



Iran Nano and Micro Technologies
Innovation Council
(INIC)

Progress Review of Iran Nanotechnology Plan: From Vision to Reality

November 2024

Title: Progress Review of Iran Nanotechnology Plan: From Vision to Reality

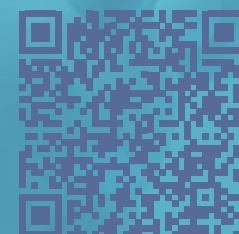
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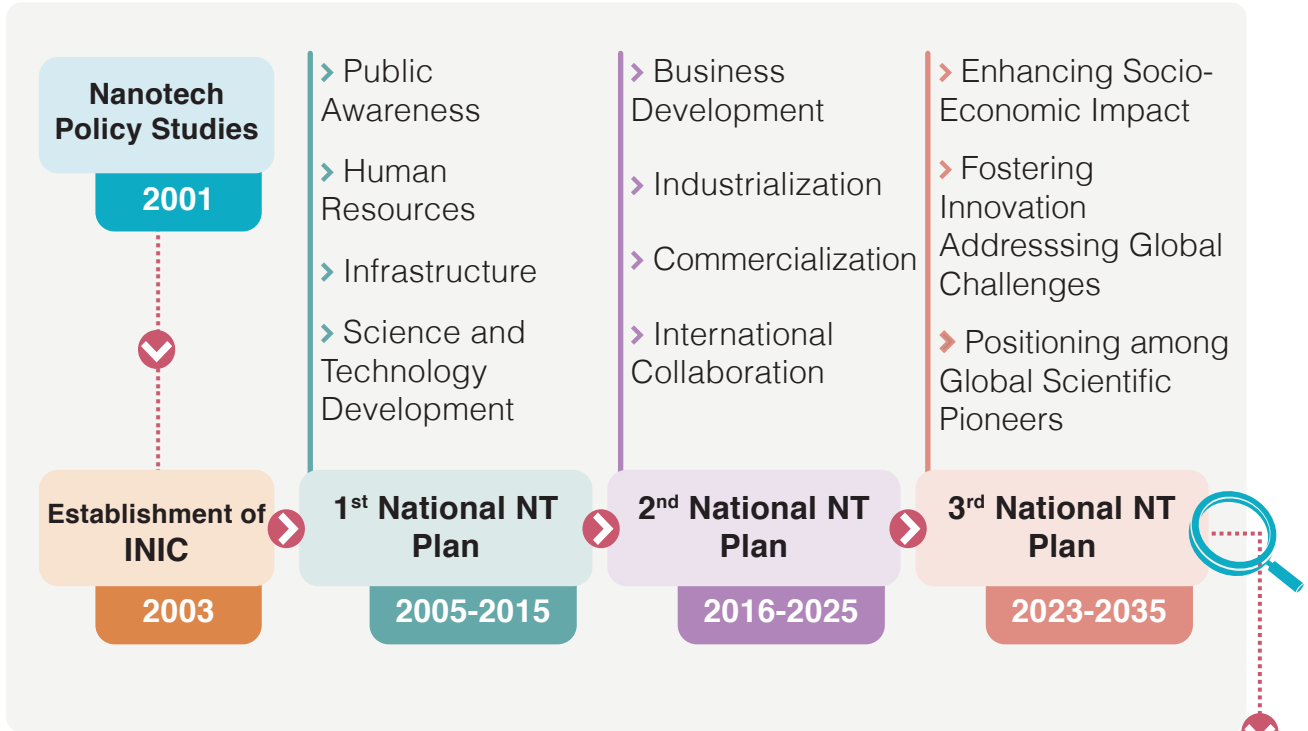
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Iran Nanotechnology Policy Timeline



Structure of Iran's 3rd Nanotechnology Plan



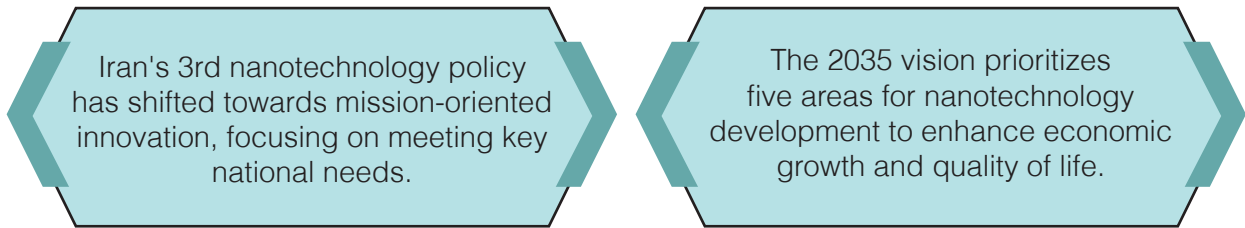
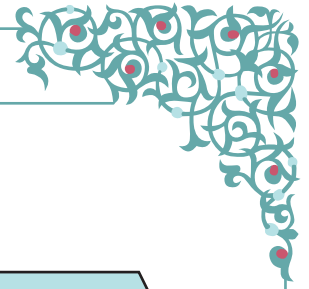


