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Factors Influencing the Direction of the Science, Research, and Technology Sector in the Seventh Progress Plan and the Scenarios Ahead

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A B S T R A C T

The country's scientific community needs to identify the key drivers and barriers of science and technology. Given the importance of contextual and social conditions in which the drivers of science, technology, and innovation emerge, details of these factors can be traced in experts' opinions, policy documents, and domestic written records. Under such circumstances, drivers, obstacles, and challenges are not considered sudden or accidental phenomena; rather, their traces can be found in specialized discussions and policy documents. The aim of the researcher was to identify the most significant driving and hindering factors and to explain possible future pathways. The research questions were: What drivers, enabling conditions, and capabilities are represented in policy documents from an exploratory perspective? What challenges, crisis-generating factors, and issues are highlighted in these documents? Finally, which of these categories are considered priorities by experts? Data were collected through documentary research, and the analysis involved weighting and prioritization using the Friedman test, followed by scenario development. In this exploratory study, five key documents containing important orientations and insights regarding factors influencing the future of science, research, and technology in Iran were first examined, and relevant statements and propositions were extracted. A questionnaire was then designed based on the literature and the propositions contained in these policy reports and was distributed among a group of higher education specialists. Subsequently, the Friedman test was conducted to rank the factors. The highest-ranked factors were identified and used as the basis for constructing four scenarios concerning the future of higher education, science, and technology. These scenarios were then prioritized according to weighted averages, leading to the identification of the preferred scenario. Using the opinions of a panel of experts, the scenarios were evaluated in terms of feasibility, plausibility, consistency with national realities, advantages, risks, and potential consequences. The findings of this exploratory study, following the identification and prioritization of drivers and barriers and the evaluation of the four proposed scenarios, indicated that the scenario of Strengthening and Stabilization had the highest feasibility and plausibility. The Collaborative Development of Science and Technology scenario ranked second in terms of likelihood of realization and credibility.

Keywords: *7th development program؛ science driver؛ scenario building؛ futurology of science.*

Introduction

The country's scientific community needs to identify the driving and repulsive forces of science and technology. Given the importance of the contextual and social conditions in which the drivers of science, technology, and innovation emerge, their details can be found in the perspectives and documents of elites as well as domestic writings and records. Under such circumstances, drivers, obstacles, and challenges are not considered *ad hoc* phenomena; their traces can be found in expert discussions and policy documents. The researcher aims to discover the main driving and repulsive forces and to explain possible future paths. The researcher's questions are: What drivers, enablers, and capabilities do Iranian policy documents represent through an exploratory approach? Also, what challenges, crises, and issues have these documents highlighted? Finally, which of these categories do experts prioritize more?

Methodology

The data collection method was documentary, and the analysis method involved weighting and prioritization using the Friedman test, followed by scenario writing. In this exploratory research, first, five key Iranian documents containing important orientations and content regarding factors influencing the future of science, research, and technology in Iran were reviewed, and relevant items were extracted. A questionnaire inspired by the literature and statements within these policy reports was developed and administered to a number of higher education specialists. The Friedman test was then used to rank the factors. Subsequently, the factors with the highest rankings were identified, and with attention to these, four scenarios for the future of higher education, science, and technology in Iran were constructed. Finally, these scenarios were prioritized based on weighted means, and the preferred scenario was revealed. At the end, a group of experts re-evaluated the scenarios in terms of feasibility and credibility, alignment with the country's realities, advantages, risks, and consequences.

Findings

Four scenarios were developed during the exploratory study process The description of the four scenarios is as follows:

1. Collaborative Development: Over the past twenty years, significant parts of the missions of the Ministry of Science, Research and Technology (MSRT) have been separated from its body and transferred to other institutions, such as medical education, the Vice Presidency for Science and Technology, the Headquarters for the Comprehensive Scientific Map of Iran, the National Elites Foundation, etc. Other branches such as Islamic Azad University, Farhangian University, and universities and research institutes affiliated with executive bodies also lack the necessary convergence with the MSRT. This scenario emphasizes the necessity of cooperation, coalition, and national division of labor to fill this gap, as the MSRT alone cannot achieve optimal development in the sector.

2. Targeted and Cautious Development: This scenario suggests that partners will not cooperate desirably and emphasize competition. Due to the continued supply-driven approach and lack of planning in other sectors, graduate unemployment will persist. Therefore, the Ministry of Science and other sector trustees must spend their limited resources in a targeted and cautious manner.

3. Strengthening and Consolidation: This scenario seeks to maintain the status quo, enhance existing capabilities, and prevent the situation from worsening, as resources and opportunities for development are scarce.

4. Reorganization and restructuring: In this scenario, due to the weakness of the demand side, while preserving minimum achievements, restructuring is undertaken to become more agile or to downsize.

To examine the differences between scenarios one to four, the above table and the rankings of each component were used, and the weighted mean of each scenario was calculated. The weighted mean values for each scenario are shown in the table below.

Table 1. Weighted Mean Values for Each Scenario

Scenario	Weighted Mean Rank
Scenario 1: Collaborative Development	14.26
Scenario 2: Strengthening and Consolidation	13.28
Scenario 3: Targeted and Cautious Development	8.20
Scenario 4: Reconfiguration (Agilization and Downsizing	7.82

According to the table above, at this stage, the Collaborative Development scenario has the highest score with a weighted mean of 14.26. In second place is the Strengthening and Consolidation scenario. These two scenarios are important in terms of the priority and significance of the contributing factors. Now it must be seen which of these two scenarios has greater feasibility and credibility in practice and reality, aligns with Iran's context, and entails lower risks and more advantages. This clarification was achieved in the next stage, which involved evaluating the scenarios. Thus, using the opinions of a group of experts, the scenarios were evaluated in terms of feasibility and credibility, alignment with the country's realities, advantages, risks, and consequences.

Conclusion

The evaluation of the four narrated scenarios indicated that the "Strengthening and Consolidation" scenario, followed by the "Collaborative Development" scenario for science and technology, have greater feasibility and credibility.

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