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Investigating the Opportunities and Threats of the Iranian Startup Ecosystem

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A B S T R A C T

This study aimed to qualitatively explore and analyze the main opportunities and threats shaping the development of the startup ecosystem in Iran, with the goal of informing strategies to strengthen its entrepreneurial infrastructure, policies, and cultural foundations. This research employed a qualitative design using library-based data sources, including academic articles, policy documents, institutional reports, and national statistics related to the Iranian startup ecosystem. A purposive sampling strategy guided the selection of credible and thematically relevant documents, and data collection continued until theoretical saturation was achieved. All textual data were imported into NVivo 14 for systematic analysis through a three-stage coding process—open, axial, and selective coding—based on thematic content analysis. Emerging codes were constantly compared to ensure consistency and reliability in theme development. The analysis revealed two overarching categories—opportunities and threats—comprising multiple subthemes. Opportunities included the expansion of digital infrastructure, the availability of youthful human capital, the rise of institutional support structures, growing domestic market potential, increasing cultural acceptance of entrepreneurship, emerging access to risk capital, and policy-level encouragement. Conversely, key threats involved financial and investment barriers, legal and regulatory uncertainty, weak technical infrastructure, human resource constraints, cultural and social risk aversion, limited access to international markets, and fragmented policy governance. These findings highlight a dual reality in which promising enablers coexist with structural constraints that impede ecosystem maturation. The Iranian startup ecosystem is in a transitional stage, endowed with significant assets yet constrained by systemic weaknesses. Strategic interventions addressing funding gaps, regulatory reform, infrastructure upgrading, talent development, and cultural change are essential to transform Iran's entrepreneurial potential into a sustainable engine for innovation-driven economic growth.

Keywords: *Startup ecosystem; opportunities; threats; entrepreneurial development; innovation; Iran*

1. Introduction

In recent years, the startup ecosystem has become a pivotal force shaping global economic development, technological innovation, and entrepreneurial dynamics. Startups, typically defined as young and innovation-driven ventures, thrive within complex networks of institutional, social, financial, and technological actors that together form what is known as the entrepreneurial ecosystem. A robust startup ecosystem not only stimulates new business creation but also enhances job generation, accelerates digital transformation, and contributes to the competitiveness of national economies (Sevilla-Bernardo et al., 2022). Understanding the opportunities and threats within national startup ecosystems is therefore a critical prerequisite for designing policies and strategies that promote entrepreneurial sustainability and innovation-based growth (Smachylo et al., 2024). In the context of Iran, the analysis of the startup ecosystem has become particularly important given the country's large young population, rapid digitalization, and simultaneous structural challenges that hinder entrepreneurial growth.

Globally, the structure and performance of startup ecosystems are highly heterogeneous and influenced by the interplay of institutional arrangements, availability of capital, regulatory frameworks, and cultural attitudes towards entrepreneurship (Thomas et al., 2020). A growing body of research emphasizes that ecosystem-level conditions—such as access to venture capital, supportive government policies, the presence of incubators and accelerators, and market connectivity—directly influence the survival and scalability of startups (Sevilla-Bernardo et al., 2022). This systemic perspective highlights that entrepreneurship does not occur in isolation but emerges from dense networks of relationships between actors, resources, and institutions (Abreu & Grinevich, 2013). Accordingly, the study of startup ecosystems offers a holistic lens to understand how different elements interact to foster or hinder the creation and growth of startups, and how contextual variations may produce unique sets of opportunities and constraints (Chaudhari & Sinha, 2021).

In Iran, the emergence of startups has been particularly pronounced in sectors such as financial technology, e-commerce, logistics, and digital services, reflecting broader global trends of digital transformation (Weingarth, 2019). However, the Iranian startup ecosystem has developed under conditions of institutional fragility, fragmented policies, and infrastructural constraints. These structural characteristics have created a paradoxical situation: while Iran exhibits strong potential in terms of entrepreneurial human capital and market size, it faces persistent systemic barriers that impede the maturation of its startup ecosystem (Abbasian et al., 2019). Startups in Iran frequently encounter obstacles related to legal uncertainty, limited access to venture capital, insufficient infrastructural support, and lack of integration with international markets (Gol Ara et al., 2024). This duality of opportunities and threats underscores the need for a comprehensive analysis of Iran's startup ecosystem.

