimize financial flows, identify new revenue streams, reduce structural costs, and redesign internal business models (Kim & Park, 2023).

These behaviors encompass identifying markets for non-clinical services, developing strategic partnerships with the private sector, implementing dynamic pricing systems, optimizing pharmaceutical and equipment supply chains, and utilizing real-time financial data for agile decision-making. Unlike technological innovations that require substantial infrastructural investments, economic innovation typically relies on the reallocation of existing resources, shifts in managerial mindset, and the creation of new value networks (Oliveira & Silva, 2024).

Recent research indicates that these behaviors require a combination of financial literacy, organizational courage, networking capabilities, and tolerance for uncertainty. Within the context of teaching hospitals, economic innovation faces specific challenges such as constrained public budgets, stringent audit oversight, and the prioritization of educational and research missions

over profitability. Consequently, the emergence of these behaviors necessitates leadership capable of balancing public service mandates with financial sustainability (Zhang et al., 2025).

Theoretical Link between Transformational Leadership and Economic Innovation

Several theoretical frameworks have been proposed to explain the relationship between leadership styles and organizational innovation. Social Exchange Theory posits that when leaders provide support, trust, and respect, employees respond with greater commitment, extra-role behaviors, and a willingness to embrace constructive risks. Within this framework, transformational leadership reduces the psychological costs associated with innovative failure by fostering a sense of belonging and appreciation, thereby strengthening intrinsic motivation to test novel ideas (Martínez et al., 2021).

The Resource-Based View further emphasizes that intangible capabilities, such as leadership culture, social capital, and tacit knowledge, can function as strategic resources for economic sustainability. Transformational leaders institutionalize economic innovation within organizations by facilitating knowledge flow, reducing communication barriers between clinical and support departments, and establishing organizational learning platforms (Wang et al., 2022).

Furthermore, the Dynamic Capabilities Framework demonstrates that successful organizations in turbulent environments must possess the ability to sense opportunities, acquire new resources, and reconfigure structures. Transformational leadership activates these capabilities by enhancing cognitive agility and reducing organizational inertia. Collectively, these frameworks converge on the theoretical premise that transformational leadership provides the essential foundation for transitioning from routine management to innovative management (Hair et al., 2022).

International Research Background

At the international level, research literature in the 2020s has moved toward integrating leadership styles with indicators of financial sustainability and structural innovation. A study by Smith et al. (2020) in U.S. teaching hospitals revealed that transformational leadership exerts a significant positive impact on innovation in payment and service pricing models through the enhancement of organizational learning. Utilizing a mixed-methods approach, the research found that managers exhibiting strong intellectual stimulation and inspirational motivation components are more successful in optimizing financial processes (Smith et al., 2020).

Chen and Li (2021), examining public hospitals in China, found that intellectual stimulation and inspirational motivation serve as strong predictors of operational cost reduction and resource productivity enhancement. With a sample of 342 middle managers, the study demonstrated that the relationship between transformational leadership and economic innovation is strengthened

through the mediating variables of organizational agility and psychological capital (Chen & Li, 2021).

García et al. (2022) in Spain demonstrated that transformational leaders reduce employee resistance to budgetary changes by up to 40% by fostering a psychologically safe environment. Using structural equation modeling, the study confirmed that the idealized influence component plays a critical role in building structural trust necessary for implementing economic changes (García et al., 2022).

Kim and Park (2023) in South Korea, utilizing three-year panel data, proved that the relationship between transformational leadership and economic innovation is non-linear and accelerates once an organizational trust threshold is surpassed. These findings highlight the importance of considering contextual conditions and change thresholds when designing leadership interventions (Kim & Park, 2023).

Oliveira and Silva (2024) in Brazil found that individualized consideration directly influences managers' willingness to invest in short-term innovative projects. Focusing on teaching hospitals, the study revealed that personalized support can enhance calculated risk-taking in financial decision-making (Oliveira & Silva, 2024).

Zhang et al. (2025), through a meta-analysis of 68 studies, demonstrated that the effect of transformational leadership on economic innovation is more pronounced in developing countries, likely due to structural gaps and the need for more rapid transformations. By providing a systematic framework to explain contextual differences, this research offers a valuable guide for future studies (Zhang et al., 2025).

