Original Article
http://mjiri.iums.ac.ir
Medical Journal of the Islamic Republic of Iran (MJIRI)

Med J Islam Repub Iran. 2026 (25 Feb);40.19. https://doi.org/10.47176/mjiri.40.19

From Tradition to Transformation: Policy Solutions for Advancing Medical Education Toward Entrepreneurial Universities

Mohammad Mahboubi[1,2], Taha Nasiri[3,4*], Sadra Taheri Maleki[5], Majid Ghorbanniya Delavar[6], Babak Rastegarimehr[1]

Received: 12 May 2025 Accepted: 20 Oct 2025 Published: 25 Feb 2026

Abstract

Background: The higher education system is undergoing a significant transformation, shifting from its traditional role of knowledge production to embracing the concept of entrepreneurial universities. This shift aims to align with global development processes by not only generating knowledge and ideas but also translating them into actionable outcomes. In this article, we explore solutions toward (Third-Generation University) Entrepreneurial Universities and propose policy solutions to facilitate this transition.

Methods: This study adopts a qualitative approach, utilizing an analytical research framework for policy development. The research aims to identify "policy solutions for transforming to third-generation universities by implementing changes in medical education." The study was conducted in three stages: a comprehensive literature review, the Delphi method, and the Policy dialogue (policy discussions) to finalize policy options.

Results: Several solutions were identified, including the development of support models for entrepreneurial activities, structural and organizational reforms, capacity-building for medical sciences universities based on regional needs, and fostering mutual and effective collaboration with industry. Among these, three key policy options were prioritized: (1) Revising and reforming medical education programs, (2) Formulating support models for entrepreneurial activities, and (3) Restructuring the functional framework of universities.

Conclusion: The process of driving change is multi-faceted and time-intensive. To ensure success, changes and innovative approaches should be introduced through educational programs and structured curricula. Implementing effective change models and providing necessary support to students across various medical science disciplines are critical steps in this transformation.

Keywords: Entrepreneurial Universities, Third-Generation University, Medical Sciences, Policy solutions, Stakeholder Analysis

Cite this article as: Mahboubi M, Nasiri T, Taheri Maleki S, Ghorbanniya Delavar M, Rastegarimehr B. From Tradition to Transformation: Policy Solutions for Advancing Medical Education Toward Entrepreneurial Universities. *Med J Islam Repub Iran.* 2026 (25 Feb);40:19. https://doi.org/10.47176/mjiri.40.19

Introduction

Higher education has undergone fundamental transformations in recent decades, particularly in response to societal changes. In today's competitive and knowledge-based world, the emphasis on entrepreneurship has emerged as a significant concern for various educational institutions, including universities globally. It is evident that the higher education system is shifting from its traditional role of merely producing knowledge to becoming entrepreneurial universities, aligning more closely with global development processes (1). This transformation aims not only to generate knowledge and ideas but also to translate them into actionable outcomes.

Throughout the history of universities, these profit or non-profit organizations have experienced tumultuous evolution. Despite differences in methods and activity patterns, they have shared a common principle: addressing

Corresponding author: Dr Taha Nasiri, dr.tahaf5@yahoo.com

1. Department of Public Health, Abadan University of Medical Sciences, Abadan, Iran
2. Research Center for Evidence-Based Health Management, Maragheh University of Medical Sciences, Maragheh, Iran
3. Health Management Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran
4. Department of Health Services Management, Faculty of Health, Baqiyatallah University of Medical Sciences, Tehran, Iran .
5. Department of Pharmacology and Toxicology, Faculty of Pharmacy, Baqiyatallah University of Medical Sciences, Tehran, Iran
6. Student Research Committee, Baqiyatallah University of Medical Sciences, Tehran, Iran

↑What is "already known" in this topic:
Universities of medical sciences are expected to evolve into third-generation or entrepreneurial universities that link education, research, and innovation. However, the policy pathway and governance mechanisms required for this transformation, particularly in developing countries, remain unclear and fragmented.

→What this article adds:
This study integrates evidence from a scoping review, expert Delphi, and policy dialogue to propose context-specific policy solutions for transforming medical education toward third-generation universities in Iran. It highlights the roles of governance flexibility, inter-sectoral collaboration, and innovation ecosystems as strategic levers for sustainable academic transformation.

[DOI: 10.47176/mjiri.40.19]

societal needs through the production of applicable knowledge and its practical application (2, 3). Across different historical periods, distinct types of universities have emerged, gradually giving way to others through paradigm shifts. To date, five generations of universities have been identified: the first generation (medieval), the second, the third, the fourth, and the fifth. Currently, universities in Iran are in a transitional phase, moving towards the establishment of third-generation universities (3).

Historically, universities have evolved from the education phase (first generation) and research phase (second generation) to the entrepreneurship-focused third generation, which is rooted in regionally-based innovation systems and linear economic models. The fourth-generation university is increasingly associated with the discourse surrounding the circular economy, emphasizing social responsibility, regional development, participation, innovation, and academic entrepreneurship (4). The lack of social accountability, absence of democracy and transparency, market abuse, and environmental degradation are notable consequences of this evolution. Fifth-generation universities are characterized by a focus on human development and civilization-building, where individuals express their preferred fields of study, and assessments are conducted to determine their aptitude and capability. This generation aims to shift universities from a quantity-oriented approach (pure degrees: bachelor's, master's, doctoral, and post-doctoral) to a quality-oriented one, emphasizing skilled graduates (5).