Cost-Effective and Efficient Wastewater Treatment With Nanobubbles



WATOX
BEYOND INNOVATION

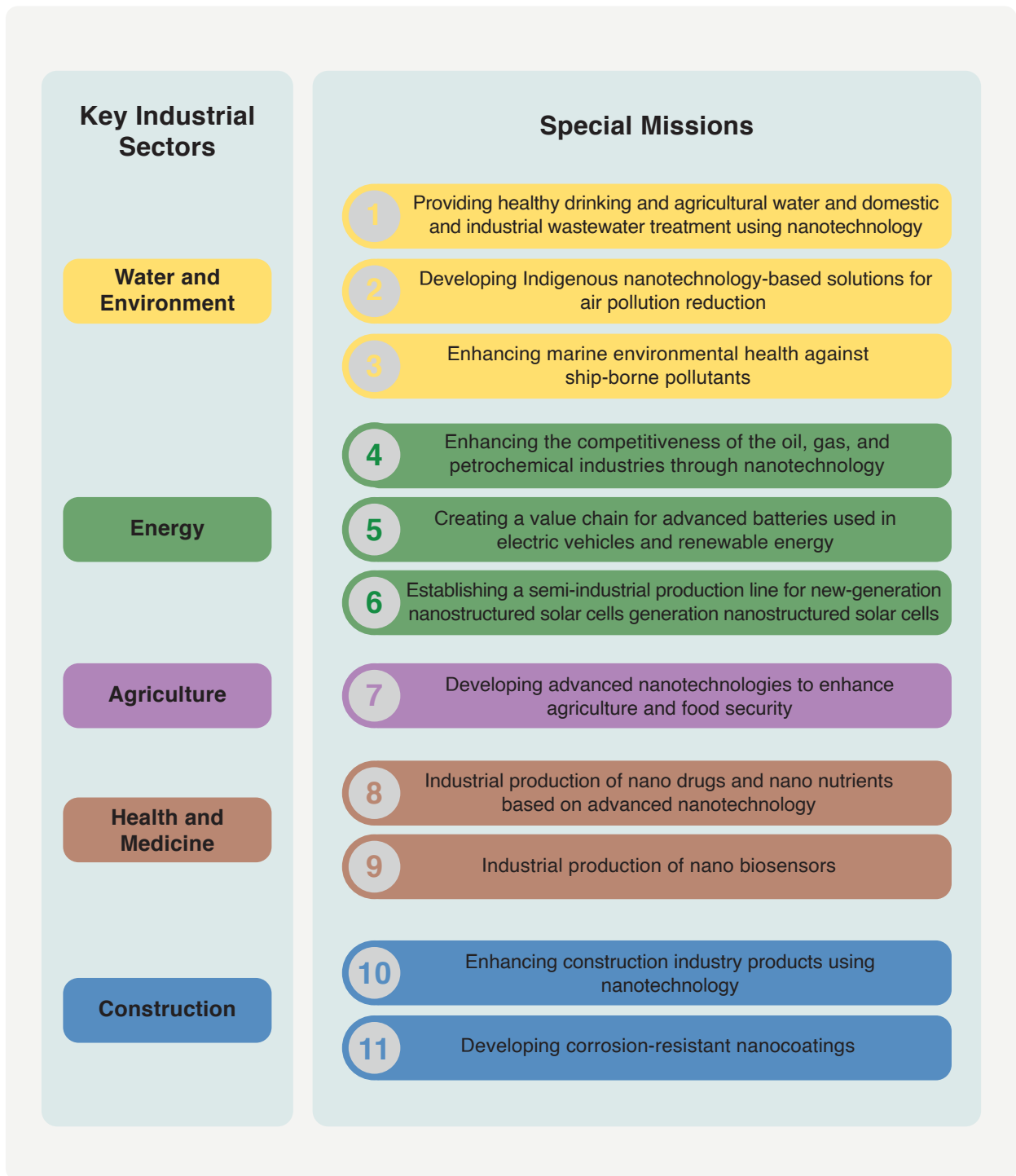
Mission-Oriented Policies



➔ Structure of Implementation Plan for Mission-Oriented Policy

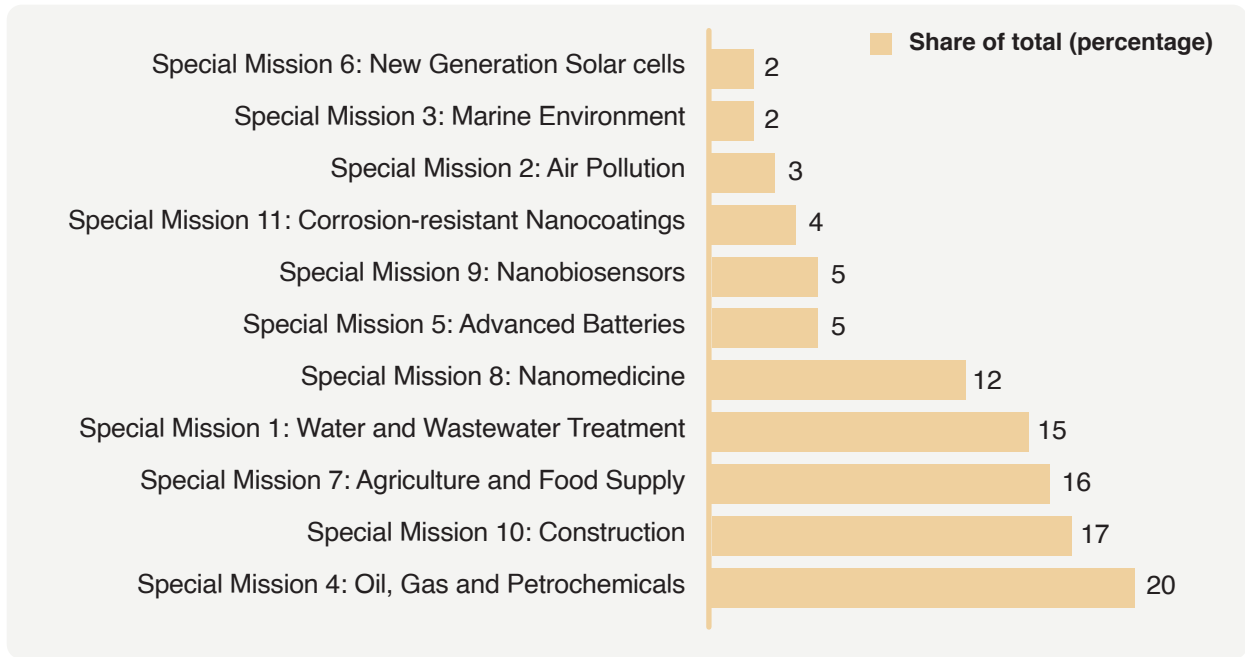


Key Industrial Sectors of Nanotechnology and Their Special Missions

