Presidency of the Islamic Republic of Iran
Vice Presidency for Science, Technology and Knowledge Based Economy

HSE UNIVERSITY

Iran's National Science and Technology Foresight Program: activities: An overview of recent activities

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Mandate of the Iran National Science and Technology Foresight Program

The mandate of the National Science and Technology Foresight Program, under the responsibility of the Vice-Presidency for Science, Technology, and Knowledge-Based Economy, along with the establishment of its permanent secretariat, was passed by a Cabinet decree issued in March 2015.

IRAN National S&T Foresight Program Mandate:

01

Policy intelligence

Enhancing policy intelligence to identify S&T priorities and focus areas in policymaking, considering the future technologies and their impacts.

02

Priority setting

Identifying disruptive technologies, technological opportunities, and challenges to inform national strategic positioning and investment decisions.

03

Business intelligence

Enhancing business intelligence by promoting future S&T opportunities to startups, firms, and the broader innovation ecosystem actors.

۱۵۴۲۰۲/ت۵۱۳۷۷ هـ
شماره
۱۳۹۳/۱۲/۱۷ تاریخ

جمهوری اسلامی ایران
رئیس جمهور
تصویب‌نامه هیأت وزیران

بسمه تعالی
"با صلوات بر محمد و آل محمد"

معاونت علمی و فناوری رییس جمهور – وزارت علوم، تحقیقات و فناوری

هیئت وزیران در جلسه ۱۳۹۳/۱۲/۶ به پیشنهاد وزارت علوم، تحقیقات و فناوری و معاونت علمی و فناوری رییس‌جمهور و به استناد اصل یکصد و سی و هشتم قانون اساسی جمهوری اسلامی ایران تصویب کرد:

۱- معاونت علمی و فناوری رییس‌جمهور موظف است ظرف شش ماه شیوه‌نامه طراحی و تدوین برنامه ملی آینده‌نگاری علم و فناوری شامل توالی تکرارهای بعدی، دستگاه‌های همکار، زمان اجرا، نحوه تامین هزینه ها، افق زمانی، حوزه‌های دارای اولویت، روش اجرا و سایر موضوعات اجرایی را تهیه و جهت تصویب به شورای عالی علوم، تحقیقات و فناوری (ستف) ارایه نماید.