The emergence of complex concepts such as the knowledge-based economy (6) and knowledge-driven organizations (7) indicates the development of a new framework within the academic community. Typically, universities act as producers of knowledge, while industries serve as consumers, both relying on each other to achieve specific goals (8). Therefore, universities must transform their missions, leadership, and management, define new financing methods, outline innovative activities, and establish effective models for faculty promotion, all while aligning with the needs of society and industry (9).

The production of wealth from knowledge represents a new paradigm in medical education, with curriculum changes forming its foundation (10, 11). Ghorbani et al. (2021) identified seven main functions essential for innovative and entrepreneurial activities: supportive (financial and non-financial) activities, entrepreneurial education (curriculum and capacity-building for faculty), the creation and provision of applicable knowledge, transitional functions or interactions with elements of the national innovation system (government and industry), fostering an innovative and entrepreneurial culture, and governance aimed at economic growth and development (12). Valero-López et al. identified key elements for creating entrepreneurial universities, including entrepreneurial leadership, curriculum, culture, applied research, and technology transfer (13). Zazouli et al. emphasized the importance of education, research, and the integration of information technology in achieving this type of university (14). Haji-Miri et al. highlighted the role of empowering faculty members and the factors influencing empowerment as crucial for implementing third-generation universities, ultimately presenting a conceptual model in this field (15).

Qasemi et al. focused on empowering faculty members through four themes: problem-based learning, integration of methods, assessment-based education, and PIES in the development of third-generation universities (16).

In Iran, there remains a significant gap in establishing fourth-generation (socially accountable) and fifth-generation (civilization-building) universities. Given the current economic conditions and widespread crises, prioritizing the transition to third-generation universities is essential. Efforts should be directed towards transforming education into a value-creating endeavor that generates wealth for universities and facilitates substantial income generation. In line with the ongoing transformations related to the transition from second to third-generation universities, medical universities in the country are striving to manage this paradigm shift (3). The nature of these transformations, the alignment of upcoming changes with the new missions of universities, and the focus on empowering faculty, students, and staff are critical as they move towards establishing third-generation medical universities. This has prompted managers, planners, and policymakers in medical education to increasingly seek creativity and innovation in the optimal allocation of financial resources and in planning tailored to the environmental and internal needs of universities. The novelty of this research lies in its integrative approach that combines scoping review, Delphi consensus, and policy dialogue to generate actionable policy insights tailored to the context of Iranian medical education.

Methods

Design and Setting

The present study employed a qualitative approach within the framework of a policy research project aimed at identifying policy solutions for advancing towards third-generation universities by implementing changes in the field of medical education. This study employed a qualitative research design within a policy research framework to identify effective policy solutions supporting the transition of medical universities towards third-generation models, focusing on structural, managerial, and educational reforms in medical education. The research was conducted in three sequential phases: a scoping review, the Delphi method, and a policy dialogue session. The study included medical universities in Iran and selected international institutions to incorporate global perspectives.

Participants

Participants in this study included experts and specialists in the fields of management and policy-making within universities and the medical education system. Participants were selected based on their expertise in university management, health system policy-making, and medical education. Inclusion criteria included: holding a PhD or equivalent in management, health policy, economics, or medical education, and a minimum of 10–15 years of executive experience. Participants were involved at different

[DOI: 10.47176/mjiri.40.19]

stages, including expert consultations, Delphi rounds, and policy dialogue sessions.

Data Collection and Analysis

Phase One: Scoping Review

A comprehensive scoping review was undertaken to systematically map the existing evidence and conceptual approaches regarding third-generation universities and educational transformation in the field of medical sciences. The review followed the methodological framework developed by Arksey and O'Malley (2005) and further refined by Levac et al. (2010), encompassing five key stages:

(1) identifying the research question,
(2) identifying relevant studies,
(3) selecting eligible studies,
(4) charting the data, and
(5) collating, summarizing, and reporting the results.

Electronic searches were conducted across Web of Science, Scopus, ScienceDirect, and PubMed databases for publications published between 1980 and 2024. The search strategy combined the following keywords and Boolean operators ("AND," "OR"): "third-generation university," "medical education," "entrepreneurship," "innovation in higher education," and "policy reform."

The initial search yielded 14,473 records. After removing duplicates, 8,355 records remained. Titles and abstracts of 1,000 records were screened, leading to 63 full-text articles assessed for eligibility. Finally, 30 studies met the inclusion criteria and were included in the review. In addition, 11 sources of grey literature, including reports from the World Health Organization (WHO) and the World Bank, were examined to capture relevant policy perspectives (Figure 1).