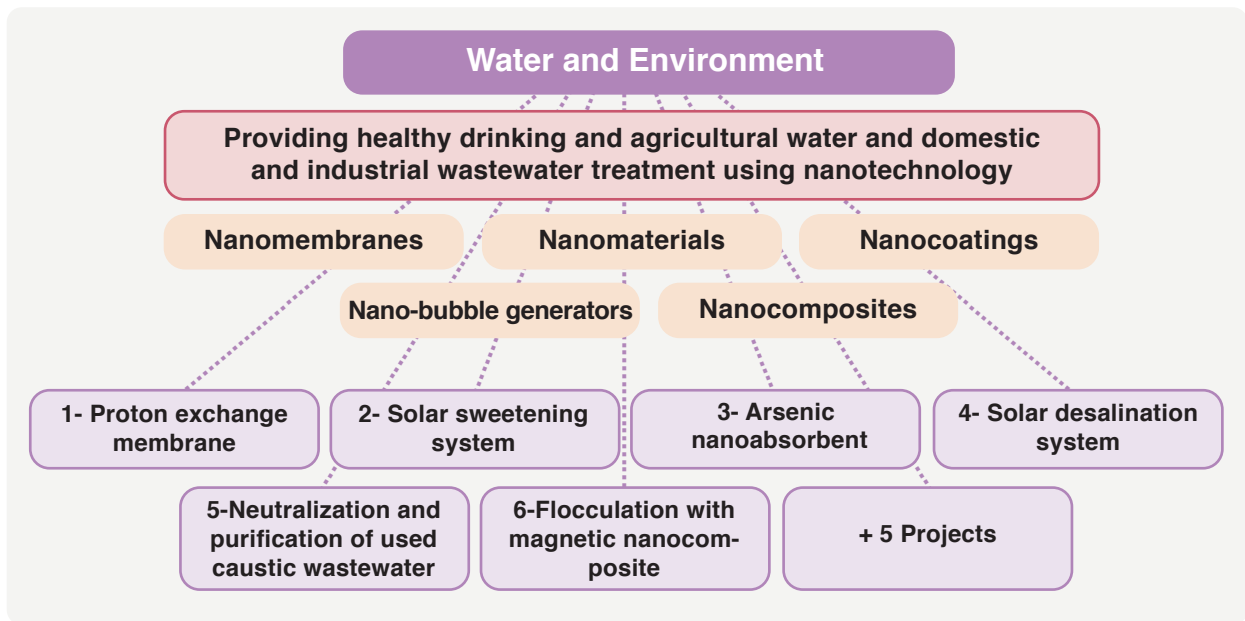




Breakdown of Technology Development Projects by Mission

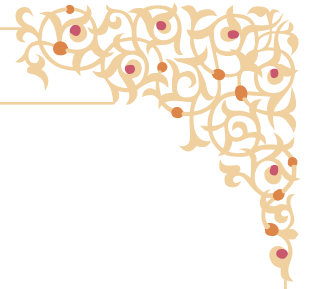


For Example: Mission-Oriented Policy Landscape in Water and Environment

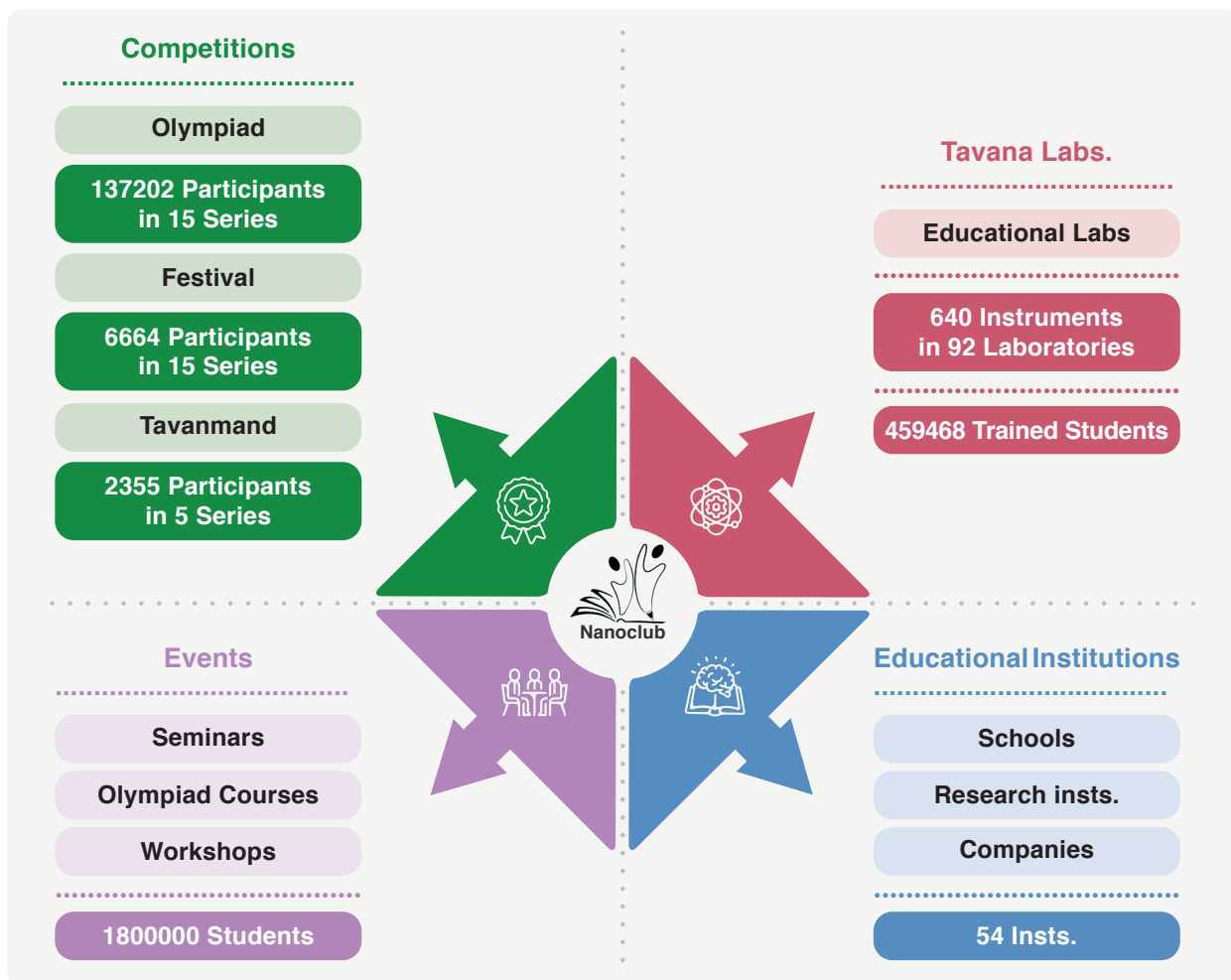
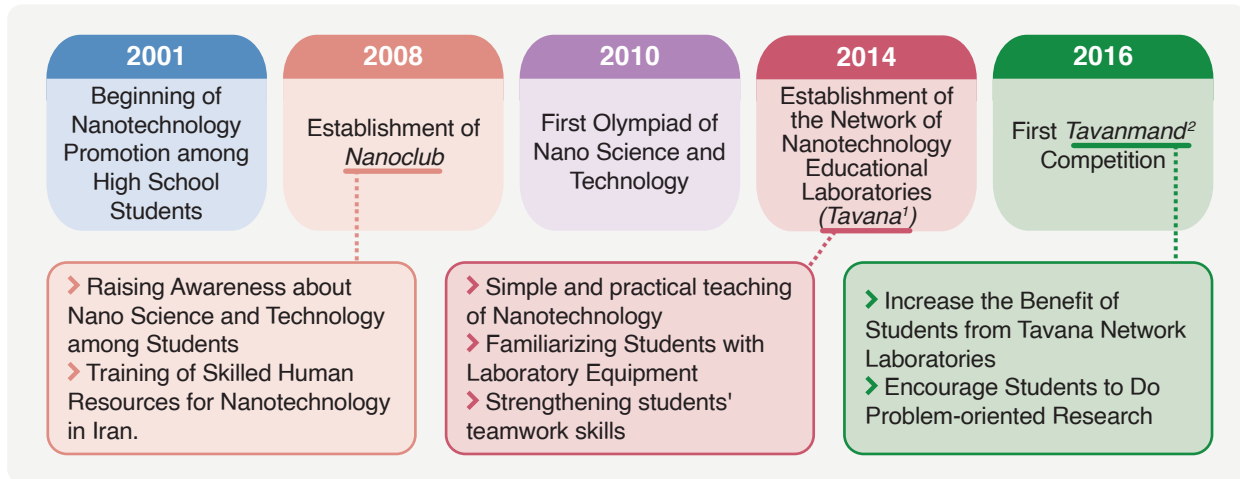