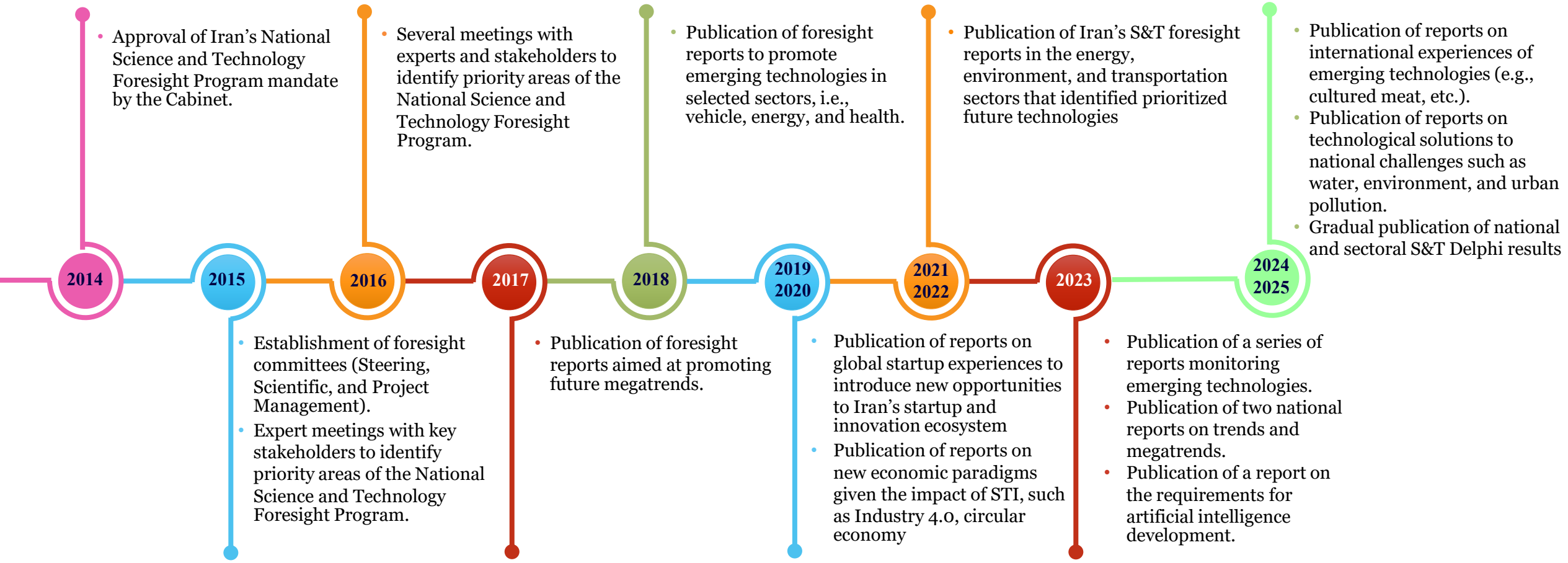
۲- معاونت علمی و فناوری رییس‌جمهور موظف است برنامه ملی آینده‌نگاری علم و فناوری کشور را برای حوزه‌های اولویت‌دار مربوط با استفاده از اعتبارات مصوب و بهره‌گیری از حداکثر مشارکت صاحب نظران و نخبگان کشور و هماهنگی دستگاه‌های اجرایی طراحی، تدوین و برگزار نماید.

۳- کلیه دستگاه‌های اجرایی ضمن همکاری با معاونت علمی و فناوری رییس‌جمهور در مرحله طراحی و تدوین برنامه، از نتایج این برنامه بهره‌گیری و استفاده نمایند.

