

Analysis of the Health Entrepreneurship Ecosystem in Iran: Opportunities, Challenges, and Development Strategies

Abolghasem Arabion^{1,*} - Davood Ghorbani² – Hossein Moein Jahromi³

¹ Associate Professor, School of Entrepreneurship, University of Tehran

Arabion@ut.ac.ir

² PhD Student in Entrepreneurship Management, University of Tehran

d.ghobani@ut.ac.ir

³ PhD Student in Entrepreneurship Management, University of Tehran

Hosseinmoein@ut.ac.ir

ABSTRACT

The health entrepreneurship ecosystem in Iran has experienced notable growth in recent years, driven by increasing demand for innovative health services, the expansion of digital health technologies, and the rise of knowledge-based companies. Despite this progress, the ecosystem continues to face significant structural and regulatory challenges that limit its full potential. This study aims to provide a comprehensive analysis of the current state of Iran's health entrepreneurship ecosystem by identifying its key opportunities, major obstacles, and strategic pathways for development. Using a combination of literature review, ecosystem analysis frameworks, and expert insights, the research highlights several critical opportunities—including a highly educated workforce, growing interest in digital health solutions, and supportive national policies. At the same time, it identifies persistent challenges such as fragmented regulations, limited access to venture capital, insufficient data infrastructure, and weak collaboration among major stakeholders. The findings underscore the need for integrated policy reform, improved regulatory clarity, enhanced financial mechanisms, and strengthened collaboration between universities, industry, and government. The study concludes by proposing targeted strategies to foster innovation, improve market readiness, and accelerate sustainable growth within Iran's health entrepreneurship ecosystem.

Keywords: Digital health; Health technology innovation; Health startups; Innovation ecosystems; Telehealth; Health data infrastructure; HealthTech entrepreneurship; Technological adoption in healthcare; e-health development; Emerging health technologies

1. INTRODUCTION

Entrepreneurship has become a critical driver of innovation, economic growth, and structural transformation in health systems worldwide. As healthcare challenges become increasingly complex—ranging from rising chronic diseases to escalating service delivery costs—traditional models of healthcare provision struggle to meet the accelerating demand for accessible, high-quality, and cost-effective services. In this context, health entrepreneurship has emerged as a dynamic mechanism for generating novel solutions, integrating digital technologies, and advancing patient-centered models of care. The global shift toward digital health, artificial intelligence, telemedicine, and data-driven services has further accelerated the need for robust entrepreneurial ecosystems capable of supporting innovation across clinical, technological, and managerial domains.

In Iran, the health sector holds significant strategic importance due to its large population, strong medical education infrastructure, and increasing emphasis on knowledge-based economic development. Over the past decade, the country has witnessed a noticeable expansion of health-related startups, innovation hubs, and accelerators, particularly in areas such as telehealth,

electronic health records, health analytics, and smart medical devices. National policies promoting digital transformation and supporting knowledge-based companies have also contributed to an emerging foundation for entrepreneurial activity in the health domain. Despite these advancements, however, Iran's health entrepreneurship ecosystem remains underdeveloped compared to global benchmarks, facing regulatory complexity, fragmented institutional structures, capital constraints, limited data accessibility, and cultural barriers to technology adoption.

An entrepreneurial ecosystem functions as a network of interconnected actors—including entrepreneurs, universities, investors, regulatory bodies, healthcare organizations, and support institutions—whose interactions determine the success and sustainability of entrepreneurial ventures. Understanding the strengths and weaknesses of this ecosystem is therefore essential for designing effective interventions and enabling health innovations to scale. While various studies have explored Iran's broader entrepreneurship environment, comprehensive analyses specifically focused on the health sector remain limited. This gap is particularly important given the sector's unique regulatory requirements, ethical considerations, and critical role in societal well-being.

This study seeks to fill this gap by conducting a comprehensive analysis of the health entrepreneurship ecosystem in Iran, identifying its key opportunities, major challenges, and potential strategies for sustainable development. Through a review of existing literature, examination of ecosystem components, and integration of expert perspectives, the research provides insights into how policy, finance, technology, and institutional dynamics shape entrepreneurial activity in the health sector. The findings aim to support policymakers, health technology entrepreneurs, investors, and innovation leaders in strengthening the ecosystem and fostering a more conducive environment for health sector innovation.