Strategy 1: Raising Public Awareness



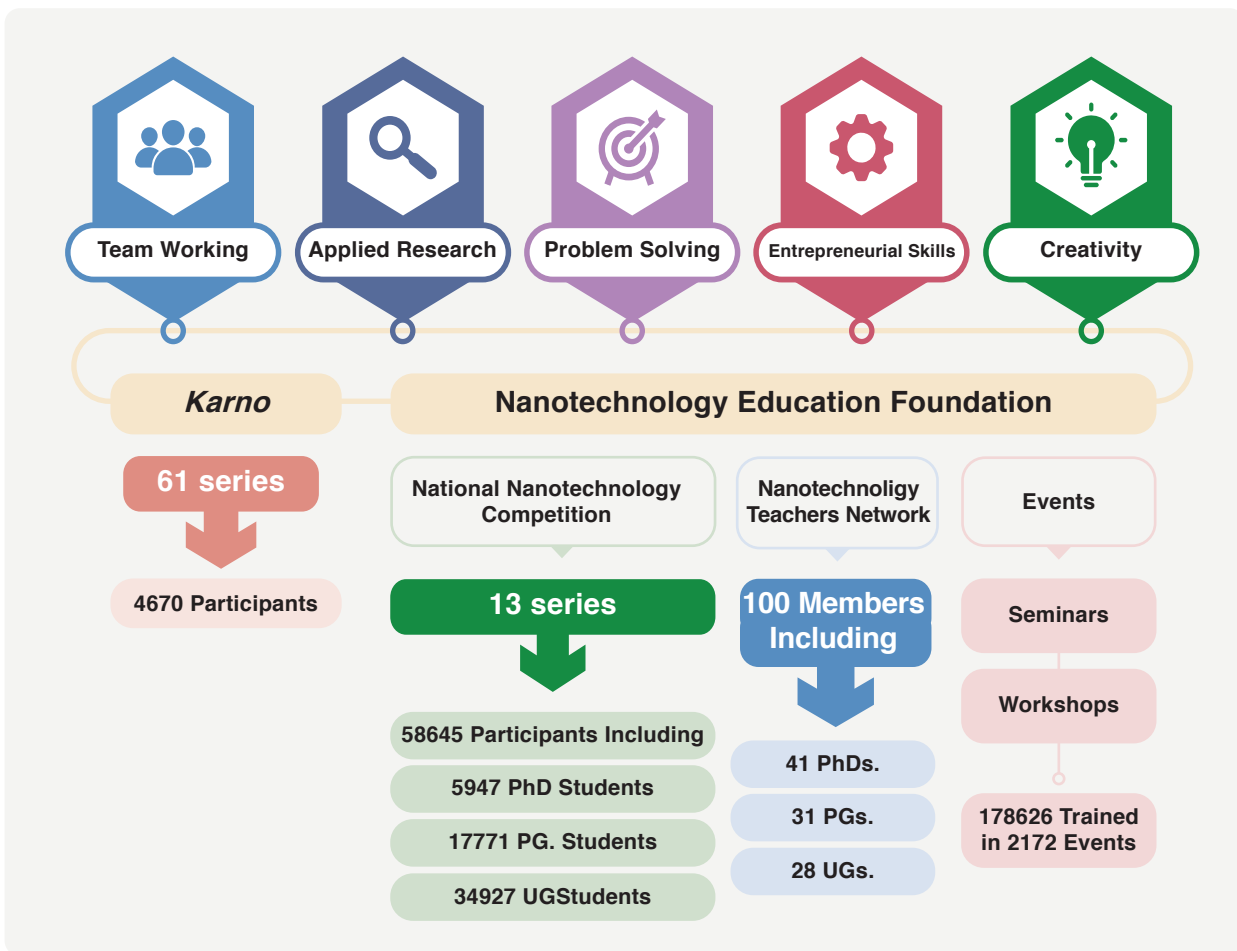
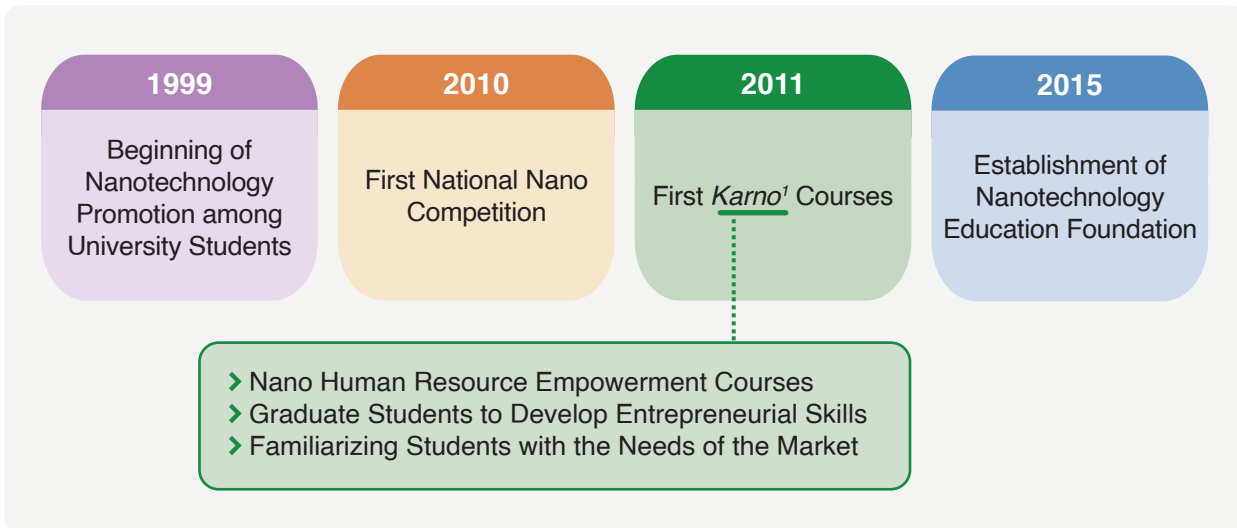
High School Students



1- Tavana is a Persian word that means powerful.
 2- Tavanmand is a Persian word that means capable.



University Students



1- Karno is a Persian word that means new work.



Strategy 2: Enhancing Scientific Research

Nanotechnology Academic Human Resource

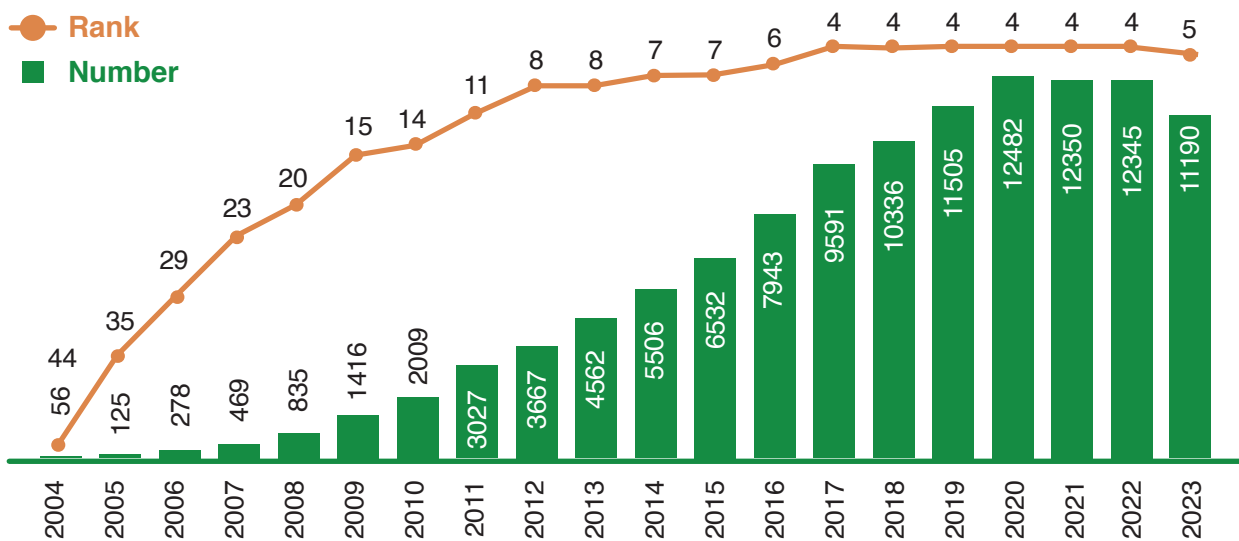
About 42,000 MSc and Ph.D. active Experts Participating in Nanotechnology Research