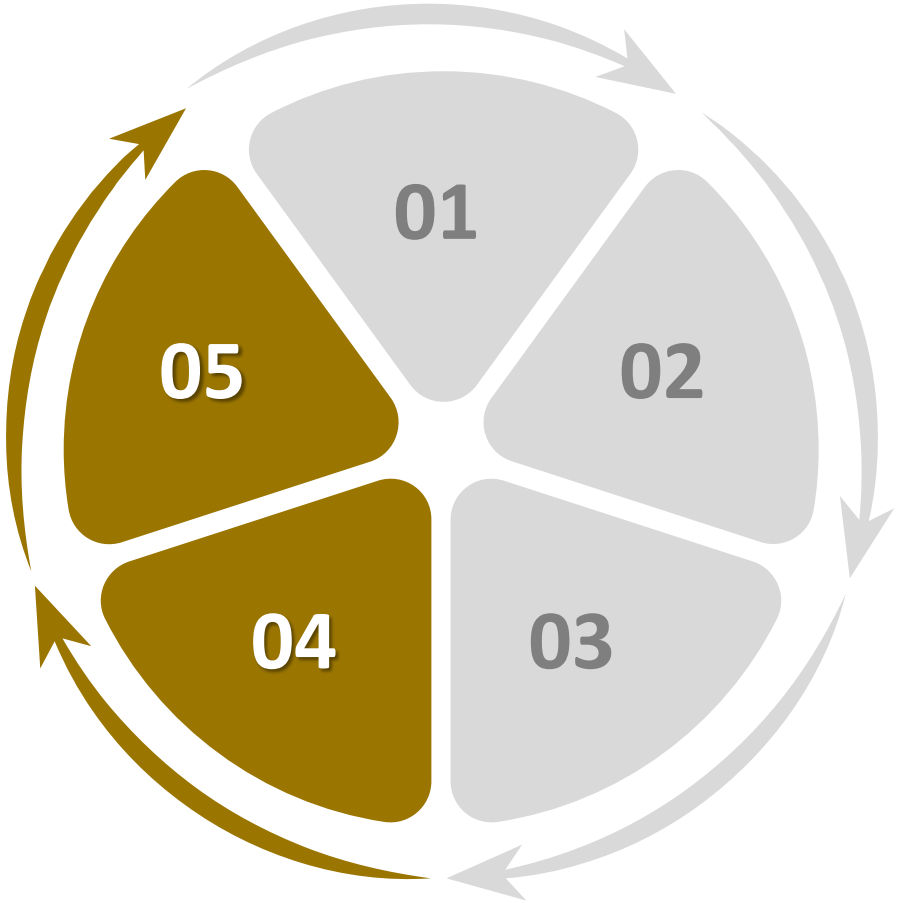
اسحاق جهانگیری
معاون اول رییس جمهور

رونوشت به دفتر مقام معظم رهبری، دفتر رییس‌جمهور، دفتر رییس قوه قضاییه، دفتر معاون اول رییس‌جمهور، دبیرخانه مجمع تشخیص مصلحت نظام، سازمان مدیریت و برنامه ریزی کشور، معاونت حقوقی رییس جمهور، معاونت امور مجلس رییس‌جمهور، معاونت اجرایی رییس جمهور، دیوان محاسبات کشور، دیوان عدالت اداری، سازمان بازرسی کل کشور، معاونت قوانین مجلس شورای اسلامی، امور تدوین، تنقیح و انتشار قوانین و مقررات، کلیه وزارتخانه ها، سازمان ها و مؤسسات دولتی، نهادهای انقلاب اسلامی، دبیرخانه شورای اطلاع‌رسانی دولت و دفتر هیئت دولت ابلاغ می شود.

Iran National Science and Technology Foresight Program: Timeline



Ongoing Programs of Iran National S&T Foresight Program



01 Future Promotion

Promoting future-oriented thinking through social media platforms, dialogue, related events, and other initiatives.

02 Thematic Foresight (sectoral Delphi)

Identifying and prioritizing future technologies in selected sectors through the analysis of international experiences, review of national policies, reports, and expert surveys.

03 Technological Solutions to National Challenges

Providing technological solutions to address national challenges, i.e., water scarcity, air pollution, smart cities, and electricity imbalance.

04 Monitoring Emerging Technologies

Identifying emerging technologies in key areas, such as AI, and using the foresight methods, natobaly Delphi and scenario planning, to determine their priorities.

05 Analysing Trends and Megatrends (national Delphi)

Identifying technological and non-technological trends as well as megatrends, and promoting prioritized megatrends given the results of the national Delphi.

1. Foresight and Future-oriented Thinking Promotion

Organizing promotional events

Convening promotional events such as the Iran Future Forum, scientific and specialized conferences, and student competitions

Promoting future-oriented Dialogue

Fostering future-oriented dialogue via podcasts, videocasts, and forums aimed at raising public and expert awareness about opportunities and challenges of emerging technologies

Promoting foresight and future awareness on social media

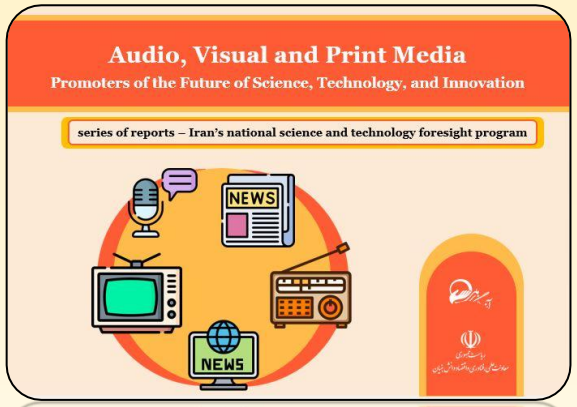
Active engagement on social media platforms, particularly LinkedIn, with over 2,400 followers.
Monthly publication of short analytical and translated reports on the future trends and technologies

https://www.linkedin.com/company/iranforesight

1. Foresight and Future-oriented Thinking Promotion (I)

Instances of Reports on Promoting Science and Technology Foresight among experts and citizens