Inclusion criteria encompassed studies focusing on educational transformation, policy reform, and innovation in higher or medical education, published in English. Data

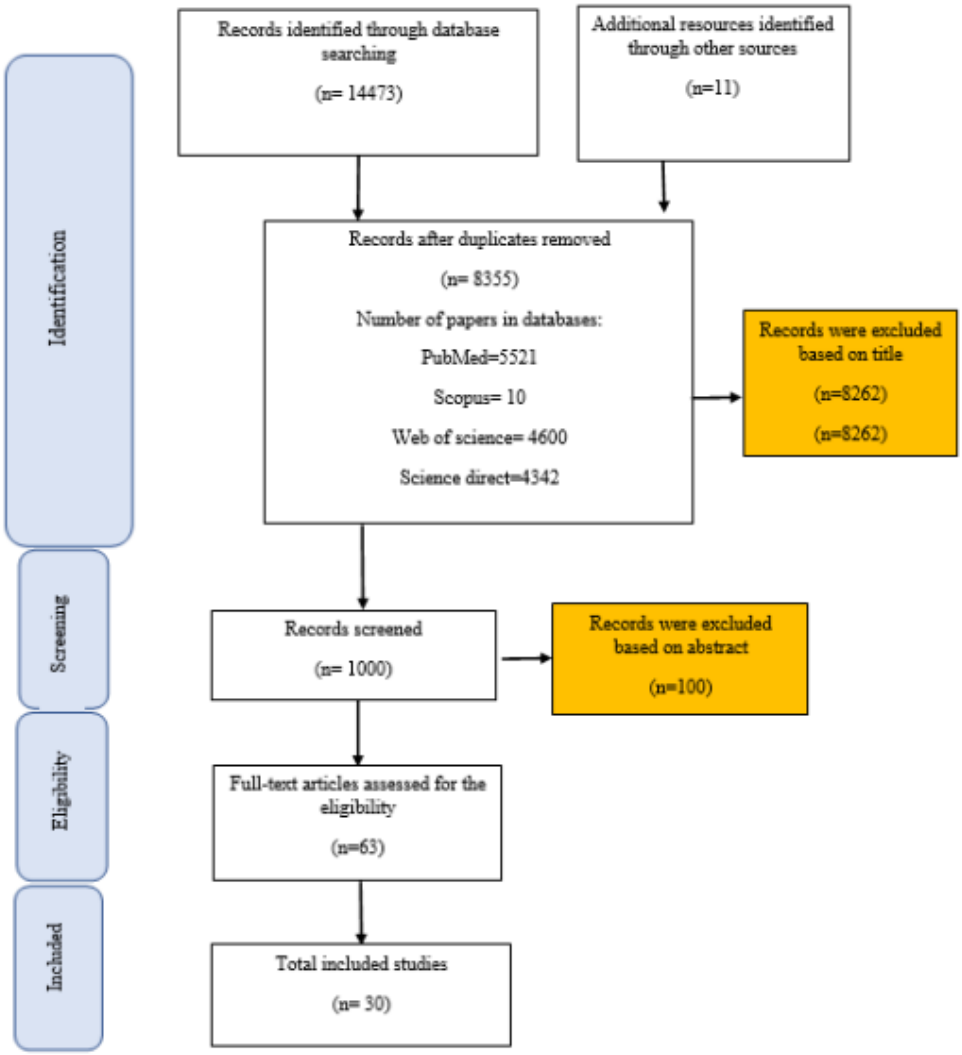

Figure 1. Search strategy

[DOI: 10.47176/mjiri.40.19]

were charted and categorized under four conceptual domains—curriculum reform, governance, entrepreneurship support mechanisms, and structural transformation—and analyzed using qualitative content analysis.

The findings of the scoping review served as the empirical foundation for developing the Delphi questionnaire. They guided the subsequent phases of the study, particularly the identification and prioritization of context-specific policy options.

Phase Two: Delphi Method

In the second phase, the classic Delphi method was employed. This involved selecting a sample of experts, designing a Delphi questionnaire, distributing it to the experts, gathering their insights, calculating the average of their responses, determining the threshold intensity, and refining the proposed indicators (17). A second-round questionnaire was prepared based on the average results from the first round, followed by the collection and analysis of responses in subsequent rounds. The conclusion of these Delphi rounds was regarded as an essential component of the method.

In this phase, a questionnaire was designed and sent to health system experts, aiming to finalize the highest-priority solutions based on the results of the first phase. The experts included individuals holding a PhD in management, economics, health system policy, or medical education, as well as those with at least 15 years of executive experience in health system management and policy-making roles. The designed questionnaire was circulated over two rounds. The first round was fully open-ended, enabling participants to share their insights on the topic. Responses were organized, and duplicate or similar entries were discarded. In the second round, the refined questionnaire from the first stage was redistributed, asking participants to prioritize the identified solutions based on established criteria (cost-effectiveness, feasibility, acceptability) using a Likert scale (1 to 5). Experts rated each option on feasibility, cost-effectiveness, and acceptability using a 5-point Likert scale (1 = very low to 5 = very high). Consensus was defined as 70% or higher agreement (ratings ≥4). Seven participants were involved in this phase (Table 1).

Phase Three: Policy Dialogue

In the third phase, a policy dialogue was organized with experts and senior specialists in university management and medical education policy. Policy dialogue, similar in nature to consensus-building techniques, is a participatory decision-making process widely used in health policy development to foster collective reasoning and evidence-informed debate. Participants were selected purposively based on predefined eligibility criteria, including academic background in management or educational policymaking and a minimum of ten years of executive experience in managerial or policymaking roles within medical universities or the Ministry of Health.