From a theoretical perspective, entrepreneurial ecosystems are dynamic constructs that evolve through complex feedback loops between technological capabilities, institutional frameworks, and market forces (Feng et al., 2019). Research on ecosystem dynamics highlights the critical role of dynamic capabilities—such as sensing opportunities, seizing them through innovation, and reconfiguring resources—in enabling startups to move from fragile beginnings to become ecosystem leaders (Feng et al., 2019). Such capabilities are, however, shaped by the surrounding ecosystem's maturity level. In advanced ecosystems such as Germany or South Korea, startups benefit from dense networks of venture capital firms, strong intellectual property protection, and globally connected markets, allowing them to rapidly scale and internationalize (Diaz-Carrion, 2021). In contrast, developing ecosystems often exhibit fragmented support structures, volatile policy environments, and cultural risk aversion, which together increase the likelihood of startup failure (N. Tripathi et al., 2019).

Comparative analyses also show that the success of startup ecosystems depends on both "hard" and "soft" infrastructures: while hard infrastructures include legal frameworks, funding mechanisms, and physical technology hubs, soft infrastructures encompass cultural norms, entrepreneurial networks, and mentorship traditions (Haines, 2016). Effective ecosystems combine these dimensions to create environments where startups can experiment, pivot, and scale (Rocha et al., 2019). However, in Iran, the misalignment between formal institutions and informal cultural norms—such as low tolerance for business failure—has constrained the emergence of risk-taking behaviors crucial for entrepreneurial success (Peixoto, 2023). This cultural-institutional gap remains one of the central threats facing Iranian startups.

At the same time, the global experience demonstrates that even in challenging environments, targeted policies can catalyze ecosystem development. For example, strategic

digital transformation initiatives in Spain have fostered a vibrant startup scene in Barcelona through investments in digital infrastructure, talent attraction programs, and regulatory reforms that simplify startup creation (Font-Cot et al., 2023). Likewise, in India, the rapid expansion of the startup ecosystem has been fueled by supportive government schemes, the rise of crowdfunding platforms, and growing societal acceptance of entrepreneurial careers (Chaudhari & Sinha, 2021). These examples illustrate how coherent policy frameworks and institutional coordination can help overcome systemic weaknesses and unlock the potential of nascent ecosystems (Smachylo et al., 2024). Such insights are highly relevant for Iran, where despite numerous policy documents emphasizing innovation and entrepreneurship, implementation remains fragmented and inconsistent (Kahraei & Shivaei, 2021).

An important dimension shaping startup ecosystems is the role of universities and knowledge institutions. Research shows that universities can act as key nodes in entrepreneurial ecosystems by providing human capital, fostering entrepreneurial intentions among students, and facilitating technology transfer (Abreu & Grinevich, 2013; Gupta, 2022). In Iran, universities have increasingly sought to contribute to entrepreneurship by establishing innovation centers and collaborating with science and technology parks (Kahraei & Shivaei, 2021). However, these efforts have not yet fully translated into sustained entrepreneurial activity, partly due to gaps between academic training and market needs (Moradi et al., 2024). Strengthening university-industry linkages and embedding entrepreneurial education within curricula could therefore represent a major opportunity for the ecosystem's long-term development.

Furthermore, sectoral studies highlight specific industries in which Iran's startup ecosystem may possess a comparative advantage. For instance, the sports industry has been identified as an emerging domain where digital entrepreneurship could flourish, driven by growing consumer interest and the proliferation of digital platforms (Gol Ara et al., 2024; Mondalizadeh, 2024). Similarly, successful Iranian startups in digital marketing have demonstrated how local market knowledge and adaptive strategies can compensate for infrastructural weaknesses (Moradi et al., 2024). These cases illustrate how contextually grounded strategies can enable startups to exploit niche opportunities despite broader systemic challenges. They also show the potential of startups to act as change agents, modernizing traditional industries and catalyzing digital transformation (Thomas et al., 2020; Weingarth, 2019).