The concept of "Future Day" is presented as an initiative that fosters dialogue between policymakers and scholars to shape a sustainable future, drawing on global foresight experiences and leading future-related events



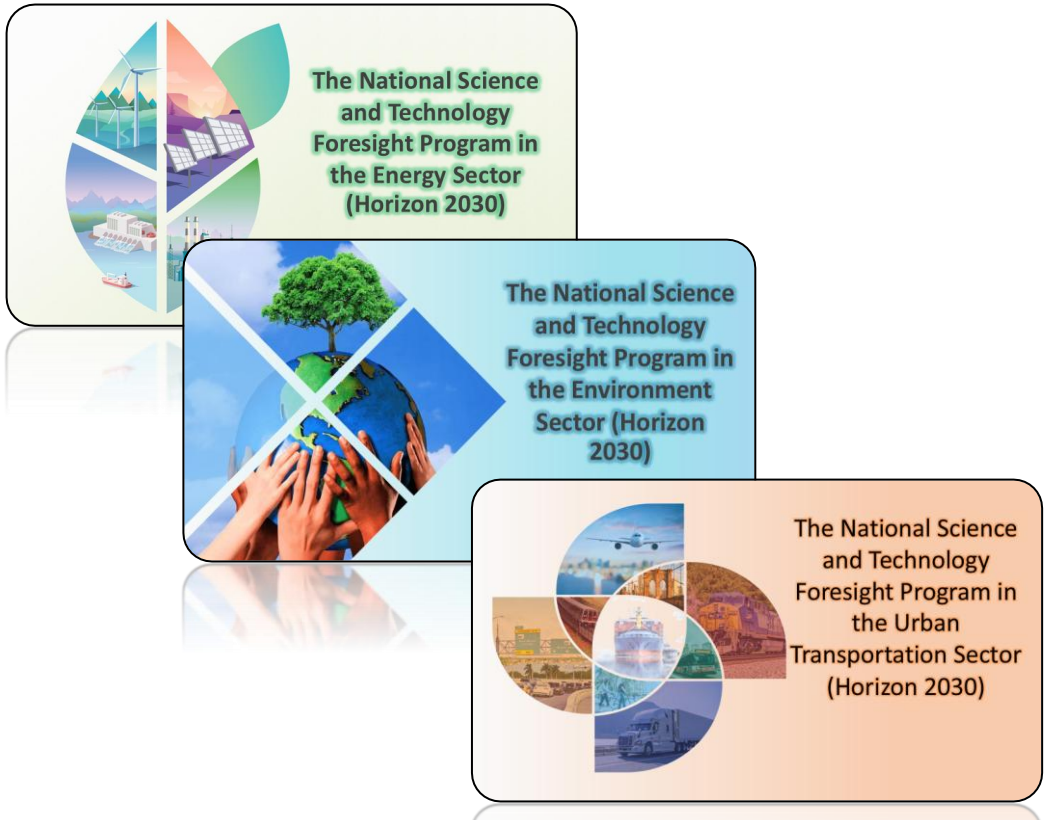
Introduces domestic audio, visual, and print media in Iran, promoting the future of science, technology, and innovation.
It highlights notable outlets and programs that enhance public awareness regarding the future.

Introduces movies, series, and documentaries depicting the future of science, technology, and innovation. Movies are a suitable mechanism for developing mass awareness about future technologies, such as Metaverse, in Ready Player One

Introduces "Museums of the Future" as a way of shaping and promoting public understanding and awareness of STI and the future

2. Thematic Foresight (Energy, Environment and Transportation Sectors)

The National S&T Foresight Program adopts a range of foresight tools considering our local conditions while benefiting from international experiences. We adopt both market-pull and technology-push approaches to identify and prioritize technologies and technology areas.