The remainder of the paper is structured as follows: Section 2 provides a review of the theoretical foundations and international perspectives on health entrepreneurship ecosystems. Section 3 outlines the methodological approach used in this study. Section 4 presents the findings related to the opportunities and challenges within Iran's ecosystem. Section 5 discusses these findings in the context of broader development trends. Finally, Section 6 proposes practical strategies for enhancing ecosystem performance and concludes the study.

2. LITERATURE REVIEW

The entrepreneurship ecosystem has emerged as a fundamental framework for understanding how innovation develops within specific sectors, including healthcare. This section reviews the key theoretical foundations of entrepreneurial ecosystems, examines global trends in health entrepreneurship, and explores existing research on the development of Iran's health innovation environment.

2.1 Theoretical Foundations of Entrepreneurial Ecosystems

The concept of the entrepreneurial ecosystem was introduced to describe the complex set of interdependent actors, institutions, and environmental conditions that support or hinder entrepreneurial activity. Isenberg (2010) conceptualizes ecosystems as comprising six critical domains: policy, finance, culture, supports, human capital, and markets. Similarly, Stam (2015) emphasizes the importance of framework conditions—such as infrastructure and institutions—alongside systemic conditions including networks, leadership, and talent.

Across these frameworks, ecosystems are understood as dynamic rather than static structures, shaped by continuous interactions among stakeholders. Key factors influencing ecosystem performance include regulatory clarity, availability of risk capital, quality of entrepreneurial education, and the presence of

supportive intermediaries such as incubators and accelerators. These theoretical models provide an analytical foundation for assessing the health entrepreneurship ecosystem in Iran.

2.2 Health Entrepreneurship and Innovation

Health entrepreneurship refers to the creation of novel products, services, or business models that improve healthcare delivery, enhance patient outcomes, or reduce system inefficiencies. The global health sector has undergone rapid transformation due to technological advancements in digital health, artificial intelligence, telemedicine, mobile health applications, remote monitoring, and data analytics. These innovations are reshaping traditional healthcare systems by increasing accessibility, enhancing decision-making, and enabling personalized care.

Several studies highlight that health entrepreneurship is characterized by unique challenges compared to other industries. These challenges include strict regulatory requirements, ethical considerations, clinical validation needs, and high market entry barriers. Therefore, a strong ecosystem is essential for reducing uncertainty and enabling entrepreneurs to navigate the complexities of health markets.

2.3 Global Health Innovation Ecosystems

Countries such as the United States, Finland, Singapore, Israel, and Australia have developed robust health innovation ecosystems supported by integrated policies, strong university-industry collaboration, and well-established digital health infrastructures. Common characteristics of high-performing ecosystems include:

clear and supportive regulatory frameworks
high levels of public and private investment
advanced data governance and interoperability standards
active participation by hospitals, insurers, and research institutions
innovation clusters and specialized accelerators
International experiences demonstrate that successful ecosystems rely heavily on collaboration, knowledge exchange, and coordinated governance—elements that are often underdeveloped in emerging economies.

2.4 Health Entrepreneurship in Iran

In Iran, interest in digital health and health entrepreneurship has grown significantly over the past decade. Research indicates rising activities in areas such as telemedicine, electronic health records, consumer health apps, and smart medical devices. The growth of knowledge-based companies, technology parks, and specialized accelerators has contributed to early ecosystem development.

However, the literature also identifies persistent structural challenges that limit the ecosystem's evolution. These challenges include fragmented regulatory processes, limited integration of health data systems, weak commercialization pathways for academic research, and insufficient venture capital investment. Studies have also noted the gap between universities and industry, limited collaboration among key health actors, and cultural resistance within clinical institutions toward adopting new technologies.