The dialogue followed a structured sequence of activities: (1) preliminary review of policy dimensions and contextual factors, (2) identification and discussion of existing policy gaps and constraints, (3) deliberation on potential policy options and innovative solutions, and (4) synthesis and documentation of agreed-upon recommendations. These stages were flexibly adapted according to the session's objectives and the participants' expertise. At the beginning of the session, a 15-minute presentation was delivered summarizing the results of the previous phases and the proposed strategies for promoting the transition of medical universities toward third-generation (entrepreneurial) models, drawing upon global evidence from health systems. Participants were then invited to discuss the proposed solutions under the theme "Managing Change in Medical Education: Moving toward Third-Generation Universities" and to identify key criteria for prioritizing and evaluating these policy options (18, 19).

The session lasted approximately two hours, during which all discussions were recorded and transcribed verbatim. A total of five experts participated in this phase, whose characteristics are presented in Table 2.

In this study, the Delphi technique and policy dialogue

Table 1. Characteristics of Participants in the Delphi Study

Experience and Academic Background		1	2	3	4	5	6	7
National Policy Maker	Planning	*	*					
	Execution			*	*			*
	Evaluation					*		
University Policy Maker	Planning							
	Execution							
	Evaluation							
Faculty member		*	*	*			*	
Independent Researcher								*

Table 2. Characteristics of Participants in the Policy Dialogue Stage

Experience and Academic Background		1	2	3	4	5
National Policy Maker	Planning execution evaluation	*	*	*	*	
University Policy Maker	Planning execution evaluation	*				
Faculty member		*	*	*	*	*
Independent Researcher						

[DOI: 10.47176/mjiri.40.19]

were applied sequentially, each serving complementary purposes within the research design. The Delphi method aimed to achieve expert consensus on feasible strategies for managing change toward third-generation medical universities through iterative and anonymous feedback that minimized bias. In contrast, the policy dialogue extended this process by validating and contextualizing the proposed options through structured discussions among senior administrators and policymakers. While the Delphi ensured methodological rigor and consensus in identifying strategies, the policy dialogue translated them into actionable, context-sensitive recommendations.

Data were analyzed qualitatively across all three phases using a content analysis approach.

In the scoping review, extracted data were categorized into major conceptual domains, including curriculum reform, governance and leadership, entrepreneurial support mechanisms, and structural transformation.

In the Delphi phase, expert responses were compared and synthesized narratively to identify convergence of viewpoints rather than statistical measures, ensuring conceptual clarity and refinement of priorities.

During the policy dialogue, recorded discussions were analyzed inductively and deductively to extract themes related to feasibility, stakeholder engagement, and implementation challenges. Integration and triangulation of findings from all three phases led to the development of a coherent policy framework for transforming medical universities toward third-generation models. Special attention was devoted to identifying the core attributes of third-generation medical universities, reflecting their evolution into innovative and value-oriented institutions. These attributes highlight the university's overall performance as a value-creating and innovation-driven organization; the active contributions of managers, faculty members, staff, and students in fulfilling the university's entrepreneurial mission; and the establishment of dynamic social interactions that nurture an entrepreneurial and developmental culture within the academic environment. Together, these elements define the strategic and cultural foundations necessary for transforming traditional medical universities into third-generation, innovation-based institutions.

Within this conceptual framework, essential institutional functions—such as fostering innovation, promoting commercial revenue generation, aligning educational programs with market needs, cultivating teamwork and risk-taking, and enhancing adaptive capacity in organizational structures—were identified and defined. During the policy dialogue phase, four operational frameworks—technical, social, political, and financial—were examined to assess the feasibility and sustainability of proposed solutions. Influential factors within each domain were analyzed and synthesized into the final recommendations. Moreover, a review of relevant laws, values, and regulatory frameworks was conducted to assess their impact on policy implementation, emphasizing principles such as integration and cohesion, professionalism, value creation, social accountability, justice, and equitable access to educational opportunities.

A stakeholder analysis was also performed to evaluate the positions, influence, and potential impact of key actors in implementing the proposed policies. Stakeholders' levels of agreement were scored as follows: Strongly Agree = +2, Agree = +1, Neutral = 0, Disagree = –1, Strongly Disagree = –2. Their relative power was rated as Very High = 5, High = 4, Medium = 3, Low = 2, Very Low = 1, No Power = 0. Additionally, the effectiveness and efficiency of stakeholder engagement were assessed using a similar five-point scale (Very High = 5 to No Effectiveness/Efficiency = 0).

This study was derived from a research project with number 1917 that conducted at Abadan University of Medical Sciences and approved by the institutional Ethics Committee (Approval Code: IR.ABADANUMS.REC.1403.104).

Results

Based on the findings from the first phase of internal and external studies, various solutions have been proposed for medical universities in their transition towards third-generation universities, each engaging a specific aspect of medical education in the country (Table 3).

According to the experts, the following solutions were prioritized: the modification and reform of educational programs, the development of supportive models for entrepreneurial activities, and the review of the university's functional structure. Among the points raised by members regarding the key criteria for prioritizing and considering their selected solutions is the fact that currently, only a few universities have changed their missions in this regard, and there are many limitations or confusions regarding decision-making on how to manage these changes among their staff, faculty, and students. It seems that under the current conditions, the Ministry of Health, Treatment, and Medical Education, as the authority on education and health policymakers in the long term, should adopt an approach to create a culture of value creation in medical universities and operationalize it based on the needs of the country's regional areas and social demands. Therefore, the solutions or policy options "modification and reform of medical education programs," "development of supportive models for entrepreneurial activities," and "review of the university's functional structure" were selected, which will be elaborated on below(Table 4).