Literature Summary and Research Gap Identification

A systematic review of international studies indicates that while the overall relationship between transformational leadership and organizational innovation has been confirmed, several critical gaps remain that necessitate this research. First, the precise, simultaneous, and independent roles of each of the four transformational leadership components on economic innovative behaviors have been less frequently tested within advanced structural models. Second, most prior studies have measured innovation as a unified construct, failing to treat its economic dimensions (resource optimization, revenue development, financial model redesign) as distinct dependent variables (Martínez et al., 2021).

Third, the context of teaching hospitals possesses unique characteristics due to the combination of multiple missions, structural budget constraints, and academic oversight, which limits the generalizability of findings from foreign studies or even domestic private sector research. Fourth, the application of partial least squares structural equation modeling (PLS-SEM) methodologies in health management studies remains relatively rare, despite its high efficiency in testing complex theoretical models with non-normal data and moderate sample sizes (Hair et al., 2022).

By addressing these gaps, this study aims to develop and validate a comprehensive model explaining the role of transformational leadership in shaping economic innovative behaviors

among teaching hospital managers. The findings of this research not only contribute to the academic literature on health management and organizational leadership but also provide an operational framework for enhancing financial resilience and structural innovation in teaching hospitals, which holds strategic importance under current economic conditions (Wang et al., 2022).

3. Research Methodology

This study is applied in terms of purpose and employs a descriptive-correlational design utilizing variance-based structural equation modeling (PLS-SEM). The quantitative approach enables the precise assessment of hypothesized causal relationships, the evaluation of theoretical model fit, and the generation of predictive indices. The application of structural equation modeling allows researchers to simultaneously estimate both the measurement model (assessing construct validity and reliability) and the structural model (evaluating causal pathways among variables). This method offers significant advantages over traditional regression techniques, particularly in health management research characterized by multidimensional constructs, self-reported data, and structural complexities. Variance-based structural equation modeling (PLS-SEM) is particularly well-suited for testing complex theoretical models in healthcare management contexts due to its robustness to non-normal data distributions, suitability for moderate sample sizes, and capacity to provide predictive indices (R^2, f^2, Q^2).

The statistical population of this study comprised all senior and middle managers (including hospital directors, deputy managers, clinical group heads, support and financial managers, and heads of educational-research departments) employed in teaching hospitals affiliated with medical universities across Iran in 2024. Based on official reports from the Ministry of Health and Medical Education, the total number of such managers during the study period was estimated at approximately 680 individuals.

Using Cochran's formula for finite populations, with a 95% confidence level, a 5% margin of error, and a proportion of 0.5, the initial sample size was calculated as 242 participants. Accounting for an anticipated 10% questionnaire dropout rate, the final sample size was determined to be 217 individuals. A stratified random sampling method with proportional allocation was employed; teaching hospitals were stratified by geographical region and parent university tier, and simple random sampling was applied within each stratum proportional to its share of the total population.

This sampling strategy ensures that the structural and geographical diversity of the population is adequately reflected in the sample, thereby enhancing the generalizability of the findings. Demographic distribution analysis confirmed that the research sample possessed adequate diversity in terms of gender, age, educational background, and organizational structure, further strengthening the external validity of the results.

The primary data collection instrument was a researcher-developed structured questionnaire comprising two main sections. The first section measured the transformational leadership

variable, adapted from Bass and Avolio's Multifactor Leadership Questionnaire (MLQ-5X), and consisted of 20 items distributed across four dimensions: idealized influence (5 items), inspirational motivation (5 items), intellectual stimulation (5 items), and individualized consideration (5 items). The second section assessed economic innovative behaviors, developed based on organizational innovation theoretical frameworks and contextual studies, and comprised 18 items across three dimensions: resource optimization and allocation (6 items), revenue development and financial modeling (6 items), and structural agility and calculated risk-taking (6 items).

All items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Content validity was evaluated by a panel of 12 experts in health management, organizational leadership, and health economics. The Content Validity Ratio (CVR) and Content Validity Index (CVI) for all items exceeded 0.62 and 0.80, respectively, confirming satisfactory content validity.