Existing research typically focuses either on general entrepreneurship in Iran or on specific components of the health sector. Comprehensive studies that analyze the health entrepreneurship ecosystem as an integrated structure remain limited, highlighting a need for deeper exploration of its opportunities, challenges, and developmental pathways.

2.5 Summary of the Literature Gap

The review reveals three main gaps in current literature:

Limited holistic ecosystem analysis specifically tailored to the health sector in Iran.
Insufficient examination of interdependencies among regulatory, financial, technological, and institutional components.
Lack of strategy-oriented research that proposes actionable recommendations for ecosystem development.

Addressing these gaps is essential for enabling policymakers, investors, and entrepreneurs to strengthen Iran's health innovation landscape.

3. METHODOLOGY

This study adopts a structured methodology designed to analyze the current state of the health entrepreneurship ecosystem in Iran and identify key opportunities, challenges, and development strategies. Given the complex and multifaceted nature of entrepreneurial ecosystems, a qualitative and exploratory approach was selected to capture the perspectives of diverse stakeholders and to integrate insights from existing literature, policy documents, and expert experiences.

3.1 Research Design

A descriptive–analytical research design was employed, combining qualitative data collection with systematic analysis. This design enables an in-depth examination of ecosystem components, interactions among stakeholders, and contextual factors influencing entrepreneurial activity within the health sector. The research methodology integrates three main elements:

Document and literature review

Semi-structured expert interviews

Ecosystem analysis using thematic coding and a conceptual framework

This triangulated approach enhances the reliability and validity of the findings.

3.2 Data Sources

The study draws on two primary data sources:

3.2.1 Secondary Data

Secondary data were collected through:

peer-reviewed journal articles on entrepreneurship and digital health

policy documents issued by the Ministry of Health, Ministry of ICT, and national innovation bodies

reports from health innovation accelerators, technology parks, and research centers

global benchmarks from countries with advanced health innovation ecosystems

These sources provided foundational insights into ecosystem structure, regulatory environments, and global best practices.

3.2.2 Primary Data

To capture expert perspectives, semi-structured interviews were conducted with key stakeholders in Iran's health entrepreneurship ecosystem. Participants included:

founders and managers of health technology startups

executives from accelerators and innovation hubs

healthcare professionals engaged in innovation

policymakers and regulatory experts

venture capitalists and investors specializing in health technologies

A purposive sampling method was used to ensure representation across various roles within the ecosystem.

3.3 Data Collection Tools

3.3.1 Semi-Structured Interviews

An interview protocol was designed to explore:

actors and components of the ecosystem

perceived opportunities and emerging trends

major regulatory, financial, technological, and cultural challenges

recommendations for ecosystem improvement

Interviews were conducted either in person or via online platforms and typically lasted 30–60 minutes. All interviews were recorded with participant consent and transcribed for analysis.

3.3.2 Document Analysis

Key documents were reviewed using a structured assessment framework to identify recurring patterns, policies, and structural gaps affecting ecosystem performance.

3.4 Data Analysis Approach

A thematic analysis method was employed to analyze both interview transcripts and documentary evidence. The analysis proceeded through the following steps:

Familiarization with data

Initial coding of recurring concepts

Development of categories aligned with ecosystem components (policy, finance, talent, infrastructure, culture, etc.)

Extraction of themes related to opportunities, challenges, and developmental pathways

Cross-validation of themes using multiple data sources

NVivo or similar qualitative analysis software can be used to support coding, though manual coding is equally viable.

3.5 Conceptual Framework

The analysis was guided by entrepreneurial ecosystem frameworks developed by Isenberg (2010) and Stam (2015), adapted to the specific characteristics of the health sector. The framework emphasizes:

regulatory environment

financial resources

human capital and talent

support organizations (accelerators, incubators, technology parks)

knowledge infrastructure (universities, research institutes)

markets and demand

culture and network interaction

This framework ensures a systematic and comprehensive examination of Iran's health entrepreneurship ecosystem.

3.6 Validity and Reliability

To strengthen the trustworthiness of the findings:

Triangulation was achieved by combining interviews, documents, and literature.

Member checking was used by sharing preliminary results with selected participants for feedback.