Methodology for Implementing Foresight in Thematic Areas (sectors)

1. Assessing the current status of Iran in the sector and identifying key challenges
2. Reviewing national policy and strategic documents to outline legal and regulatory requirements
3. Reviewing international foresight experiences to identify a long list of prioritized technologies
4. Defining the scope of foresight in the sector
5. Identifying and categorizing a shot list of prioritized technologies
6. Conducting expert surveys (Delphi) to prioritize future technologies, given the national requirements

3. Technological Solutions to National Challenges

Methodology

01 Reviewing Iran's status towards the national challenges

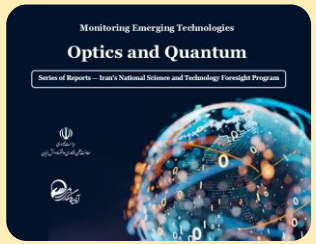
02 Reviewing international experiences and best practices in addressing similar challenges

03 Proposing a set of policy and technological solution for the challenges given the Iranian context

04 Outlining technological recommendations to address the challenge in Iran

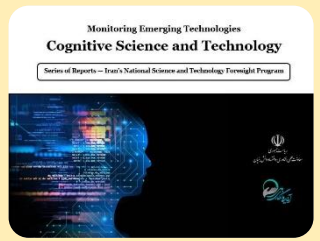
4. Monitoring Emerging Technologies

Review of international reports led to the identification of 137 emerging technologies within 12 areas, nine of which align with the thematic activities of the Technology Development councils affiliated with the Vice-Presidency for Science, Technology, and Knowledge-Based Economy.



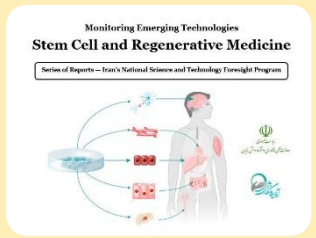
Optics and Quantum
(83 Technologies)

Advanced Materials
(40 Technologies)

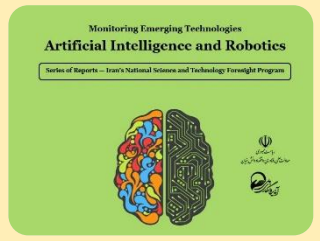


Cognitive Science
(100 Technologies)

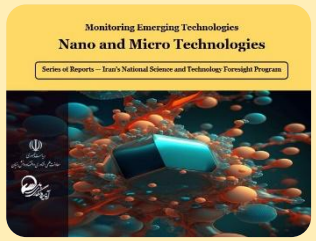
Finance and Governance
(58 Technologies)



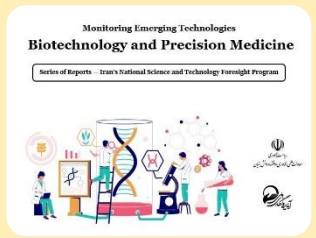
Stem Cells
(60 Technologies)



AI and Robotics
(66 Technologies)



Nano and Micro
(113 Technologies)



Biotechnology
(72 Technologies)

Connectivity
(54 Technologies)

4. Monitoring Emerging Technologies (I)

Foresight Implementation for Identifying Priority Technologies

1

Reviewing Reports

Reviewing international reports and extracting an initial long list of technologies

2

Holding expert meetings

Convening at least four expert meetings (members respresent government organizations, firms, universities, and research institutes) to finalize the list of

3

National Delphi

Developing an online questionnaire and two rounds of surveys to find prioritized technologies

4

Identifying priority technologies

Communication and promoting the prioritized area by formal communication, publication in social media, and other public oultes

The Delphi on prioritizing emerging technologies related to AI and Robotics was conducted from September 2024 to May 2025, during which 763 questionnaires were completed. The following Slides briefly present our findings.