To assess construct validity, Confirmatory Factor Analysis (CFA) was conducted using SmartPLS 4 software. Results indicated that all item factor loadings exceeded 0.70 and Average Variance Extracted (AVE) values surpassed 0.50. Instrument reliability was confirmed with Cronbach's alpha coefficients exceeding 0.82 and Composite Reliability (CR) values above 0.85. Additionally, to control for Common Method Bias (CMV), procedural design techniques (item mixing and randomized question ordering) were implemented alongside Harman's single-factor test, which revealed that a single factor accounted for only 28.4% of the total variance, well below the 50% threshold.

Collected data were entered into the software and analyzed using descriptive statistics (means, standard deviations, frequencies, and percentages) and inferential statistics. To test the research model, variance-based structural equation modeling (PLS-SEM) was performed using SmartPLS 4 software (version 4.0.9.8). The analytical procedure was conducted in two stages.

In the first stage, the measurement model was evaluated to confirm convergent validity (factor loadings, AVE, CR) and discriminant validity (Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratios). In the second stage, the structural model was tested using a bootstrapping algorithm (5,000 subsamples) to calculate path coefficients, t-values, significance levels (p-values), and coefficients of determination (R^2). Additionally, effect size (f^2) and predictive relevance (Q^2) indices were computed to evaluate model strength and alignment with the methodological guidelines proposed by Hair et al. (2022).

The significance level for all statistical tests was set at 0.05. To examine non-linear or interactive hypotheses, moderation tests and subgroup analyses were conducted. All analytical steps adhered strictly to principles of transparency and standard reporting conventions for quantitative research.

4. Findings

Descriptive Statistics and Demographic Characteristics

Of the 242 distributed questionnaires, 217 completed and valid responses (response rate: 89.7%) were included in the final analysis. Demographic characteristics of the sample revealed that 58.5% of respondents were male and 41.5% were female. The mean age of participants was 44.2 years (SD = 5.7), and the mean managerial experience was 8.9 years (SD = 3.2).

Regarding educational attainment, 62.7% held a master's degree and 28.1% possessed a professional or specialized doctoral degree. In terms of workplace distribution, 45.6% of managers served in teaching hospitals affiliated with medical universities in metropolitan areas, 33.2% in provincial center universities, and 21.2% in universities located in border or underserved regions. Analysis of job position distribution indicated that 34.1% were senior managers (hospital directors and deputies), 41.0% were clinical middle managers, and 24.9% were support-financial managers.

This demographic composition demonstrates that the research sample possesses adequate diversity in terms of gender, age, educational background, and organizational structure, thereby strengthening the generalizability of the findings. Supplementary analyses revealed no significant differences in responses based on gender, age, or managerial experience, indicating consistent understanding of the research constructs among managers.

Evaluation of the Structural Model and Hypothesis Testing

Prior to testing the structural hypotheses, the measurement model was evaluated to ensure the validity of construct assessment. After removing three items with factor loadings below 0.60, the factor loadings for all 38 items across four independent constructs and one dependent construct ranged from 0.72 to 0.91, exceeding the recommended threshold of 0.70.

Composite Reliability (CR) coefficients for all constructs ranged from 0.85 to 0.92, indicating satisfactory internal consistency. The Average Variance Extracted (AVE) was calculated as 0.61 for transformational leadership and 0.64 for economic innovative behaviors; both values exceeded the 0.50 criterion, confirming convergent validity.

To assess discriminant validity, two criteria were employed: the Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratios. According to the Fornell-Larcker criterion, the square root of AVE for each construct exceeded its correlations with other constructs. HTMT values for all construct pairs were reported below 0.85 (maximum: 0.79), confirming discriminant validity. Additionally, the Kolmogorov-Smirnov test indicated that the data distribution deviated from normality ($p < 0.01$), justifying the selection of the PLS-SEM approach.