30 Universities Organizing Nanotechnology Phd Courses

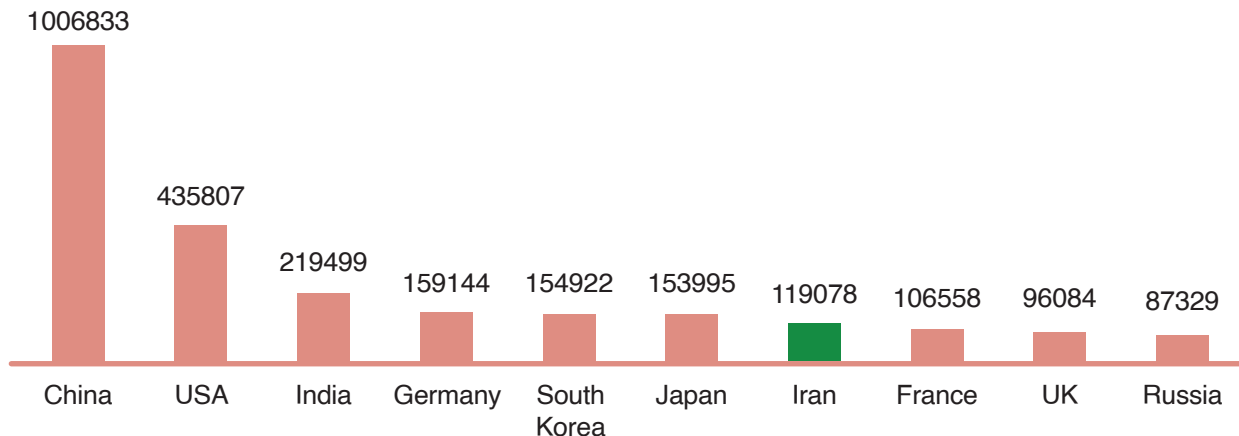
79 Universities Organizing Nanotechnology MSc Courses

Nanopublications

Iran's ISI-Indexed Nanotechnology Articles (Number and Rank) (2004-2023)