Issues investigated in the sectoral
Delphi Questionnaire

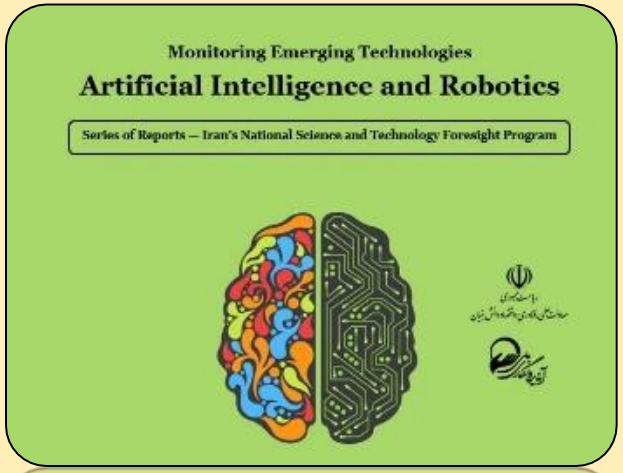
- Economic impact
- Strategic importance
- Social and cultural impact
- Scientific and technological realization at the national and international levels
- Impact on business
- Commercialization Outlook (National & Global)
- Need for Government Intervention
- Level of required technological innovation

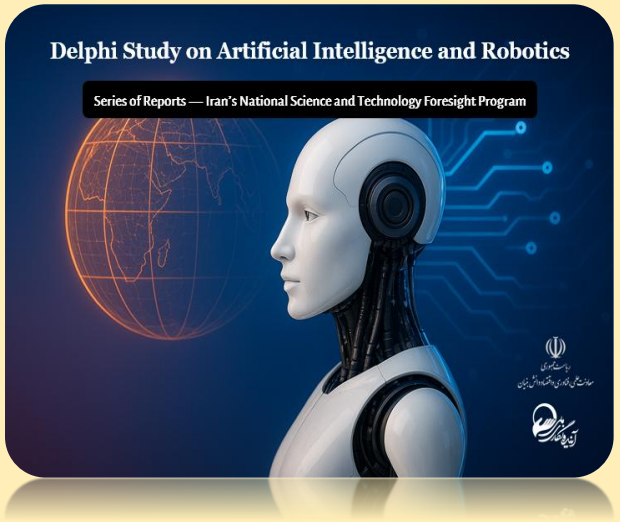
4. Monitoring Emerging Technologies (II) – Example: AI and Robotics

Instances of Delphi Results - Prioritized AI Technologies

Strategic Importance at the National and International Levels (score: out of 5)

field	Technology	Strategic importance (National Level)	Strategic importance (International Level)	Impact on businesses
Medicine	Disease Prevention Algorithm	3.77	3.73	3.55
	Data Analysis Algorithm	3.7	3.7	3.6
	Artificial Neural Network	3.62	3.65	3.54
Education	Learning Analytics Algorithm	3.53	3.48	3.45
	Virtual Learning Platform	3.45	3.40	3.28
	Game-Based Learning	3.43	3.32	3.37
Security	Fraud Prevention Platform	3.58	3.44	3.44
	Biometric Security System	3.41	3.50	3.15
	Eagle Eye Crime Prevention System	3.46	3.39	2.67
Trade	Demand Forecasting Platform	3.63	3.69	3.69
	AI-based Chatbot	3.29	3.37	3.48
	Quality Control Inspector	3.28	3.42	3.5