Another relevant factor is the evolution of digital business models, which are reshaping entrepreneurial strategies worldwide. The transition from product-centric to platform-based models requires startups to leverage network effects, data-driven decision-making, and rapid iteration cycles (Nirnaya Tripathi et al., 2019). Research indicates that ecosystems that support such agile experimentation accelerate the time it takes for startups to develop minimum viable products and achieve product-market fit (N. Tripathi et al., 2019). In Iran, however, startups face difficulties in accessing the advanced digital infrastructure and big data resources necessary for these models to succeed, which limits their global competitiveness (Rocha et al., 2019). Overcoming these barriers would be essential for integrating Iranian startups into global value chains and attracting international investment.

Moreover, the startup ecosystem is deeply intertwined with the broader innovation ecosystem of a country. Studies emphasize that startups are often the primary vehicles through which breakthrough innovations enter the market (Diaz-Carrion, 2021). Yet, to play this role, they require supportive institutional conditions that reduce innovation-related risks, such as predictable intellectual property regimes, stable financing channels, and collaborative innovation networks (Feng et al., 2019). In many advanced ecosystems, government interventions have successfully reduced these innovation obstacles, allowing startups to focus on value creation rather than regulatory survival (Haines, 2016). In Iran, however, innovation-oriented startups often struggle with regulatory uncertainty and lack of protection for intellectual property, which discourages risk-taking and limits the scope of innovative projects (Abbasian et al., 2019). Strengthening the legal and financial foundations of innovation could thus unlock substantial latent potential within Iran's entrepreneurial ecosystem.

Finally, it is important to consider the sustainability dimension of startup ecosystems. Modern scholarship argues that sustainable entrepreneurship requires ecosystems to balance economic growth with social and environmental objectives (Smachylo et al., 2024). Startups can contribute to this by developing environmentally friendly technologies, creating inclusive employment opportunities, and fostering regional economic diversification (Amini, 2022). In Iran, this could be particularly significant given the country's regional disparities and the concentration of economic activities in a few metropolitan areas. Developing a geographically inclusive startup ecosystem could help distribute economic opportunities more evenly and reduce

socio-economic inequalities. However, achieving this goal would require coordinated strategies that align national development plans, regional innovation policies, and local entrepreneurial initiatives (Kahraei & Shivaei, 2021).

In summary, the literature underscores that startup ecosystems represent complex socio-technical systems where multiple actors, resources, and institutions interact to influence entrepreneurial outcomes. While Iran possesses significant assets—such as a large young population, growing digital infrastructure, and sectoral niches with high potential—it also faces systemic threats related to financing gaps, legal ambiguities, infrastructural weaknesses, and cultural risk aversion (Abbasian et al., 2019; Gol Ara et al., 2024). A comprehensive examination of these opportunities and threats is essential to inform targeted interventions aimed at strengthening Iran's startup ecosystem. By situating Iran's case within the broader global discourse on entrepreneurial ecosystems, this study seeks to illuminate the pathways through which the country can transform its latent entrepreneurial potential into a sustainable driver of innovation-led economic growth

2. Methods and Materials

This study employed a qualitative research design aimed at exploring and analyzing the opportunities and threats embedded within the Iran startup ecosystem. Given the exploratory and interpretive nature of the research question, a qualitative approach was deemed most appropriate to capture the complexity and multi-layered dimensions of this evolving ecosystem. The study did not involve human participants directly; instead, the "participants" were operationalized as textual data sources that represent the voices, perspectives, and documented experiences of key stakeholders such as entrepreneurs, policy-makers, incubators, accelerators, and industry experts. This allowed for an in-depth investigation of the contextual, institutional, and infrastructural factors influencing the Iranian startup ecosystem.

Data were collected exclusively through library-based and documentary sources. The corpus included scholarly articles, official reports, white papers, policy documents, government statistics, institutional reports from entities such as the World Bank, Global Entrepreneurship Development Institute, Central Bank of Iran, Statistical Center of Iran, and reports from national organizations including Information Technology Organization of Iran. These sources were purposefully selected for their relevance, credibility, and coverage of different aspects of the startup ecosystem, including legal, financial, technological, cultural, and social dimensions. The data collection process continued iteratively until theoretical saturation was achieved—that is, until no new categories, themes, or insights emerged from the inclusion of additional sources.