Executive Considerations in Implementing Policies

Specific criteria for the feasibility of these solutions have been outlined to assist educational policymakers in the country.

Laws and Values

Medical universities play a crucial role in implementing directives from the Ministry and must consider the following values and laws that influence their transition towards third-generation universities (Table 5):

1. *Cohesion:* Effective informal communications, council decision-making, and external organizational alliances.

2. *Professionalism:* Efficient management, competence-based appointments, and appropriate faculty recruitment.

[DOI: 10.47176/mjiri.40.19]

Table 3. Identified Solutions from Studies to Move Towards the Third Generation University

Reforming the Medical Education Curriculum	Organizational, Structural, and Functional Review of the University
Empowering medical universities based on the needs of planning areas	Emphasis on mutual and effective cooperation with industry
Developing models to support entrepreneurial activities	University investment in the idea of knowledge-based companies
Creating a culture and teaching business startup methods	Introducing successful models in the field of entrepreneurship

Table 4. Prioritized Solutions for Transforming to Third-Generation Universities

Solution	Overview	Components	Proposed Actions	Strengths	Limitations
1. Reforming the Medical Education Curriculum	Central to creating a culture of value in medical education is outlining structure, methods, and assessment.	- Organization of content and delivery methods. - Integration of faculty, students, resources, and facilities. - Alignment with entrepreneurial mission.	- Review and reform educational programs in medical sciences. - Offer courses to develop creativity and cognitive skills. - Increase extracurricular activities for teamwork. - Provide value-oriented internships. - Establish entrepreneurial metrics in assessments.	- Modernizes methods to meet community needs. - Produces problem-solvers and team players. - Accelerates entrepreneurship through structured programs. - Integrates entrepreneurial skills with theory.	- Risk of curriculum formulation errors. - Lack of expertise to identify changes. - Resistance to reforms. - Fragmented and politicized perspectives. - Disconnect between components and service delivery.
2. Development of Supportive Models for Entrepreneurial Activities	Creates a framework to foster entrepreneurship, a hallmark of third-generation universities.	- Promotion of Entrepreneurial Culture: Raise awareness and research innovation. - Support for Entrepreneurship: Monitor outcomes and develop business plans. - Support for Start-ups: Provide financial resources and incubators. - Support for Development: Facilitate access to technology and services.	- Raise awareness and research innovative entrepreneurship. - Monitor outcomes and analyze market opportunities. - Develop business plans and provide vocational training. - Offer seed capital and establish incubators. - Monitor business growth activities.	- Clear model with supportive packages for business. - Institutionalizes entrepreneurial characteristics. - Motivates emulation of successful entrepreneurs. - Improves resource allocation and process comprehensiveness.	- Risk of biases and personal interests. - Potential misalignment with entrepreneurial needs. - Possibility of misuse for financial aid. - Need for continuous feedback and updates.
3. Organizational, Structural, and Functional Review of the University	Regulates relationships between knowledge, industry, and government while adapting to new missions.	- Organizational Changes: Establish leadership and diversify financial resources. - Structural Changes: Create tech-focused units and develop infrastructure. - Functional Changes: Enhance entrepreneurship performance and interdisciplinarity.	- Establish strong leadership and define strategic vision. - Diversify financial resources to reduce reliance on government funding. - Create units focused on technology and innovation. - Enhance performance in entrepreneurship.	- Aligns members with new organizational conditions. - Enhances decision-making through shared governance. - Facilitates capacity building and operational efficiency.	- Complexity may lead to increased task multiplicity. - Resistance from students to traditional structures. - Potential displacement of roles and decision-making power.

3. Value Creation

4. *Social Accountability:* Education tailored to the needs of the target community.

5. Justice

6. Equal Access to Educational Services

7. *Relevant Laws:* Territorial planning documents, transformation packages in medical education, and faculty promotion laws.

Feasibility/Applicability Considerations

1. Technical Feasibility

- *Assessment of existing technology:* Evaluate whether the current technological infrastructure supports the implementation of the proposed solutions.
- *Skill requirements:* Determine if the necessary skills and expertise are available among staff and stakeholders.

2. Social Feasibility

- *Stakeholder engagement:* Analyze the willingness of faculty, students, and the community to embrace the changes.
- *Cultural alignment:* Assess whether the proposed solutions align with the prevailing culture and values within the university and the surrounding community.

3. Policy Feasibility

- *Regulatory compliance:* Ensure that the proposed solutions comply with existing laws and regulations.
- *Support from governing bodies:* Evaluate the level of support from relevant authorities and policymakers for implementing these solutions.

4. Financial Feasibility

- *Budget availability:* Assess whether there are sufficient financial resources allocated to support the implementation.