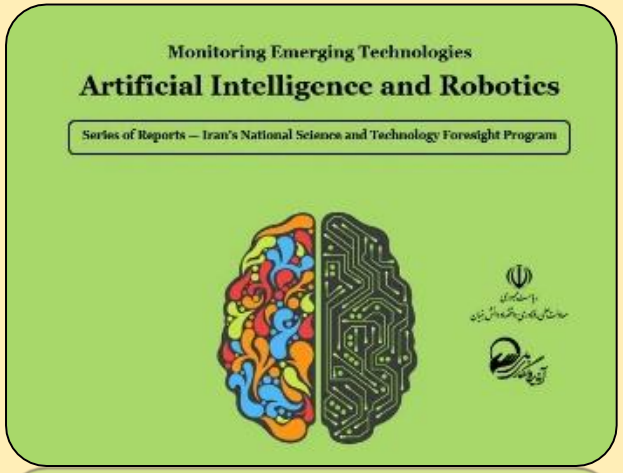


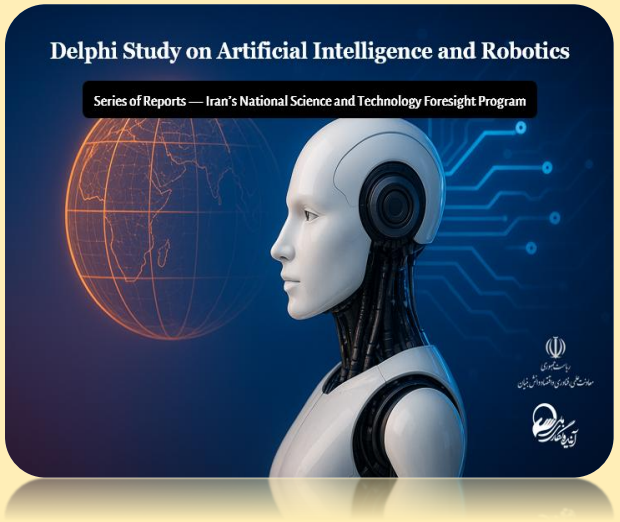
4. Monitoring Emerging Technologies (III) – Example: AI and Robotics

Instances of Delphi Results - Prioritized AI Technologies

Strategic Importance at the National and International Levels (score: out of 5)

field	Technology	Strategic importance (National Level)	Strategic importance (International Level)	Impact on businesses
Agriculture	Weather Forecasting Platform	3.56	3.69	3.79
	Pest Detection Drones	3.65	3.65	3.53
	Precision Agriculture Quadcopters	3.63	3.67	3.45
service	Machine Translation Software	3.50	3.47	3.29
	Data Classification Algorithms	3.06	3.71	3.54
	Intelligent Personal Assistants	3.00	3.23	3.00
Legal and Judicial	AI-Based Legal Consultation Chatbots	3.33	3.33	3.33
	Legal Document Drafting and Content Analysis Algorithms	3.30	3.11	3.11
	AI-Powered Judicial Assistants	3.42	3.18	3.00
Media (Cyberspace)	Fake News and Misinformation Detection Algorithms	3.74	3.65	2.92
	-	-	-	-
	-	-	-	-





5. Future Trends and Megatrends

Process of identifying Trends and Megatrend at the national level

1

Review of international reports on future megatrends, sought by keywords such as “Mega Trend,” “Trend,” and …

2

Initial identification of 40 reports, after content analysis, 10 reports were selected for outlining future trends and megatrends

3

A thorough analysis of ten selected reports to identify technological and non-technological trends megatrends

4

Integration of identified trends and megatrends into 108 consolidated trends categorized under 10 megatrends, covering social, technological, environmental, economic, and political dimensions

5. Our Proposed Future Megatrends

1. Social and Demographic Evolutions and Imbalances
2. Non-Financial Expectations from Firms and Turbulence in the Business Environment
3. Growing Expectations from Government and its Declining Resilience
4. A New World Order amid international Tensions and Shifts
5. Demanding and Change-Seeking Citizens
6. Dominance of Cyberspace and the Internet over Society
7. Unsustainable Climate and Resource Crisis
8. A Carbon-Free World and the Development of Clean Energy
9. Digitalization
10. Smart/ intelligent Objects and Artifacts

Issues investigated in the national

Delphi questionnaire

- National strategic importance
- International Strategic importance
- Economic impact
- Social and cultural impact
- Impact on industry and business
- Socio-Economic outcomes & impacts (realization interval)
- Need for government intervention