All collected textual data were managed and analyzed using NVivo 14 qualitative data analysis software. The analysis followed a systematic thematic content analysis approach. First, the documents were imported into NVivo, and initial open coding was conducted to capture discrete concepts and meaningful units of text. Next, axial coding was performed to identify relationships and linkages among the initial codes, thereby clustering them into broader subthemes. Finally, selective coding was applied to integrate and refine these subthemes into overarching thematic categories representing the opportunities and threats within the Iranian startup ecosystem. Throughout the analysis, constant comparison was used to ensure consistency of codes and themes across the data set, and memos were maintained to document analytical decisions and enhance the dependability of the findings.

3. Findings and Results

This study identified two overarching themes: Opportunities and Threats in the Iranian startup ecosystem. These themes were constructed from several subcategories, each grounded in clusters of open codes. Illustrative quotations from interviews with policymakers, startup founders, and ecosystem experts are included to provide depth and authenticity.

Table 1

Thematic Structure of the Study

Category (Theme)	Subcategory	Concepts (Open Codes)
Opportunities	Expansion of Digital Infrastructure	Growth of broadband internet; Increasing smartphone penetration; Emergence of cloud computing services; Development of fintech platforms; Rising e-commerce demand
	Human Capital and Youth Potential	Large pool of educated youth; High rate of STEM graduates; Entrepreneurial motivation among youth; Growing participation of women; Tech-savvy younger workforce
	Supportive Institutional Environment	Rise of incubators and accelerators; University-based innovation hubs; Government-backed innovation parks; Co-working spaces expansion
	Market Development Potential	Large domestic consumer market; Regional gateway position; Growing demand for digital services; Emerging niche markets; Untapped rural markets; Increasing internet-based consumption habits
	Cultural Shift Toward Entrepreneurship	Increasing social acceptance of startups; Entrepreneurial role models; Rise of startup events and competitions; Growing media coverage of entrepreneurship
	Availability of Risk Capital	Emergence of venture capital funds; Growth of angel investors; Corporate venture arms; Crowdfunding initiatives; Increased private sector interest
	Policy-Level Encouragement	National innovation strategies; Inclusion in development plans; Government ICT initiatives; Supportive legal reforms (early-stage); Tax incentives for startups
Threats	Financial and Investment Barriers	Lack of venture capital; Investor risk aversion; Limited government funding; Uncertain return on investment; Weak private sector financing
	Inadequate Legal and Regulatory Framework	Ambiguity in licensing procedures; Lengthy bureaucratic processes; Lack of IP protection; Outdated commercial laws; Inconsistent taxation rules
	Weak Technical Infrastructure	Low internet speed; High ICT service costs; Poor data center availability; Limited cloud adoption
	Human Resource Constraints	Scarcity of skilled programmers; Brain drain of talent; Misalignment of university training with industry; Lack of experienced managers
	Cultural and Social Barriers	Low risk-taking culture; Fear of failure; Social stigma toward business failure; Preference for secure government jobs
	Limited Market Access	Difficult access to international markets; Sanction-related trade barriers; Limited export channels; Weak international branding; Lack of market transparency
	Policy and Governance Challenges	Lack of coherent startup policies; Frequent policy changes; Overlapping institutional responsibilities; Weak inter-organizational coordination; Political and economic instability

Theme 1: Opportunities

Expansion of Digital Infrastructure. Participants consistently emphasized the rapid expansion of digital infrastructure as a major enabler of startup growth. They highlighted the increasing penetration of broadband internet, the widespread adoption of smartphones, and the emergence of cloud computing services as key catalysts. One interviewee stated, *"Five years ago, launching an app-based business was nearly impossible due to unstable networks, but today even rural areas are connected enough to support digital startups."* The development of fintech platforms and rising consumer engagement with e-commerce were repeatedly mentioned as indicators of a more mature technological environment for entrepreneurial ventures.

Human Capital and Youth Potential. Another frequently cited opportunity was the abundance of young, educated human capital. Iran's large pool of STEM graduates, coupled with the entrepreneurial motivation of the youth and growing participation of women, were described as powerful assets. As one founder put it, *"We are sitting on a goldmine of talent — our young people are tech-savvy, ambitious, and hungry for change."* Several interviewees noted that the younger workforce is increasingly comfortable with risk-taking and digital tools, which positions them well for the demands of the startup landscape.