[DOI: 10.47176/mjiri.40.19]

Table 5. Values and Rules Influencing the Transition to Third-Generation Universities

Solution	Reforming the Medical Education Curriculum	Developing models to support entrepreneurial activities	Organizational, Structural, and Functional Review of the University
Value Creation	++	++	++
Social Accountability	+	+	++
Justice	-	++	++
Equal Access	+	+	++
Cohesion	+	-	+
Professionalism	++	+	++
Territorial Planning Document	+	++	+
Transformation Packages in Medical Education	+	+	++
Faculty Promotion Law	++	++	++

Guide: Effective (+ and ++) / Ineffective (- and --)

Table 6. Implementation considerations for the proposed solutions

Solution Metrics	Organizational, Structural, and Functional Review of the University	Developing models to support entrepreneurial activities	Reforming the Medical Education Curriculum
Technical Feasibility	Paying attention to the position and role of individuals in the organization and the physical structure	Attention to the type of entrepreneurial activities and processes, and the necessary platforms for their formation and development	Attention to system goals, student needs, and educational infrastructure
Social Feasibility	Paying attention to organizational culture and social teachings	Attention to the demands of entrepreneurs and support based on social feedback	Attention to community and regional needs Reforms are planned/motivational, and not prescriptive
Policy Feasibility	Political acceptance of organizational agility and reviewing positions based on the new mission	Policy focuses on supporting need-based, growing, and fast-returning entrepreneurs	Policymakers' interest in educational changes by developing education-oriented packages and plans
Financial Feasibility	Costly / Possibility of misuse of resources	Costly / Potential waste of resources	Low cost

• *Cost-benefit analysis:* Conduct an analysis to determine the potential return on investment and long-term sustainability of the proposed solutions (Table 6).

Stakeholder Analysis (P4 Model)

1. Political Stakeholders/Players

• Individuals and groups affected by the policy or those who can impact the policy.

2. Position

• *Support for Policy:* Indicates whether the stakeholder supports or opposes the policy.

• *Impact Assessment:* Evaluates the level of benefit or detriment the stakeholder perceives from the policy, including their willingness to allocate resources to promote or oppose it.

3. Perception

• *Public Understanding:* How the stakeholder defines the problem, proposed solutions, and the material and symbolic consequences for themselves and others.

• *Framing of Issues:* The narrative or context in which the policy is presented to the stakeholder.

4. Power

• *Relative Power:* The stakeholder's influence in the political arena based on their political interests and resources.

• *Ability to Mobilize:* The capacity of the stakeholder to rally support or opposition around the policy (Table 7).

Effectiveness and Efficiency Analysis

To analyze the effectiveness and efficiency of the proposed solutions, we can create a structured table that evaluates each solution based on specific criteria. Here's a

Table 7. Stakeholder Analysis for Policy Solutions

Stakeholder	Reforming Curriculum	Supportive Models	Structural Review
Ministry of Health, Medical Education	Supportive	Supportive	Supportive
University of Medical Sciences	Supportive	Supportive	Supportive
Professors	Neutral	Supportive	Neutral
Students	Supportive	Supportive	Neutral
Social Economy (Market & Industry)	Supportive	Neutral	Neutral

Table 8. Effectiveness and Efficiency Analysis of Policy Solutions

Policy Solution	Effectiveness (1-5)	Efficiency (1-5)	Comments
Reforming the Medical Education Curriculum	4	5	High effectiveness in aligning education with entrepreneurial goals.
Developing Supportive Models for Entrepreneurial Activities	4	4	Effective in fostering entrepreneurship, but requires significant resources.
Organizational, Structural, and Functional Review of the University	3	4	Moderate effectiveness due to potential resistance to structural changes.

[DOI: 10.47176/mjiri.40.19]

suggested framework for your analysis (Table 8).

Discussion

As part of the transformation and innovation packages in medical sciences, the "Roadmap for Moving Towards Third Generation Universities" and the "Action Plan for Medical Universities to Transition to Third Generation Universities" have been implemented (20-22). Additionally, the vision for medical universities emphasizes that beyond current efforts in training human resources to address the community's health and treatment needs, universities should extend their activities toward the third generation of universities, defining new horizons in entrepreneurship, introducing modern professions, and creating wealth.

According to the Fifth Development Plan (1394-1390), the policies and actions of universities to resolve national issues have been underscored. One of the essential components of this approach is the expansion of university growth centers and knowledge-based companies, recognized as vital infrastructures within third-generation universities. Habibi Razavi, Kioha, and Mirzaei, along with their colleagues, have highlighted the importance of creating supportive facilities and connections in the transition to third-generation universities (23-25). In an article titled "Realizing Third Generation Universities Through the Development of University Growth Centers," Habibi Razavi and colleagues point to the invaluable role of these centers in increasing the survival chances of startups and small and medium-sized enterprises over the past two decades. These centers contribute to the quality enhancement of startups by providing workspaces, facilities, and support services, ultimately boosting their success. Additionally, the characteristics of third-generation universities and the creation of appropriate supportive frameworks for utilizing growth centers within these universities have been explored (23).

On the other hand, Ismaili and colleagues have referred to presenting a comprehensive model of a curriculum similar to the findings here. The results of this study indicate that an international curricular program encompassing all necessary and effective criteria for supporting the third-generation university model should be introduced (26).

Furthermore, integrating an international perspective provides a broader understanding of how different higher education systems have approached the transition toward third-generation universities. Comparative analyses from countries such as Finland, the Netherlands, and South Korea highlight key enabling factors—such as innovation ecosystems, flexible governance structures, and academic–industry collaboration—that can inform the adaptation of these models within Iran's medical education context.