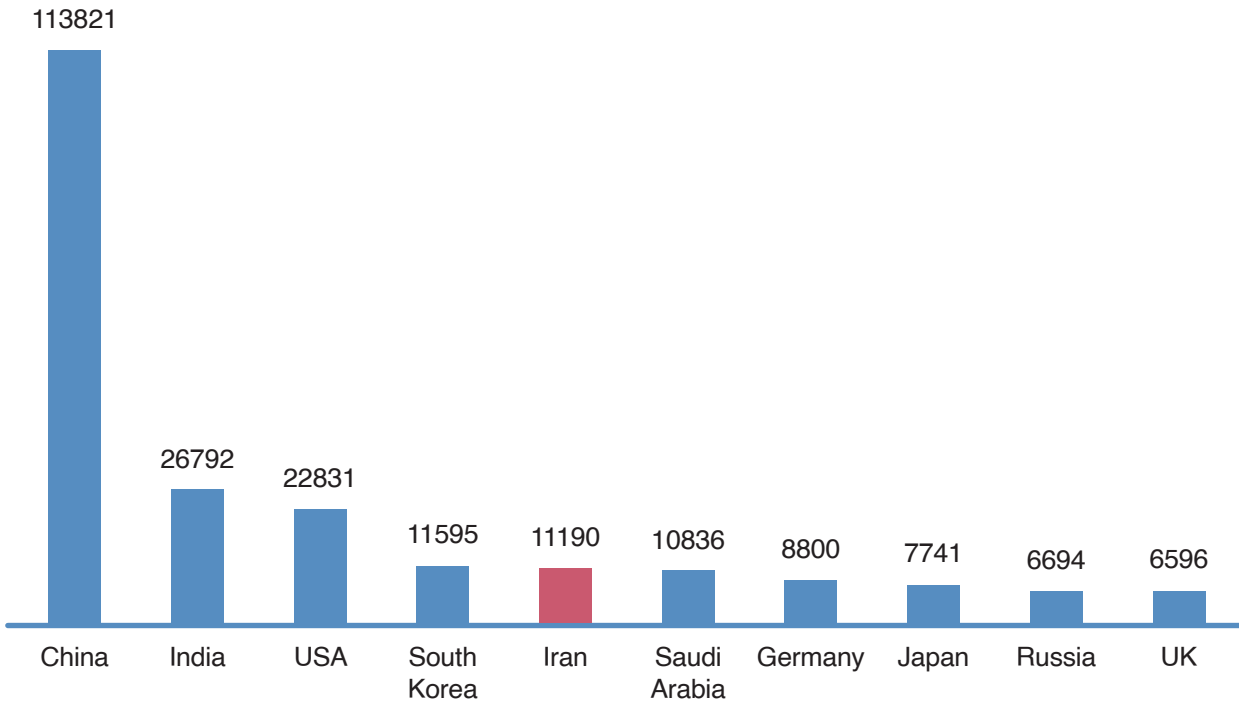


10 Leading Countries in Nanotechnology Publications (Cumulative-2000-2024 [May])

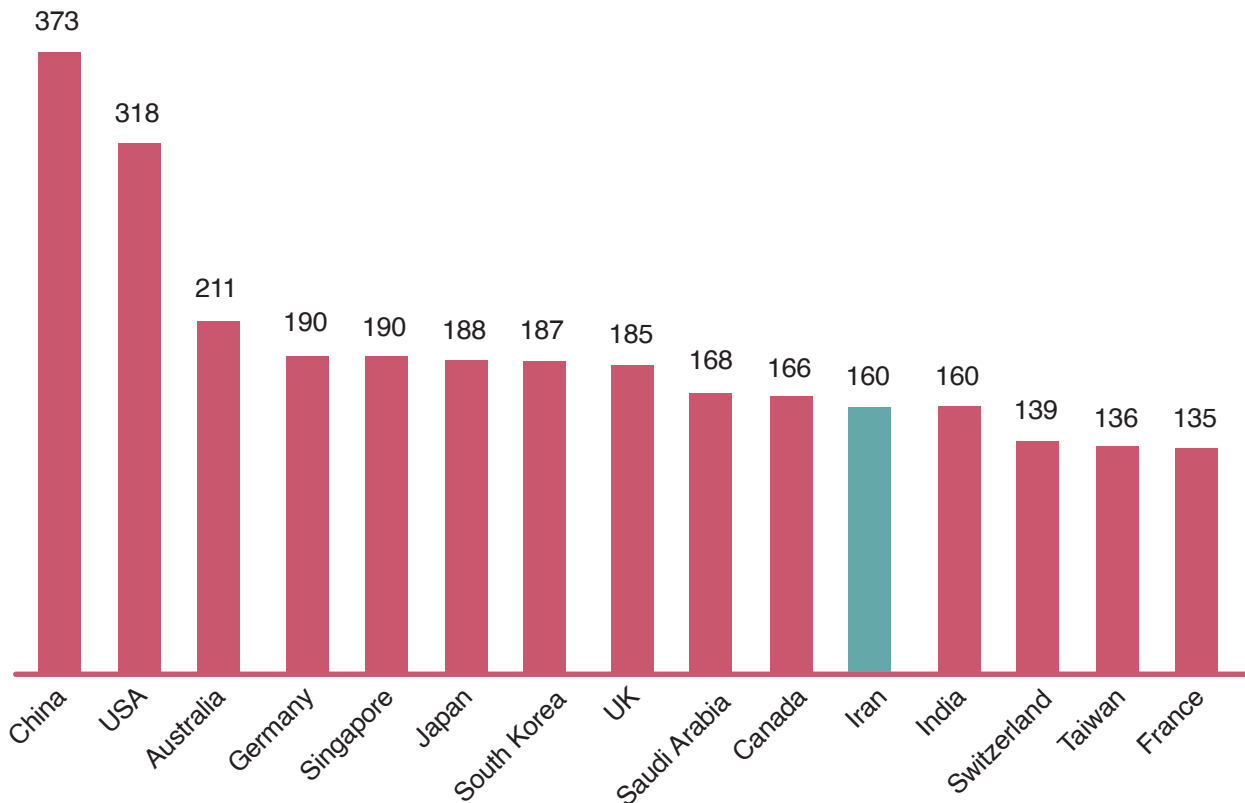


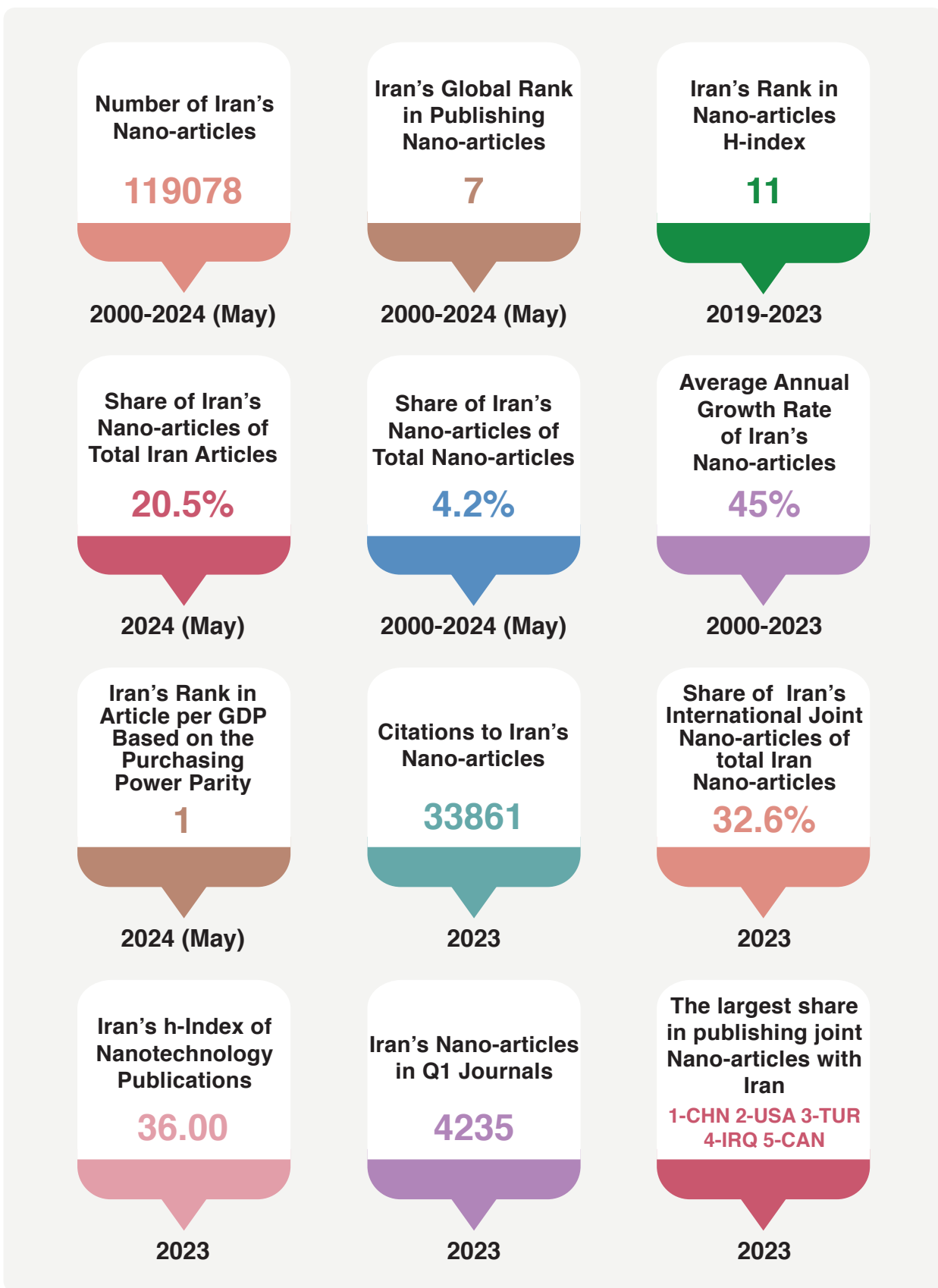
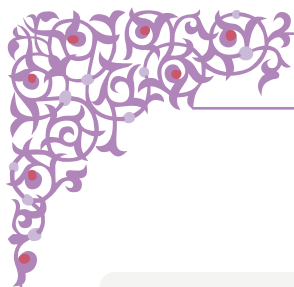