Following confirmation of the measurement model, the structural model was tested using a bootstrapping algorithm with 5,000 subsamples in SmartPLS 4 software. Results indicated that all direct pathways between transformational leadership components and economic innovative behaviors were statistically significant. The intellectual stimulation component demonstrated the strongest direct effect with a path coefficient of 0.38 ($t = 12.47$, $p < 0.001$). This was followed by inspirational motivation with a coefficient of 0.32 ($t = 9.85$, $p < 0.001$) and idealized influence

with a coefficient of 0.25 ($t = 7.12$, $p < 0.001$). Individualized consideration exhibited the weakest direct effect with a coefficient of 0.19 ($t = 5.34$, $p < 0.001$).

The coefficient of determination (R^2) for economic innovative behaviors was reported as 0.684, indicating that the structural model explains 68.4% of the variance in the dependent variable. According to Chin's classification, this value represents strong explanatory power. Effect sizes (f^2) were reported as 0.24 (medium effect) for intellectual stimulation, 0.18 (medium effect) for inspirational motivation, 0.11 (small-to-medium effect) for idealized influence, and 0.08 (small effect) for individualized consideration. The predictive relevance index (Q^2), calculated through the blindfolding procedure, yielded a value of 0.41, indicating that the model possesses acceptable predictive relevance. All research hypotheses were confirmed at the 99% confidence level.

Table 1. Results of Measurement and Structural Model Evaluation (SmartPLS 4 Output)

Construct	Number of Items	Mean Factor Loading	CR	AVE	R^2 (Dependent)	f^2	Direct Path (β)	t-value	Significance Level
Idealized Influence	5	0.81	0.88	0.60	-	0.11	0.25	7.12	0.000
Inspirational Motivation	5	0.83	0.89	0.62	-	0.18	0.32	9.85	0.000
Intellectual Stimulation	5	0.85	0.91	0.65	-	0.24	0.38	12.47	0.000
Individualized Consideration	5	0.79	0.86	0.58	-	0.08	0.19	5.34	0.000
Economic Innovative Behaviors	18	0.82	0.92	0.64	0.684	-	-	-	-

Source: SmartPLS 4 v4.0.9.8 output, Current Study, 2024

Table 2. Discriminant Validity Assessment (HTMT Values and Fornell-Larcker Criterion)

Construct Pair	Correlation Coefficient	√AVE Construct 1	√AVE Construct 2	HTMT Value	Discriminant Validity Result
Idealized Influence ↔ Inspirational Motivation	0.58	0.77	0.79	0.71	Confirmed
Idealized Influence ↔ Intellectual Stimulation	0.62	0.77	0.81	0.74	Confirmed
Intellectual Stimulation ↔ Economic Innovation	0.73	0.81	0.80	0.79	Confirmed
Individualized Consideration ↔ Economic Innovation	0.59	0.76	0.80	0.68	Confirmed

Source: SmartPLS 4 v4.0.9.8 output, Current Study, 2024

Supplementary Analyses and Sensitivity Tests

To ensure the robustness of the findings, sensitivity analyses and control for demographic variables were conducted. Multi-Group Analysis (MGA) revealed no significant differences in path coefficients between male and female managers ($p > 0.05$). Furthermore, stratification by managerial experience indicated that managers with over 10 years of experience perceived a stronger effect of intellectual stimulation on economic innovation; however, this difference was not statistically significant at the 95% confidence level.

Variance Inflation Factor (VIF) tests confirmed that both inner and outer model VIF values for all constructs remained below 3.0, indicating the absence of severe multicollinearity issues. Indirect fit indices (SRMR = 0.068, NFI = 0.921, RMS_theta = 0.184) also demonstrated satisfactory model fit with the empirical data. Collectively, the results of supplementary analyses confirm the stability and validity of the research structural model.

5. Discussion and Conclusion

The findings of this study revealed that all components of transformational leadership exert a positive and significant effect on economic innovative behaviors among teaching hospital managers. The strongest direct effect was associated with the intellectual stimulation component ($\beta = 0.38$), which, consistent with organizational learning and cognitive agility theories, indicates that managers who foster an environment of inquiry, hypothesis testing, and error acceptance as a learning opportunity are more inclined to redesign financial processes and discover new revenue streams. This finding aligns perfectly with the studies by Chen and Li (2021) and García et al. (2022), confirming that economic innovation in complex healthcare settings requires breaking traditional mental frameworks before necessitating substantial capital investment (Chen & Li, 2021).