Kioha, Mohammadi, and their colleagues emphasize the importance of structural changes in the move toward third-generation universities (23, 27). Mohammadi and colleagues outline the dimensions of structural changes in universities moving towards health sciences universities, which include composition, professionalism, complexity, independence, and formality. As stated in this study, creating changes in the higher education system of the country requires attention to composition, independence, and professionalism to establish an entrepreneurial university with a creative and encouraging atmosphere (2). Attention to structural changes in moving towards value-creating universities is one of the important points in this approach.

The findings of Moradi and colleagues, after various examinations, indicate two main categories of internal and external university components. Within the internal factors category, similar to our findings and reviews, various elements, including administrative systems, organizational structure, organizational leadership, and entrepreneurial culture, have been emphasized. Finally, the mentioned study describes the concept of university entrepreneurship arising from the theory of the entrepreneurial organization and its required structure (27).

Additionally, attention to and provision of financial and non-financial resources for research and development, as one of the pillars of sustainable development, necessitate that medical universities increasingly focus their efforts on converting knowledge into wealth-generating technologies based on scientific research by adopting the necessary policies. It is also essential to empower the university's human resources to facilitate this shift in approach. This requires leveraging successful global models and localizing them for the faculty, staff, and students of medical universities. A closer examination of this matter reveals that to move toward the third generation and entrepreneurial universities, a culture of value creation must be embedded within the university, and capable, creative, and innovative human resources must be utilized.

It is also crucial to note that empowering human resources in today's competitive world of organizations depends on the attitudes and perspectives of the organization's top managers. A study by Fazel and colleagues assesses the empowerment of university human resources with respect to establishing third and fourth-generation universities, categorizing it into individual and organizational aspects. The individual characteristics of focus include knowledge, motivation, skills, confidence, creativity, and satisfaction, while organizational components refer to leadership and management actions, recognition, compensation, and so on. These aspects also apply to our study, highlighting the importance and impact of necessary human resource characteristics in progressing toward the third-generation university (27).

Ultimately, one can say that a value-creating medical university has a structure and individuals who create value, as well as dynamic connections with its environment. In this regard, the university structure should be reevaluated and progress toward flexibility, and the university's human resources—including faculty, staff, and students—should embrace an entrepreneurial, creative, and transformative spirit, seeking to establish new connections within various environments inside and outside the university. Moreover, valuable activities and initiatives based on the capabilities of young and talented students, guided by active and entrepreneurial faculty members, have already taken place. Among the measures that can institutionalize these processes broadly across medical universities through educational program development are creat-

[DOI: 10.47176/mjiri.40.19]

ing an entrepreneurial culture and orientation among faculty and students, establishing university startups and spin-offs, founding science and technology parks, growth centers, accelerators, and incubators, and making research in this field practical. These findings are consistent with international evidence emphasizing that successful transformation toward third-generation universities depends on dynamic university–industry collaboration and supportive innovation ecosystems. However, unlike many Western models, the Iranian context requires adaptation of these principles to the cultural, organizational, and policy structures of medical universities.

Conclusion

The transition from traditional to entrepreneurial universities, particularly in medical education, represents a significant shift in the higher education landscape. This transformation is essential for aligning universities with global development processes, fostering innovation, and translating knowledge into actionable outcomes that benefit society. The findings of this study highlight the importance of revising medical education programs, developing supportive models for entrepreneurial activities, and restructuring the functional framework of universities to facilitate this transition. The proposed solutions emphasize the need for a holistic approach that integrates curriculum reform, capacity-building, and collaboration with industry. By fostering an entrepreneurial culture, universities can empower students and faculty to engage in value-creating activities, ultimately contributing to economic growth and societal development. However, the implementation of these changes requires careful consideration of technical, social, policy, and financial feasibility, as well as the active involvement of stakeholders at all levels. The journey towards third-generation universities is complex and time-intensive, requiring continuous evaluation, adaptation, and support. It is crucial for policymakers, university leaders, and educators to work collaboratively to overcome challenges and ensure the successful adoption of entrepreneurial practices. By embedding a culture of innovation and entrepreneurship within medical education, universities can not only enhance their relevance in a rapidly changing world but also play a pivotal role in addressing pressing societal needs. The proposed policy framework, while tailored to Iran's medical education system, also contributes to the global dialogue on how universities in developing contexts can adopt and adapt third-generation university models.

Acknowledgment

We thank all the dear people who helped us in conducting the research.

Conflict of Interests

The authors declare that they have no competing interests.

Authors' Contributions

T.N, M.M, B.RM conceptualized and designed the study, S.T,M.Y,M.G. collected the data, T.N,S.T. , M.M, B.RM analyzed the data; and T.N. wrote the main manuscript text. The authors have met the criteria for authorship and had a role in preparing the manuscript. Also, the authors approved the final manuscript.

Ethical Considerations

This article is taken from a research project of Abadan University of Medical Sciences with ethical code (IR.ABADANUMS.REC.1403.104 (.

Funding Support

N/A.

Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

AI Use Statement

In this article no artificial intelligence has been used.