10 Leading Countries in Nanotechnology Publications (2023)



15 Leading Countries in h-index of Nanotechnology Articles (2019-2023)

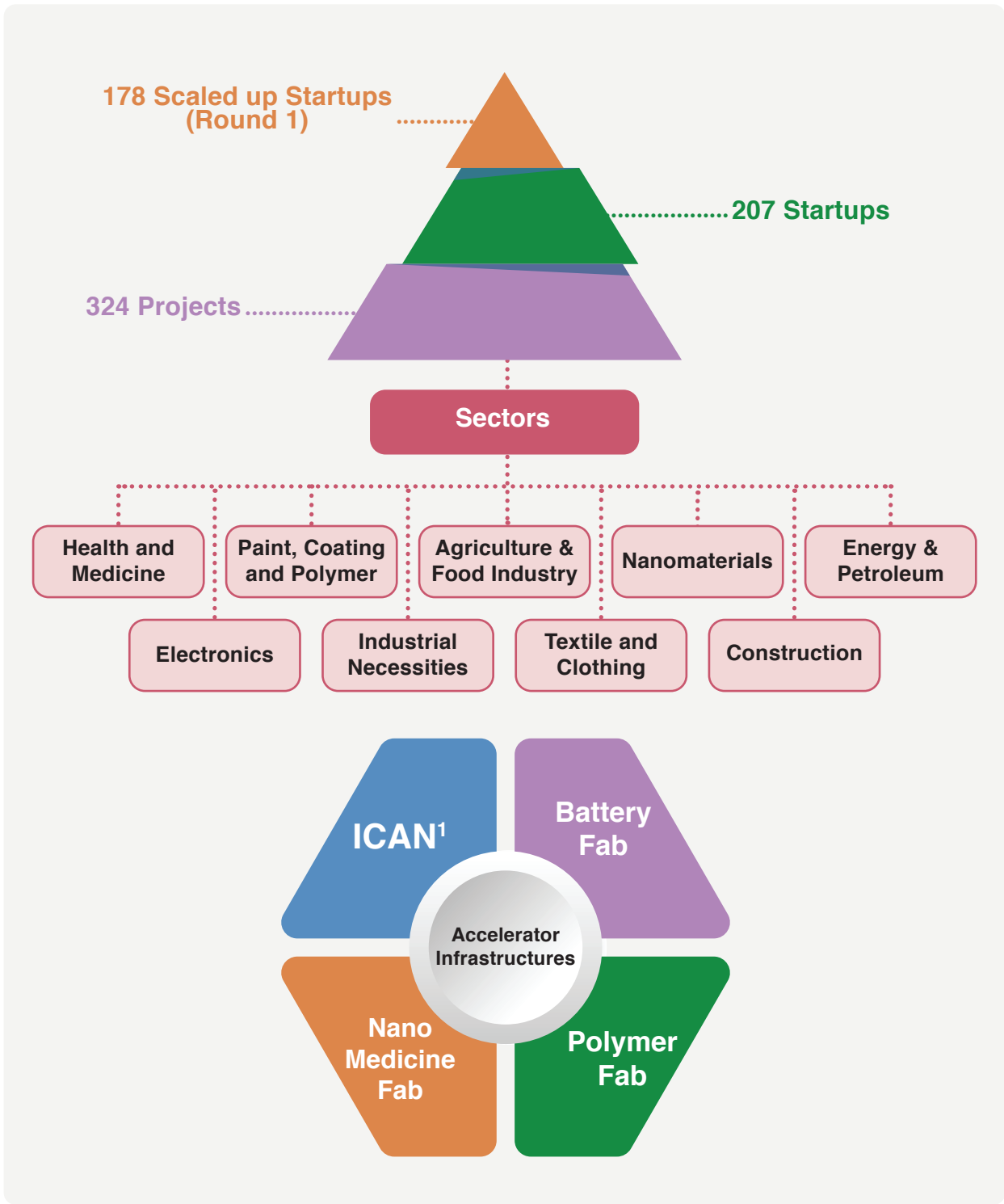




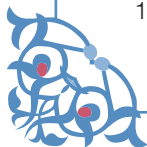


Strategy 3: Infrastructure and Technology Development

Nanotechnology Startups

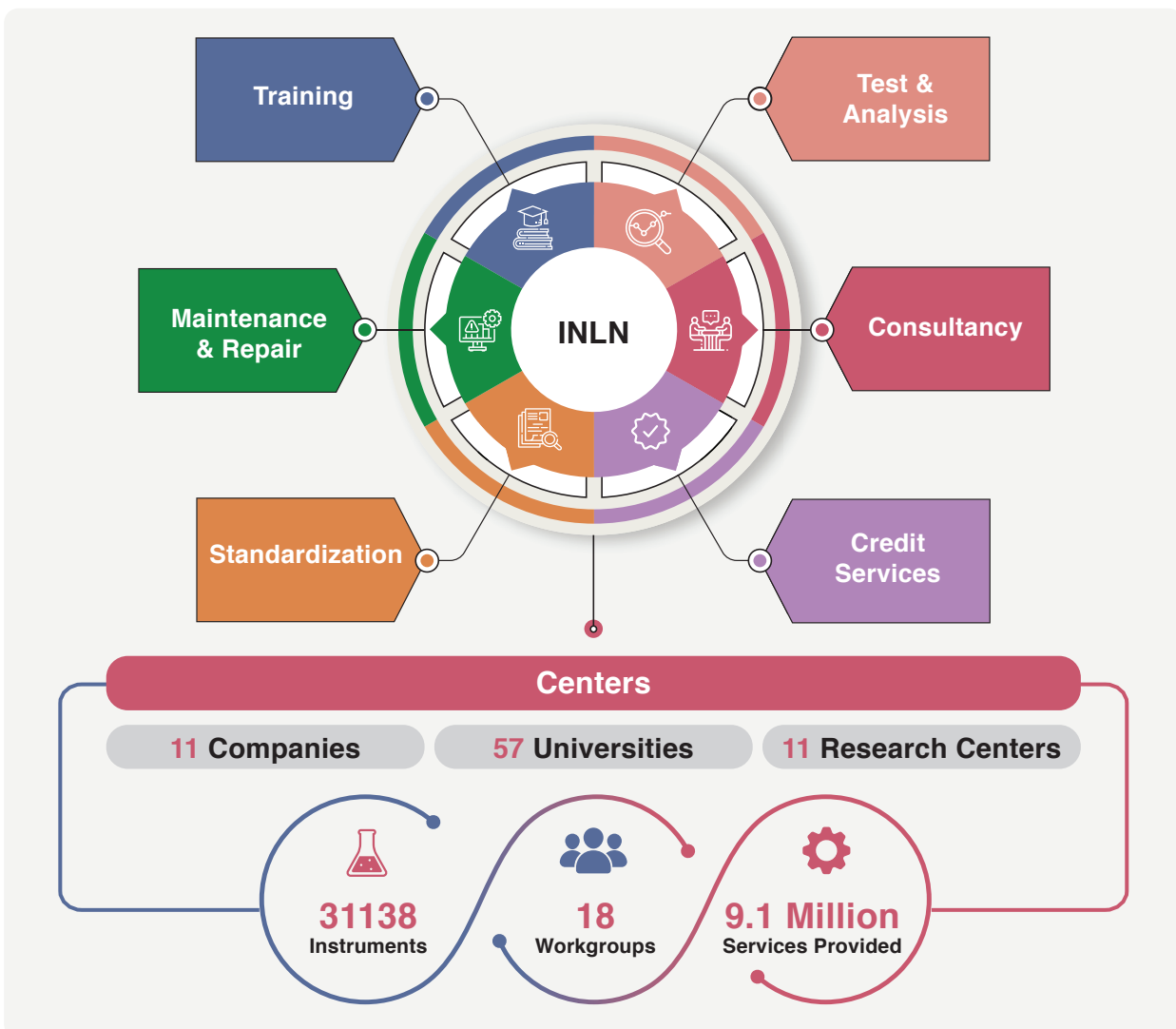
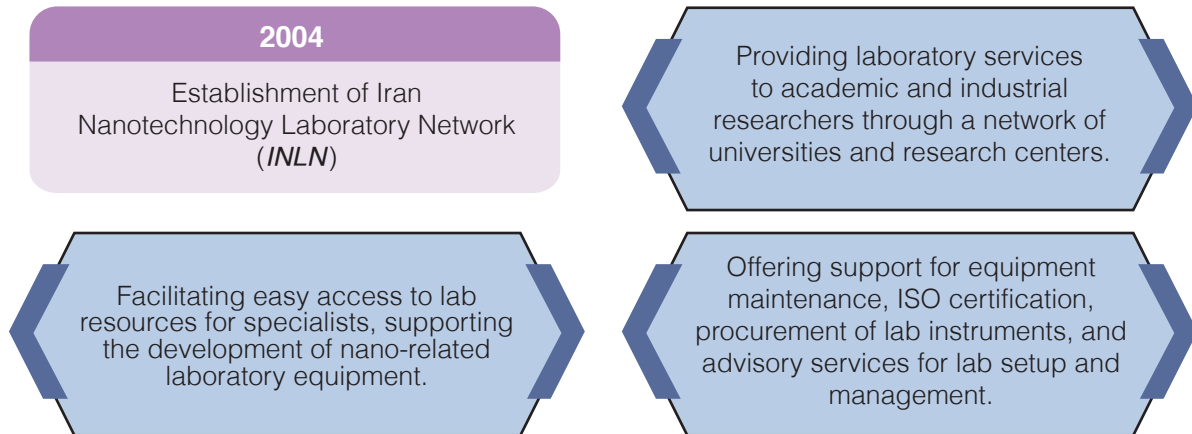