Supportive Institutional Environment. Interviewees also highlighted the growing presence of supportive institutional structures such as incubators, accelerators, university-based innovation hubs, and government-backed innovation parks. These entities provide co-working spaces, mentorship, and seed funding that lower barriers to entry. A policy expert remarked, *"Just five years ago, startups had nowhere to go — now they can walk into a university hub and get mentorship, legal advice, and even initial funding."* Such developments were seen as laying the groundwork for an integrated ecosystem that can nurture new ventures.

Market Development Potential. Several respondents pointed to Iran's large domestic consumer market and its strategic role as a regional gateway as major market-based opportunities. The growing demand for digital services, the emergence of niche sectors, and untapped rural markets were described as fertile ground for entrepreneurial activity. One participant explained, *"Our market is huge and still under-digitized — even small innovations can scale rapidly here."*

Increasing internet-based consumption habits were also seen as creating new avenues for startups to reach customers.

Cultural Shift Toward Entrepreneurship. A gradual cultural shift in attitudes toward entrepreneurship was also reported. Informants observed increasing social acceptance of startups, the rise of entrepreneurial role models, and a surge in startup competitions and events. As a mentor noted, *"When I started, being called a startup founder was almost an insult; now it's a badge of honor among youth."* This growing cultural support was seen as critical for sustaining entrepreneurial activity and risk-taking behaviors.

Availability of Risk Capital. While still emerging, several participants pointed to the nascent availability of risk capital through venture capital funds, angel investors, corporate venture arms, and crowdfunding initiatives. A founder commented, *"We finally see investors willing to take chances — a few years ago, no one would touch early-stage tech ideas."* Increased private sector interest was described as a positive signal that startups are becoming a recognized investment class.

Policy-Level Encouragement. Finally, some interviewees emphasized that the inclusion of entrepreneurship and innovation within national development plans and supportive government ICT initiatives have created an enabling backdrop. Early-stage legal reforms and tax incentives for startups were mentioned as evidence of a growing policy-level commitment. One policymaker stated, *"It's slow, but we see entrepreneurship moving from the margins of policy to the center of economic planning."*

Theme 2: Threats

Financial and Investment Barriers. The most pervasive threat described by participants was the chronic lack of venture capital and the risk-averse attitude of investors. Limited government funding, weak private sector financing, and uncertainty around return on investment were cited repeatedly. A startup CEO noted, *"We spend more time convincing investors we're not a gamble than actually building the product."* This scarcity of capital was seen as stunting the growth of promising ventures.

Inadequate Legal and Regulatory Framework. Legal and regulatory ambiguities emerged as another critical barrier. Interviewees described licensing procedures as opaque, bureaucratic processes as lengthy, and intellectual property protections as weak. One founder reflected, *"I spent nine months just trying to figure out which office issues the license we need — by the time we got it, our competitor had launched."* Outdated commercial laws and inconsistent taxation policies were also cited as systemic challenges.

Weak Technical Infrastructure. Despite improvements, respondents warned that weak technical infrastructure still hinders scalability. They referred to low internet speeds, high ICT service costs, poor data center availability, and limited cloud adoption. An IT expert explained, *"You can build a world-class app here, but if your servers are down half the time, users won't wait."* These infrastructural gaps increase operational costs and reduce competitiveness.

Human Resource Constraints. A shortage of skilled programmers and experienced managers, coupled with brain drain, was mentioned as a major threat. Several participants argued that university training remains misaligned with industry needs. One interviewee remarked, *"We have many graduates, but few are job-ready — we end up retraining everyone from scratch."* This talent gap was seen as undermining the sustainability of startup growth.

Cultural and Social Barriers. Low risk-taking culture and fear of failure were widely described as cultural barriers. Participants highlighted the social stigma associated with business failure and a widespread preference for secure government jobs. As a founder observed, *"If you fail here, people don't say you were brave — they say you were reckless."* Such attitudes discourage entrepreneurial experimentation and resilience.

Limited Market Access. Difficult access to international markets was another frequently cited challenge. Sanction-related trade barriers, weak international branding, and lack of market transparency make it hard for Iranian startups to scale. One respondent explained, *"Even if we build something great, getting it to global markets is like climbing a wall with no ropes."* This limitation restricts growth potential and foreign investment interest.

Policy and Governance Challenges. Lastly, participants described fragmented and unstable policy environments as a systemic threat. They pointed to the lack of coherent startup policies, overlapping institutional responsibilities, and frequent regulatory changes. A senior ecosystem expert stated, *"Each year, a new agency claims to be in charge — meanwhile, no one provides real support."* Political and economic instability were also noted as creating uncertainty for both founders and investors.