References

1. Sterman J. Instructor's manual to accompany business dyanmics: systems thinking and modeling for a complex world. 2000: McGraw-Hill.
2. Norouzi K, Mohammadi M, Azadi Ahmadabadi J. Discover and prioritize the factors affecting the structure of the entrepreneurial university: the Proposal for success in the university's third generation tasks. Roshd-e-Fanavari. 2017;4(52):8.
3. Hakak M, Hozni S, Shah Siyah N. Third Generation University is an indispensable necessity for health education. J Med Educ Dev. 2018. 13(2): p. 161-163.
4. Pyka A. Innovation networks in economics: from the incentive-based to the knowledge-based approaches. Eur J Innov Manag. 2002;5(3):152-163.
5. Albert M, Picq T. Knowledge-based organizations: perspectives from San Francisco Bay area companies. Eur J Innov Manag. 2004;7(3):169-177.
6. Iakovleva T, Kolvereid L, Stephan U. Entrepreneurial intentions in developing and developed countries. Education+ training. 2011;53(5):353-370.
7. Zemsky R, Duderstadt JJ. Reinventing the research university: An American perspective. Reinvent Res Univ. 2004:15-28.
8. Raeisoon M, Abbaspour A, Rahimian H, Khorsandi Taskoh A, Borzoian Shirvan S. An exploration of the organizational structure components of universities of medical sciences in transition to third generation university. Journal of Birjand University of Medical Sciences. 2018;25:1-15.
9. Ramezani SG. The Hybrid Model of Academic Capitalism in Iranian Higher Education: A Complex Interplay of Neoliberal and State-Controlled Practices. Higher Education Policy. 2024:1-28.
10. Mikelsone E, Liela E. Idea management and organisational effectiveness: A research gap. J Bus Manag. 2017;12.
11. Ghorbani AA, Sohrabi Z, Yazdani sh Khalili Azandehi S. Towards the third generation universities: The core innovative function approach. Med J Islam Repub Iran. 2021;35:32.
12. Valera-Loza DH, Junco JGD, and Palacios-Florencio B. Conceptual model about the entrepreneurial university: design and validation with the PLS methodology. An. Acad. Bras. Cienc, 2021;93:e20200494.
13. Zazoly AZ, Bigdeli S, Sohrabi Z. The viewpoints of medical sciences wealth creators regarding the wealth creation strategies and path in medical sciences universities. J Educ Health Promot. 2022;11(1):131.
14. Hajimiri K, Moradi M, Hosseini E, Jafari M, Nasehi L. A conceptual model for empowering faculty members of third-generation universities of medical sciences. J Taibah Univ Med Sci. 2023;18(2):371-382.
15. Ghasemi S, Bazrafkan L, Shojaei A, Rakhshani T, Shokrpour N. Faculty development strategies to empower university teachers by

[DOI: 10.47176/mjiri.40.19]

their educational role: A qualitative study on the faculty members and students' experiences at Iranian universities of medical sciences. BMC Med Educ. 2023;23(1):260.
16. Campos JE, Syquia JL. Managing the politics of reform: overhauling the legal infrastructure of public procurement in the Philippines. Vol. 70. 2005: World Bank Publications.
17. Organization WH. Report of the 15th FAO/WHO Joint Meeting on Pesticide Management: Rome, Italy and online, 15–18 November 2022. 2023: Food & Agriculture Org.
18. Atherton CR, Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes. By André L. Delbecq, Andrew H. Van de Ven, and David H. Gustafson. Glenview, Ill.: Scott, Foresman & Co., 1975. 174 pp. $4.75 paper and Interpersonal Conflict Resolution. By Alan C. Filley. 1976, Oxford University Press.
19. Ghaffari R, Amini A, Yazdani Sh, Alizadeh M, Salek Ranjbarzadeh F. Comparative study: curriculum of undergraduate medical education in Iran and in a selected number of the world's renowned medical schools. Iran J Med Educ. 2012;11(7):819-831.
20. Ansari H, Talebi B. Evaluation Strategies of Iran's Medical Education Policies. R&D Med Educ. 2023;12(1):11-11.
21. Ghorbani AA , Sohrabi Z, Yazdani S, Khalili Azandehi S. Structural requirements of the third-generation university: The case of medical sciences universities in Iran. Adv Med Educ Pract. 2020:63-70.
22. Habibi-Rezaei M, Siahmansouri Y. The Substantiation of Entrepreneurship Universities through Activities of University Incubators. Science Cultiv. 2012;3(1):43-49.
23. Keykha A. Recreating the Entrepreneurship Ecosystem Model of Third Generation University (Case Study: University of Tehran). Journal of Research on Management of Teaching in Marine Sciences. 2021;8(1):124-143.
24. Mirzaie Z, Soltani A, Motaharinezhad H. Explaining the characteristics of the third generation university and examining their achievement in Iranian higher education: Shahid Bahonar University of Kerman case. Quarterly J Res Plan H Educ. 2023;24(3):77-106.
25. Roshan M, Pirbabaei MT, Keynejad MA. An Introduction to the Entrepreneurial Approach in Contemporary Architecture in Iran (With a Focus on the Problems and Challenges of Architecture as Opportunities for Architectural Entrepreneurship). The Monthly Scientific Journal of Bagh-e Nazar. 2024;21(134):67-84.
26. Zahir AT, Hasanmoradi N. Developing entrepreneurial university model. J Futures Stud. 2006;18(69):31-40.
27. Fazel A, Kamalian A, Rowshan A. Identification of effective dimensions and components on academic human resources empowerment, emphasizing the third and fourth generation of universities with fuzzy delphi approach: presenting a conceptual model. Educ Strateg Med Sci. 2017;10(6):455-468.

[DOI: 10.47176/mjiri.40.19]