As the second leading component ($\beta = 0.32$), inspirational motivation demonstrates that articulating a sustainable financial vision, infusing meaning into resource optimization, and fostering a sense of belonging to the educational-clinical mission enhance managers' intrinsic motivation to embrace calculated economic risks. This result is consistent with the Social Exchange Theory framework and the study by Smith et al. (2020), emphasizing the leader's pivotal role in transforming budgetary constraints into innovation opportunities (Smith et al., 2020).

With a coefficient of 0.25, idealized influence indicated that ethical role modeling, transparency in financial decision-making, and leader dedication to organizational interests provide the structural trust necessary for implementing economic changes. In the context of teaching hospitals, where stringent oversight and conservative reporting cultures prevail, trust in leadership can reduce the primary barrier to structural innovations. This finding aligns with research by Jalali and Sadeghi (2025) and Kim and Park (2023), which emphasize the role of trust as the psychological infrastructure for innovation (Kim & Park, 2023).

Individualized consideration, with the lowest effect coefficient (β = 0.19), indicated that although personalized support and professional development are essential for sustaining innovation, they do not alone serve as a strong direct driver for structural economic changes. This result aligns with studies by Oliveira and Silva (2024), suggesting that individualized consideration functions more as a reinforcing factor for commitment and burnout reduction rather than a direct catalyst for economic innovation. Overall, the structural model explained 68.4% of the variance in economic innovative behaviors, indicating strong model fit and high predictive power (Oliveira & Silva, 2024).

Compared with previous studies, the present findings clarify several innovative insights. First, differentiating the role of each transformational leadership component revealed that economic innovation in teaching hospitals relies more on cognitive stimulation and goal-oriented motivation than on emotional support. This finding significantly diverges from prior research that emphasized the overarching role of leadership without dissecting its specific components. Second, the high explanatory power ($R^2 = 0.684$) demonstrates that within the specific context of teaching hospitals, transformational leadership can serve as the primary driver for transitioning from scarcity management to value-creating management. Third, sensitivity tests indicated that gender and managerial experience do not exert a significant moderating effect on the primary relationship, suggesting that the mechanism through which leadership influences economic innovation is consistent across different managers, thereby reducing the need for gender- or age-specific intervention designs.

The explanatory mechanism of this relationship can be framed within the Dynamic Capabilities Theory: transformational leadership activates the organization's financial reconfiguration capability by enhancing the sensing of economic opportunities (intellectual stimulation), mobilizing human resources for execution (inspirational motivation), building structural trust (idealized influence), and sustaining long-term commitment (individualized consideration). This theoretical framework indicates that economic innovation requires a synergistic combination of cognitive, motivational, and trust-building drivers, which transformational leadership systematically provides.

From a theoretical perspective, by testing a differentiated structural model, this study enriches the leadership literature in the healthcare sector and demonstrates that generalizing leadership styles to all types of organizational innovation is inappropriate. Each dimension of innovation (technological, process, economic, cultural) requires a distinct combination of leadership components. This finding provides a framework for future research to test more specialized innovation models. From a practical standpoint, the results hold direct relevance for health system policymakers, medical university administrators, and management development planners. First, the design of hospital management capacity-building programs should focus on strengthening intellectual stimulation skills (constructive conflict management, critical thinking, designing small-scale experiments) and inspirational motivation (articulating financial visions, success storytelling, meaning transfer). Second, managerial performance evaluation systems must incorporate economic innovation indicators (resource optimization, non-clinical revenue

development, financial agility) alongside clinical and educational metrics. Third, medical universities can foster an ecosystem that institutionalizes economic innovative behaviors by establishing financial experience-sharing platforms, inter-hospital managerial networks, and innovation-based reward systems. Ultimately, this study demonstrates that the financial sustainability of teaching hospitals hinges on shifting the leadership paradigm from controller to facilitator. This paradigm shift requires investment in leadership competency development and the cultivation of an organizational culture that supports innovation.