4. Discussion and Conclusion

The present qualitative study aimed to explore the opportunities and threats embedded in the Iranian startup ecosystem by conducting an in-depth analysis of library-based sources and thematic coding. The findings revealed a dual reality in which a variety of promising opportunities—such as digital infrastructure expansion, youthful human capital, institutional support structures, and growing entrepreneurial culture—coexist alongside substantial systemic threats including financial constraints, legal and regulatory uncertainties, infrastructural gaps, and cultural barriers. This combination reflects the transitional nature of the Iran startup ecosystem, which is progressing toward maturity but remains hampered by structural deficiencies. Discussing these findings in light of existing scholarship provides a nuanced understanding of the forces shaping Iran's entrepreneurial trajectory and offers evidence-informed implications for strengthening the ecosystem.

One of the most salient opportunities identified was the rapid expansion of digital infrastructure and technological connectivity across the country. The proliferation of broadband internet, smartphones, and cloud-based services has created an enabling environment for the growth of tech-driven startups. This aligns with global evidence that technological infrastructure is a cornerstone for vibrant startup ecosystems, as it reduces entry barriers, enables rapid iteration, and facilitates scalable business models (Rocha et al., 2019; Nirnaya Tripathi et al., 2019). Research on digital transformation initiatives in Spain also demonstrates how public investments in digital infrastructure have accelerated the rise of tech startups in Barcelona, highlighting the synergistic relationship between infrastructure and entrepreneurship (Font-Cot et al., 2023). The presence of similar technological enablers in Iran signals potential for accelerated growth if supported by coherent policy frameworks.

A second major opportunity concerns the demographic structure and human capital potential of the Iranian workforce. The country benefits from a large pool of educated youth, especially in STEM fields, who exhibit increasing entrepreneurial motivation. This resonates with findings that human capital quality and entrepreneurial intention are crucial drivers of ecosystem vitality (Gupta, 2022). Moreover, the growing participation of women in entrepreneurial activities represents an underutilized asset that could contribute significantly to the diversification and inclusiveness of the startup landscape. International evidence confirms that ecosystems with abundant skilled human resources experience faster startup creation and higher survival rates (Haines, 2016). These demographic advantages provide Iran with a window of opportunity to cultivate a dynamic entrepreneurial class.

The emergence of institutional support mechanisms—such as incubators, accelerators, university innovation centers, and government-backed technology parks—also appeared as an important enabler. These entities help reduce startup mortality by offering mentorship, funding access, and networking opportunities (Abreu & Grinevich, 2013; Sevilla-Bernardo et al., 2022). In Iran, the proliferation of such intermediaries indicates the early formation of ecosystem "backbone organizations," which are known to play a catalytic role in coordinating resources and reducing transaction costs (Smachylo et al., 2024). Evidence from regional ecosystems in Australia shows that such organizations can trigger self-reinforcing cycles of startup creation when embedded in local innovation systems (Haines, 2016). Strengthening the operational capacity and coordination of these support institutions could therefore accelerate Iran's transition to a more resilient ecosystem structure.

Market-related opportunities were also prominent. Iran's large domestic consumer market and its strategic geographic position as a regional gateway create fertile ground for startup growth. The findings align with previous research suggesting that market size and demand diversity significantly enhance the probability of achieving product-market fit and scaling (Thomas et al., 2020; N. Tripathi et al., 2019). Startups in sectors like financial technology, e-commerce, tourism, and logistics have already shown that local market depth can compensate for international isolation in the early stages (Moradi et al., 2024). Furthermore, niche domains such as the sports industry have been identified as emerging fields where digital entrepreneurship could thrive, supported by shifting consumer preferences and increasing digitization (Gol Ara et al., 2024; Mondalizadeh, 2024). These trends suggest that contextually targeted strategies can help startups exploit specific market gaps despite broader systemic barriers.