Timeframe: May-December 2024

Number of Participants: 2632

Completed Questionnaires: 1050

5. Future Megatrends: Delphi Questionnaire

Scoring trends and Megatrends from different dimensions

- National/International strategic importance
- Economic, social, and cultural impact
- Impact on businesses
- Temporal period of trend's impact realization
- Need for government intervention

We provided feedback to participants on their responses

- Average score for each question
- Number of respondents

Declining public trust in businesses

People are becoming pessimistic about the motives, social and economic actions of businesses, resulting in a fall in trust in them

	Null (0)	Very Low (1)	Low (2)	Medium (3)	High (4)	Very High (5)
1. Strategic importance at the national level	○	○	○	○	○	○
2. Strategic importance at the international and regional levels	○	○	○	○	○	○
3. Impact on Iran's economic growth	○	○	○	○	○	○
4. Social and economic impact on Iran	○	○	○	○	○	○
5. Impact on the growth of businesses and industries in Iran	○	○	○	○	○	○
6. Time to realize the socio-economic impacts in the country (0): already been achieved (1): Less than 5 years (2): 5-10 years (3): 10-20 years (4): More than 20 years (5): difficult to predict	○	○	○	○	○	○

5. Future Megatrends: Delphi results

The Score of Megatrends (based on Delphi average score: score out of 5)

1

Social and Demographic Evolutions and Imbalances

Number of Responses	Average Score
285	3.90

2

Unsustainable Climate and Resource Crisis

Number of Responses	Average Score
184	3.85

3

The dominance of cyberspace and the Internet on society

Number of Responses	Average Score
287	3.85

4

Increasing expectations from the government and its declining resilience

Number of Responses	Average Score
299	3.81

5

A carbon-free world and the development of clean energy

Number of Responses	Average Score
283	3.77

6

Increasing non-financial expectations from firms and turbulence in the business environment

Number of Responses	Average Score
169	3.75

7

New World in the Shadow of international Tension and Strategic Shifts

Number of Responses	Average Score
169	3.73

8

Digitization

Number of Responses	Average Score
319	3.73

9

Smart/ intelligent Objects and Artifacts

Number of Responses	Average Score
326	3.67

10

Demanding and Change-Seeking Citizens

Number of Responses	Average Score
212	3.64

5. Future Megatrends: Delphi Results (I)

A sample of results: Digitalization (within a 20-year horizon)

Trends	National strategic importance	International strategic importance	Economic Impacts	Socio-Cultural Impacts	Impact on Business Growth	Realization Interval (less is better)	Need for Government Intervention	Number of Responses
The prevalence of cryptocurrencies in Trade and Daily use	3.46	3.87	3.61	3.61	3.56	1.92	3.23	60
The growth of Big Data	4.20	4.19	4.04	3.66	4.00	2.22	2.62	77
Development of Quantum Computing	3.54	3.67	3.36	2.78	3.25	2.49	3.39	36
The Growing Importance of Mixed Media	4.00	4.04	3.81	4.06	3.94	1.87	3.42	47
The growth of data-driven organizations and businesses	4.14	4.07	4.04	3.63	4.01	2.24	3.45	66
The growth of Distributed ledger technologies (LDT) (such as Blockchain)	3.73	3.65	3.48	3.07	3.37	2.17	2.93	43
The growth in the adoption of Li-Fi technology	3.52	3.52	3.48	3.11	3.44	2.41	3.33	27
The rapid increase in the use of Cloud Computing	3.8	3.80	3.68	3.09	3.67	2.20	3.24	55
Widespread development and use of 5G network	3.97	3.95	4.02	4.00	4.07	1.91	3.62	58
Development of Virtual Reality and Augmented Reality Technology	3.57	3.68	3.63	3.65	3.56	2.24	2.99	68
Increase in the use of 3D & 4D Printing	3.71	3.80	3.64	3.10	3.81	2.31	3.00	58
Web-3 Development and Real-World Concepts	3.62	3.63	3.48	3.60	3.39	2.26	2.93	46

Thank You
For Your Attention

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