

The role of institutions in knowledge and technology transfer between Iran and neighboring countries

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Article Info	Abstract
<p>Original Article</p> <p>Main Object: Economics Scope: Iran</p> <p>Received: 15 January 2025 Revised: 24 January 2025 Accepted: 26 January 2025 Published online: 24 February 2025</p> <p>Keywords: formal institutions, informal institutions, Iran, knowledge and technology transfer, neighboring countries.</p>	<p>This study investigates the role of formal and informal institutions in facilitating knowledge and technology transfer between Iran and its neighboring countries. As a cornerstone of economic growth and development, knowledge and technology transfer fosters innovation, enhances productivity, and reduces reliance on raw materials. In this context, formal and informal institutions act as critical enablers of the process. However, institutional barriers such as weak intellectual property rights, inefficiencies in administrative systems, sanctions-related restrictions, and cultural challenges have impeded the establishment of a conducive ecosystem for regional technological collaboration. Using bibliometric analysis in R software and guided by institutional theory, this research examines these challenges and proposes actionable strategies. The findings emphasize the importance of strengthening social capital, developing intermediary institutions, enhancing research infrastructure, and designing innovative policies to promote effective knowledge and technology transfer. Additionally, the study underscores the pivotal role of strong linkages between formal and informal institutions in fostering regional and international collaboration.</p>

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Extended Abstract

Background

The exchange of knowledge and technology plays a crucial role in driving economic development, fostering innovation, and reducing dependence on raw material exports. This process is especially critical for countries in the Middle East, where technological collaboration can provide a foundation for sustainable growth and regional integration. Iran, as a central player in this region, possesses considerable potential to strengthen technological ties with neighboring countries due to shared cultural heritage, geographic proximity, and historical relationships. However, various institutional challenges hinder the creation of a conducive ecosystem for knowledge and technology exchange.

Formal institutions, including governmental organizations, academic institutions, and legal frameworks, are critical for shaping policies and enforcing regulations that facilitate such exchanges. Informal institutions, including cultural norms, trust, and social capital, also significantly influence the success of knowledge-sharing initiatives. In Iran's context, both types of institutions face distinct challenges. Weak intellectual property rights (IPR) enforcement, bureaucratic inefficiencies, and the impact of international sanctions on technological collaboration are notable barriers. Simultaneously, trust deficits, insufficient social capital, and limited regional networks further impede effective knowledge transfer. Overcoming these challenges requires a holistic approach that integrates formal reforms and informal institution-building to unlock the potential of knowledge exchange.

Aims

This research investigates the dual role of formal and informal institutions in facilitating or constraining knowledge and technology exchange between Iran and its neighboring countries. It aims to identify structural, cultural, and policy-related obstacles and propose actionable strategies to enhance regional collaboration. The overarching goal is to provide a roadmap for improving Iran's position within regional knowledge and technology networks, thereby contributing to its sustainable development and economic resilience.

Methods

The study adopts a bibliometric analysis framework combined with institutional theory, particularly the work of Douglass North, which highlights the role of institutions in reducing uncertainty and enabling economic interactions. Data were gathered from Scopus to analyze trends in knowledge exchange and the role of institutions. The research also reviews case studies from comparable regions to draw lessons applicable to Iran. Additionally, a qualitative content analysis was conducted to identify systemic gaps in Iran's formal and informal

institutional structures that hinder knowledge and technology transfer.

Results

The findings reveal a multifaceted set of challenges that collectively constrain Iran's ability to effectively exchange knowledge and technology with its neighbors. On the formal side, weak intellectual property protection discourages foreign investors and innovators from engaging in collaborative ventures. Bureaucratic inefficiencies, characterized by lengthy decision-making processes and overlapping administrative responsibilities, further exacerbate the problem. These issues are compounded by the impact of sanctions, which limit access to advanced technologies, financial resources, and international scientific networks.

On the informal side, cultural and social factors play a significant role in shaping the dynamics of knowledge exchange. The lack of trust among stakeholders, both within Iran and between Iran and its neighbors, undermines collaboration. Social capital, which includes networks of trust and reciprocity, remains underdeveloped, limiting the effectiveness of regional partnerships. Furthermore, cultural differences between Iran and certain neighboring countries create barriers to communication and mutual understanding, making it difficult to establish sustained collaboration.

Despite these challenges, there are opportunities to leverage existing strengths. For instance, Iran's geographic location and shared cultural ties with several neighboring countries provide a natural advantage for regional collaboration. Additionally, the presence of highly skilled human resources and reputable academic institutions within Iran offers a foundation for building regional research networks. Strengthening these networks, alongside addressing structural weaknesses, can significantly enhance Iran's capacity for knowledge exchange.

Proposed strategies

To overcome the identified challenges, a set of comprehensive strategies is proposed:

a) Strengthening formal institutions:

- **Enhancing Intellectual Property Rights (IPR).** Developing and enforcing transparent IPR frameworks to attract foreign investment and foster innovation. Strengthening IPR can encourage multinational companies to share advanced technologies and establish research collaborations in Iran.
- **Reforming administrative structures.** Simplifying bureaucratic processes and establishing clear lines of responsibility to reduce inefficiencies. Delegating decision-making to local institutions can improve responsiveness and adaptability in implementing collaborative projects.

- **Mitigating sanction impacts.** Seeking alternative mechanisms to bypass sanctions, such as partnerships with regional organizations, participation in joint scientific programs, and leveraging non-traditional financing models like barter systems.
- b) Building informal institutions:
 - **Fostering social capital.** Promoting trust and reciprocity through initiatives that bring stakeholders together, such as regional conferences, joint training programs, and collaborative research projects. These activities can help build lasting relationships among scientists, policymakers, and industry leaders.
 - **Cultural alignment.** Encouraging cross-cultural exchange programs and workshops to bridge cultural gaps between Iran and its neighbors. Focusing on shared values and mutual interests can strengthen the foundation for collaboration.
- c) Strengthening intermediary institutions:
 - **Developing technology parks and innovation hubs.** Establishing regional centers that act as platforms for technology transfer and innovation. These hubs can facilitate partnerships between academia, industry, and government while providing access to shared resources.
 - **Encouraging knowledge brokers.** Promoting the role of intermediaries, such as professional associations and non-governmental organizations, to facilitate knowledge exchange and resolve disputes.
- d) Promoting regional cooperation:
 - **Leveraging shared interests.** Focusing on areas of mutual benefit, such as renewable energy, water management, and public health, to foster collaboration. These domains offer opportunities for co-innovation and shared problem-solving.
 - **Strengthening regional networks.** Establishing formal agreements with neighboring countries to create frameworks for sustained collaboration. This includes forming joint research initiatives, exchange programs, and regional innovation clusters.

Conclusion

Addressing the institutional barriers to knowledge and technology exchange between Iran and its neighboring countries requires a dual approach: strengthening formal institutions while leveraging informal mechanisms to build trust and social capital. By implementing targeted reforms in intellectual property rights, administrative processes, and regional cooperation frameworks, Iran can significantly enhance its role in the regional knowledge economy. Simultaneously, fostering cultural alignment and investing in intermediary institutions can complement

these efforts, creating a holistic ecosystem for sustainable knowledge exchange.

The proposed strategies highlight the importance of an integrated policy approach that combines institutional reforms with community-building efforts. By focusing on these priorities, Iran can unlock the potential of regional collaborations, driving innovation and economic resilience in the Middle East.

Conflict of interest

The author declared no conflicts of interest.

Ethical considerations

The author has completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

Data availability

The dataset generated and analyzed during the current study is available from the author on reasonable request.

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