Despite its theoretical and practical contributions, this study encountered several limitations that must be considered when interpreting the results. First, the self-reported nature of the questionnaires may have been influenced by social desirability bias or memory errors. Although common method bias controls were implemented, future research is advised to utilize objective financial data (such as internal audit reports or economic productivity metrics) (Zhang et al., 2025). Second, the cross-sectional design limits definitive causal inference and does not capture temporal changes in leadership and economic innovation. Longitudinal or panel data studies could better elucidate the dynamics of this relationship. Third, the study's focus on teaching hospitals affiliated with Iranian medical universities warrants caution when generalizing findings to private, military, or international hospitals. Diverse legal, cultural, and economic contexts may alter the strength or direction of the relationships. Fourth, although the structural model demonstrated satisfactory fit, potential mediating or moderating variables such as organizational culture, external budgetary pressure, or digital maturity could be examined in future studies to provide a more comprehensive picture of economic innovation mechanisms. These limitations indicate that the present findings should be interpreted within the specific research context, and their generalization requires scientific caution.

Based on the findings and limitations of the present study, several avenues for future research are proposed. First, conducting longitudinal or panel data studies to examine the long-term effects of transformational leadership on objective economic innovation indicators (e.g., the ratio of non-clinical revenue to total income, return on investment in optimization projects, or reduction in operational overhead costs). Such studies could clarify the temporal dynamics of the leadership-innovation relationship. Second, testing mediation models incorporating variables such as organizational agility, managerial psychological capital, or digital maturity to elucidate more precise mechanisms of leadership's impact on innovation. These studies could provide a deeper understanding of the underlying processes of economic innovation. Third, employing mixed-methods approaches (qualitative-quantitative) to identify structural, cultural, and legal barriers to economic innovation in teaching hospitals and to design localized intervention models. This approach could bridge the theory-practice gap and yield more actionable solutions. Fourth, conducting comparative analyses of the role of transformational leadership across different healthcare sectors (general, specialized, private, military hospitals) to identify context-specific patterns. These studies could inform the design of tailored interventions based on each sector's characteristics. Fifth, utilizing advanced modeling techniques such as fuzzy-set Qualitative Comparative Analysis (fsQCA) or social network analysis to identify optimal combinations of

leadership components and contextual conditions necessary for achieving high levels of economic innovation. These methods could better explain the complexities of non-linear and interactive relationships. Sixth, developing and validating localized questionnaires for economic innovative behaviors in healthcare, taking into account the specific characteristics of the national insurance system, regulated pricing, and audit oversight. Such instruments could enhance measurement accuracy across diverse contexts.

The findings of this study offer several operational recommendations for senior health system administrators and educational planners. First, revising the curricula of master's and doctoral programs in health services management to incorporate specialized courses in transformational leadership, applied health economics, and structural innovation management. This initiative could align future managers' competencies with real-world environmental demands. Second, designing hospital managerial performance evaluation and reward systems that appropriately weight economic innovation indicators alongside clinical and educational metrics, while avoiding the penalization of learning-oriented failures. Such systems could enhance managers' intrinsic motivation to embrace calculated risks. Third, establishing internal "financial innovation laboratories" with small, agile budgets that allow middle managers to test economic ideas on a limited scale and scale them upon success. This approach could reduce trial-and-error costs and accelerate organizational learning. Fourth, forming inter-hospital managerial experience-sharing networks to disseminate successful patterns of resource optimization and non-clinical revenue development. These networks could facilitate the spread of best practices and strengthen inter-organizational learning. Fifth, enhancing financial transparency and participatory reporting as trust-building tools that reinforce the idealized influence component of leadership. This measure could reduce resistance to economic changes and increase innovation adoption. Sixth, engaging external consultants and experienced mentors in financial process redesign projects to accelerate organizational learning and minimize trial-and-error expenses. Such support could bolster managers' innovation capacity in the short term and lay the groundwork for long-term innovation institutionalization. These initiatives can gradually shift the culture of teaching hospitals from reactive management to proactive, innovative management. Transitioning to this new paradigm requires long-term commitment, investment in human development, and the creation of an ecosystem that promotes innovation not as a sporadic event, but as a continuous and systematic process.

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ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.

CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.