Inter-coder reliability checks were conducted during thematic development.

Transparency was maintained through detailed documentation of coding and analysis procedures.

3.7 Ethical Considerations

All research procedures complied with ethical guidelines for human subjects research. Participants were informed of the study's purpose, assured of confidentiality, and offered the right to withdraw at any time. Identifiable information was removed during analysis and reporting.

4. RESULTS / FINDINGS

This section presents the findings derived from thematic analysis of interview data, document review, and ecosystem assessment. The results are organized around the major components of the entrepreneurial ecosystem—opportunities, challenges, and key stakeholder dynamics—reflecting patterns that emerged consistently across data sources.

4.1 Overview of the Health Entrepreneurship Ecosystem in Iran

The analysis indicates that Iran's health entrepreneurship ecosystem is in a transitional stage, characterized by growing interest in innovation and digital health, yet constrained by structural and institutional barriers. While several promising health technology startups, accelerators, and innovation centers have emerged, the ecosystem lacks the integrated coordination and regulatory clarity seen in more developed countries.

Stakeholders widely recognize the ecosystem's potential, but they point to significant gaps in financing, data accessibility, and policy alignment. The following subsections detail the most prominent themes.

4.2 Opportunities for Ecosystem Development

4.2.1 Expanding Demand for Digital Health Solutions

Across interviews, stakeholders emphasized a strong and growing demand for telemedicine, remote monitoring, AI-driven diagnostics, mobile health apps, and digital therapeutic tools. This demand is fueled by:

rising prevalence of chronic diseases

increasing digital literacy among patients

national interest in reducing healthcare system costs

Document analysis indicates that national policies also encourage the adoption of digital health tools, particularly in underserved regions.

4.2.2 Strong Human Capital and Medical Expertise

Iran's highly educated workforce—particularly in medicine, engineering, and IT—was repeatedly cited as a significant asset. Interviewees highlighted:

globally competitive medical education

strong academic research output

availability of skilled software developers and engineers

This combination of clinical and technical talent creates a fertile ground for health innovation.

4.2.3 Growing Infrastructure for Innovation

The study found increasing activity in:

university-based innovation centers

health-specific accelerators

technology parks with healthcare programs

knowledge-based companies (KB companies)

These institutions provide mentorship, prototyping facilities, and early-stage support.

4.2.4 Supportive National Policies

Policy analysis shows a rising emphasis on:

knowledge-based economic development

health system digital transformation

encouraging private-sector innovation in healthcare

Although implementation gaps remain, the policy environment signals growing institutional support for entrepreneurship in health.

4.3 Challenges Hindering Ecosystem Performance

Despite existing opportunities, several challenges were consistently identified as major obstacles to ecosystem development.

4.3.1 Fragmented and Unpredictable Regulatory Environment

This was the most frequently cited barrier. Stakeholders described regulation in Iran's health sector as complex, ambiguous, and slow. Issues include:

lack of unified digital health regulations

inconsistent approval processes for health innovations

overlapping responsibilities between regulatory bodies

unclear standards for software-as-a-medical-device (SaMD)

Some founders reported delays of months to years in obtaining necessary licenses.

4.3.2 Limited Availability of Venture Capital for Health Startups

Most investors remain hesitant to fund health startups due to:

long commercialization timelines

high regulatory risk

need for clinical validation and testing

Consequently, many health startups rely on personal funding or small government grants, which restrict growth.

4.3.3 Insufficient Data Infrastructure and Interoperability

Interviewees emphasized the lack of:

standardized health data formats

access to anonymized patient datasets

interoperable systems among hospitals and clinics

APIs for third-party developers

These limitations restrict companies developing AI, analytics, and digital health solutions.

4.3.4 Weak Collaboration Among Key Stakeholders

The ecosystem suffers from low cross-sector collaboration, including:

weak university-industry linkages

limited engagement of hospitals with startups

minimal cooperation between insurance companies and innovators

siloeed activities among government agencies

This fragmentation reduces innovation diffusion and slows adoption of new technologies.