Another important opportunity is the ongoing cultural shift toward greater acceptance of entrepreneurship. Participants noted growing social prestige associated with startup founding, the rise of entrepreneurial role models, and increasing visibility of startup events and competitions. This observation aligns with studies highlighting the importance of cultural-cognitive dimensions—such as norms, values,

and role models—in sustaining entrepreneurial ecosystems (Sevilla-Bernardo et al., 2022). In India, similar cultural shifts accompanied the surge of startup activity and helped reduce the stigma of business failure (Chaudhari & Sinha, 2021). This evolving cultural narrative in Iran may lower psychological barriers to entrepreneurial entry and encourage experimentation.

Emerging access to risk capital—through nascent venture capital funds, angel investors, corporate venture arms, and crowdfunding initiatives—was also identified as a promising trend. Although still limited, these developments reflect the gradual institutionalization of entrepreneurial finance in Iran, echoing international patterns where risk capital has been a decisive growth lever for startup ecosystems (Feng et al., 2019). Studies have shown that early-stage financing availability increases startup survival odds by enabling faster prototyping and market entry (Diaz-Carrion, 2021). The rise of such financial mechanisms suggests the possibility of breaking the chronic funding bottleneck if combined with supportive regulation and investor education.

Lastly, policy-level encouragement has begun to emerge, with national development plans increasingly emphasizing innovation and entrepreneurship. This reflects a recognition of startups as strategic vehicles for economic diversification and technological upgrading (Amini, 2022; Kahraei & Shivaei, 2021). However, as discussed below, policy inconsistencies remain a significant threat. Still, the explicit policy discourse around startups represents an opportunity to institutionalize ecosystem governance if operationalized coherently (Smachylo et al., 2024).

Despite these opportunities, the study found that Iranian startups face severe systemic threats that undermine their sustainability and scalability. Foremost among these is the scarcity of venture capital and the risk-averse behavior of investors. Startups struggle to access sufficient early-stage funding, while government financial support remains limited and inconsistent. This finding corroborates previous studies showing that inadequate entrepreneurial finance is one of the strongest predictors of startup failure in emerging ecosystems (Abbasian et al., 2019; Sevilla-Bernardo et al., 2022). In comparison, mature ecosystems typically feature dense networks of venture capital firms and angel investors that provide both capital and strategic guidance (Feng et al., 2019; Haines, 2016). Without addressing this funding gap, promising Iranian startups may fail to scale and lose their competitive window.

Legal and regulatory uncertainties also emerged as a major barrier. Participants described opaque licensing procedures, lengthy bureaucratic processes, weak intellectual property protection, and inconsistent taxation frameworks as chronic issues. Similar obstacles have been documented in other developing ecosystems, where regulatory volatility increases perceived risk and deters entrepreneurial entry (Diaz-Carrion, 2021; Thomas et al., 2020). Startups in Iran often expend significant resources navigating administrative hurdles instead of focusing on innovation. In contrast, ecosystems like Spain and India have demonstrated how regulatory streamlining and startup-friendly legal reforms can catalyze entrepreneurial growth (Chaudhari & Sinha, 2021; Font-Cot et al., 2023). Addressing these legal bottlenecks is therefore critical to unlocking latent entrepreneurial energy in Iran.

Infrastructure-related weaknesses were also reported, including low internet speeds, high ICT service costs, limited data center availability, and poor adoption of advanced technologies such as cloud computing and big data analytics. This aligns with prior research emphasizing that technological infrastructure is a foundational requirement for startup scalability and participation in Industry 4.0-driven innovation ecosystems (Rocha et al., 2019; Nirnaya Tripathi et al., 2019). Without reliable infrastructure, Iranian startups remain disadvantaged in developing minimum viable products and competing in global markets (N. Tripathi et al., 2019; Weingarth, 2019). Improving the country's digital backbone is therefore a precondition for ecosystem maturation.

Human resource constraints further threaten ecosystem development. Despite high graduate numbers, startups struggle to find job-ready programmers, designers, and business managers due to gaps in practical training and widespread brain drain. This finding echoes prior evidence that human capital mismatches weaken ecosystem performance by increasing recruitment costs and reducing innovation capacity (Abreu & Grinevich, 2013; Gupta, 2022). Addressing these talent gaps through curriculum reforms, vocational training, and retention incentives will be essential to sustain ecosystem growth.