4.3.5 Cultural Resistance and Low Risk Tolerance

Healthcare institutions, especially public hospitals, often exhibit:

resistance to adopting new digital tools

preference for traditional procedures

low willingness to pilot innovative solutions

These cultural challenges create additional barriers for startups seeking early traction.

4.3.6 Operational Barriers for Startups

Founders identified several practical challenges:

difficulty in accessing clinical environments for testing

lack of business development expertise among technical founders

limited awareness among patients about digital health services

high cost of medical device prototyping and certification

4.4 Stakeholder Analysis

The findings highlight differing roles, motivations, and constraints among ecosystem stakeholders.

4.4.1 Government and Regulatory Bodies

Their role is central but characterized by:

inconsistent policies

parallel decision-making structures

slow approval processes

However, recent initiatives in digital transformation provide a foundation for future improvement.

4.4.2 Universities and Research Institutions

Universities emerge as strong sources of:

talent

research output

innovation ideas

Yet, commercialization pathways remain weak, and university-industry collaboration is limited.

4.4.3 Accelerators and Innovation Hubs

These institutions drive early-stage development but face:

limited funding

difficulty connecting startups with hospitals

shortage of experienced mentors in health business models

4.4.4 Investors

Investors are interested but risk-averse, often lacking expertise in evaluating health-related technologies.

4.4.5 Healthcare Providers

Hospitals and clinics express cautious interest, but real engagement remains limited due to operational pressures and resistance to change.

4.4.6 Entrepreneurs and Startups

Entrepreneurs show strong motivation and creativity but lack:

access to capital

regulatory guidance

opportunities for clinical testing

market pathways involving insurers

4.5 Summary of Key Findings

The analysis reveals the following core insights:

Iran has a promising foundation for health entrepreneurship driven by talent, demand, and policy interest.

Significant regulatory, financial, and structural barriers limit ecosystem maturity.

Weak stakeholder collaboration is a central challenge underpinning many other issues.

To scale health innovation, Iran must strengthen coordinated governance, investment mechanisms, data infrastructure, and commercialization pathways.

Conclusion

This study set out to provide a comprehensive analysis of Iran's health entrepreneurship ecosystem by examining its current status, emerging opportunities, structural challenges, and the strategic pathways required for its sustainable development. The findings demonstrate that although Iran possesses significant foundational strengths—including a highly educated workforce, growing digital-health capabilities, and supportive national innovation policies—the ecosystem remains constrained by fragmented regulation, limited access to venture capital, weak data-integration infrastructures, and insufficient collaboration among key stakeholders such as universities, industry players, hospitals, insurers, and government agencies. Globally, high-performing health innovation ecosystems share several defining features: coherent and adaptive regulatory frameworks, strong public-private investment capacity, mature digital-health infrastructures, and robust mechanisms for cross-sector coordination. When benchmarked against these standards, Iran's ecosystem shows substantial potential but also clear structural gaps. The absence of integrated governance mechanisms, unclear regulatory pathways for health-technology ventures, inadequate commercialization pipelines for academic research, and cultural resistance in clinical institutions continue to slow the translation of innovation into scalable market solutions.

Addressing these gaps requires a shift from fragmented, actor-specific interventions toward a more coordinated ecosystem-level approach. Targeted strategies should prioritize regulatory streamlining, the development of interoperable national health-data platforms, increased financial instruments tailored to

health entrepreneurship, and stronger university–industry–government linkages. Empowering specialized accelerators, strengthening digital-health standards, and fostering trust through clear ethical and data-governance policies are essential for enabling sustainable innovation and market growth. Overall, this analysis underscores that Iran stands at a critical inflection point. By implementing coherent policy reforms and institutional mechanisms that align incentives across stakeholders, the country can unlock the full potential of its health-innovation capacity and position itself as a regional leader in digital health and medical technology. Future research should expand on empirical assessments of ecosystem performance, conduct comparative benchmarking with peer countries, and explore sector-specific pathways—such as AI-driven diagnostics, telemedicine, and smart medical devices—to further guide evidence-based policymaking and investment.

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