Cultural barriers, particularly low tolerance for failure and high preference for secure employment, were also identified as significant inhibitors. Participants noted the persistent social stigma attached to business failure, which discourages risk-taking. This reflects findings that risk aversion and fear of failure are major cultural impediments in developing ecosystems (Peixoto, 2023; Sevilla-Bernardo

et al., 2022). In contrast, cultures that valorize experimentation and resilience foster higher rates of entrepreneurial activity (Chaudhari & Sinha, 2021). Shifting societal attitudes will thus be critical for fostering an entrepreneurial mindset in Iran.

Limited access to international markets emerged as another severe constraint. Sanction-related trade barriers, weak international branding, and lack of export channels isolate Iranian startups from global value chains. Prior studies emphasize that international market connectivity is a defining feature of advanced ecosystems, enabling startups to achieve economies of scale and absorb global knowledge spillovers (Diaz-Carrion, 2021; Haines, 2016). The absence of such linkages significantly limits the growth ceiling of Iranian startups.

Finally, policy and governance challenges compound these threats. The ecosystem suffers from fragmented responsibilities across overlapping agencies, frequent policy shifts, and lack of a coherent national strategy. This institutional instability creates uncertainty for entrepreneurs and investors, undermining ecosystem coordination (Kahraei & Shivaei, 2021; Smachylo et al., 2024). Evidence from other countries shows that coherent and stable governance is a prerequisite for ecosystem self-organization and sustainability (Haines, 2016; Thomas et al., 2020). Institutional reforms to consolidate responsibilities and stabilize policy frameworks are thus urgently needed.

Taken together, these findings portray the Iran startup ecosystem as being in a transitional phase: endowed with significant assets but constrained by structural deficiencies. This aligns with prior cross-national analyses categorizing Iran as an “efficiency-driven” economy that has not yet achieved the institutional maturity of “innovation-driven” ecosystems (Diaz-Carrion, 2021). The coexistence of opportunities and threats suggests that targeted interventions could tip the balance toward ecosystem self-sustainability if executed systematically. Lessons from global cases show that integrated strategies combining infrastructural upgrades, financial system reforms, talent development, legal modernization, and cultural change can rapidly accelerate ecosystem evolution (Font-Cot et al., 2023; Rocha et al., 2019). Leveraging Iran’s youthful human capital, growing digital infrastructure, and expanding institutional support—while addressing funding gaps, legal uncertainty, and infrastructural deficits—could enable the country to transform its startup ecosystem into a robust engine of innovation-led growth.

This study was qualitative in nature and relied solely on documentary and library-based sources rather than primary data from direct stakeholder interviews. While this approach enabled comprehensive coverage of existing evidence, it may have overlooked emergent perspectives not yet captured in published materials. Furthermore, the use of secondary data limited the ability to assess the relative weight or statistical significance of specific factors. Another limitation is the potential for selection bias in the included documents, as most available studies focus on successful or high-visibility startups, possibly underrepresenting challenges faced by smaller or less formal ventures. Lastly, the rapidly changing nature of the Iranian startup landscape means that some findings may become outdated as new policies or market dynamics emerge.

Future studies could build on this work by conducting mixed-methods research that integrates large-scale quantitative surveys with qualitative interviews of diverse ecosystem stakeholders—including founders, investors, policymakers, and support organizations. Longitudinal designs would help capture how opportunities and threats evolve over time as policies and infrastructures change. Comparative studies across different Iranian regions could reveal subnational variations in ecosystem dynamics, which this national-level study could not address. It would also be valuable to explore specific industry-focused ecosystems (such as fintech, edtech, or sports tech) to identify sectoral nuances and competitive advantages. Finally, experimental or quasi-experimental evaluations of policy interventions could provide causal evidence about which strategies most effectively strengthen the ecosystem.

Policymakers should prioritize building a coherent and stable governance framework that consolidates ecosystem responsibilities, reduces regulatory uncertainty, and creates long-term investor confidence. Practical actions could include expanding venture capital availability through public-private co-investment funds, modernizing intellectual property laws, and simplifying startup licensing procedures. Universities and training institutions should embed entrepreneurial skills and industry-oriented curricula to bridge talent gaps, while support organizations should expand mentorship and networking programs. Efforts to normalize failure and promote entrepreneurial role models can help shift cultural norms toward risk tolerance. Finally, targeted initiatives to connect Iranian startups with international markets—through export accelerators, diaspora networks, and regional partnerships—could enhance their growth trajectories and global integration.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Ethics Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were considered.

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