1- Industrialization Center for Applied Nanotechnology



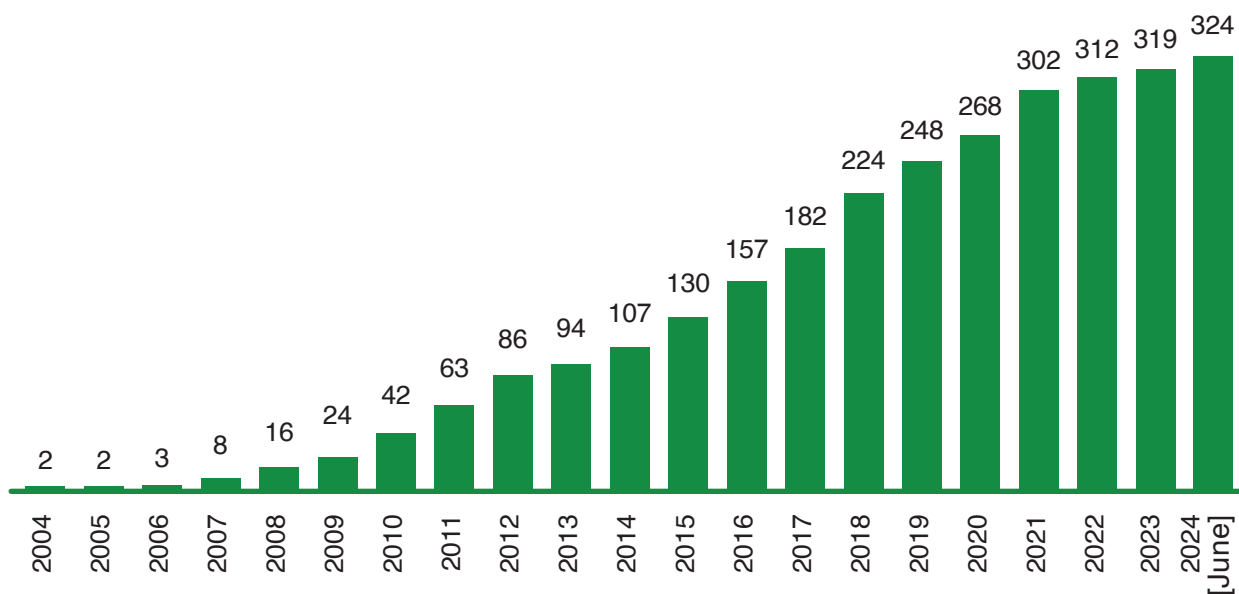


Nanotechnology Laboratory Network



Nanotechnology Patents

The number of Iran's nanotechnology published patent applications (2006-2024 [June])

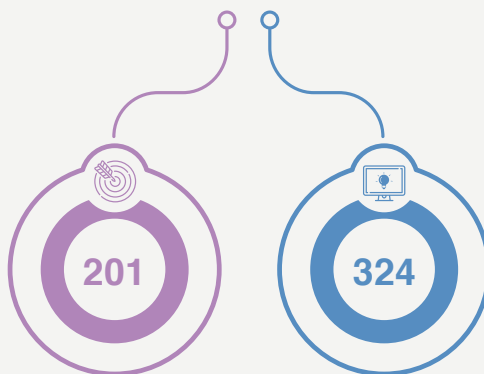


Iran Nanotechnology Patents - By the End of June of 2024

Iran Nanotechnology Patents

33.33% of Iran Patents

0.12% of Worldwide Nanotechnology Patents



Iran Nanotechnology Published Patent Applications



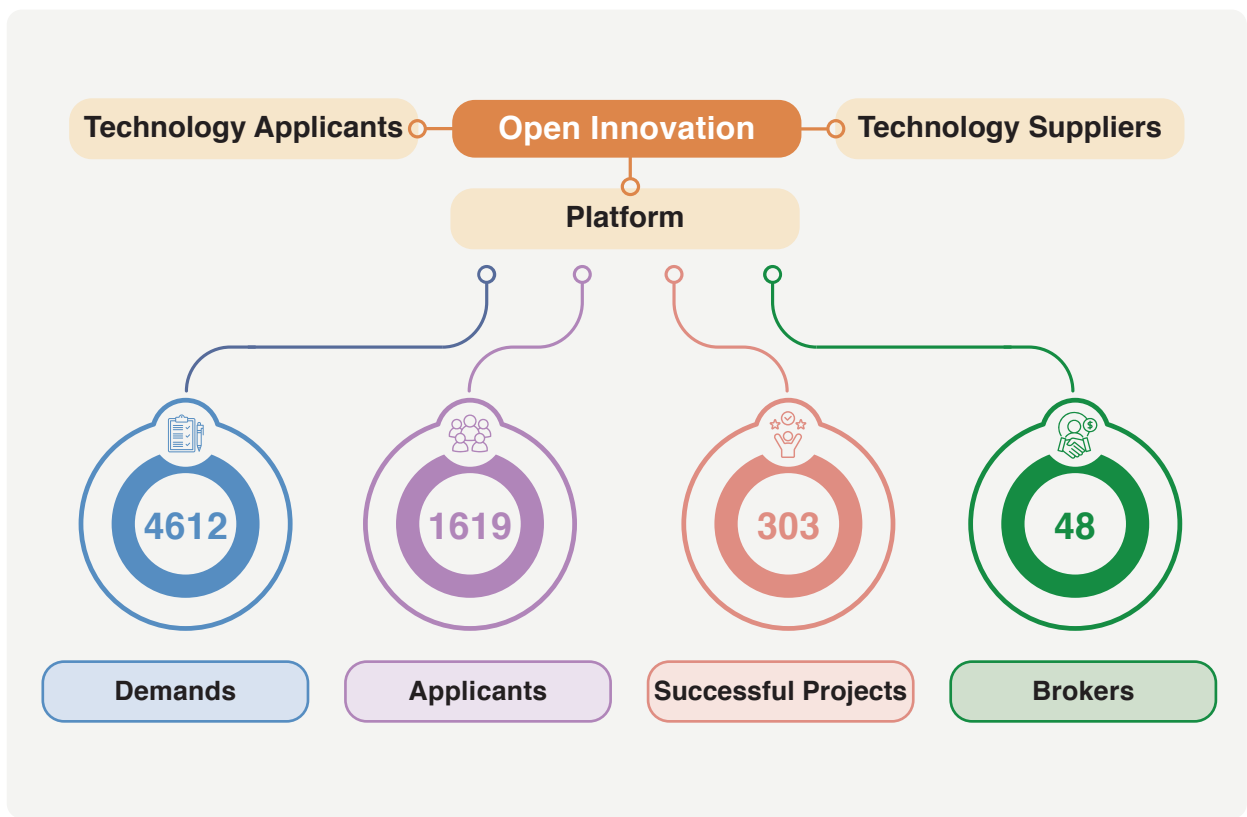
Strategy 4: Industrialization



Nanotechnology Exchange Network

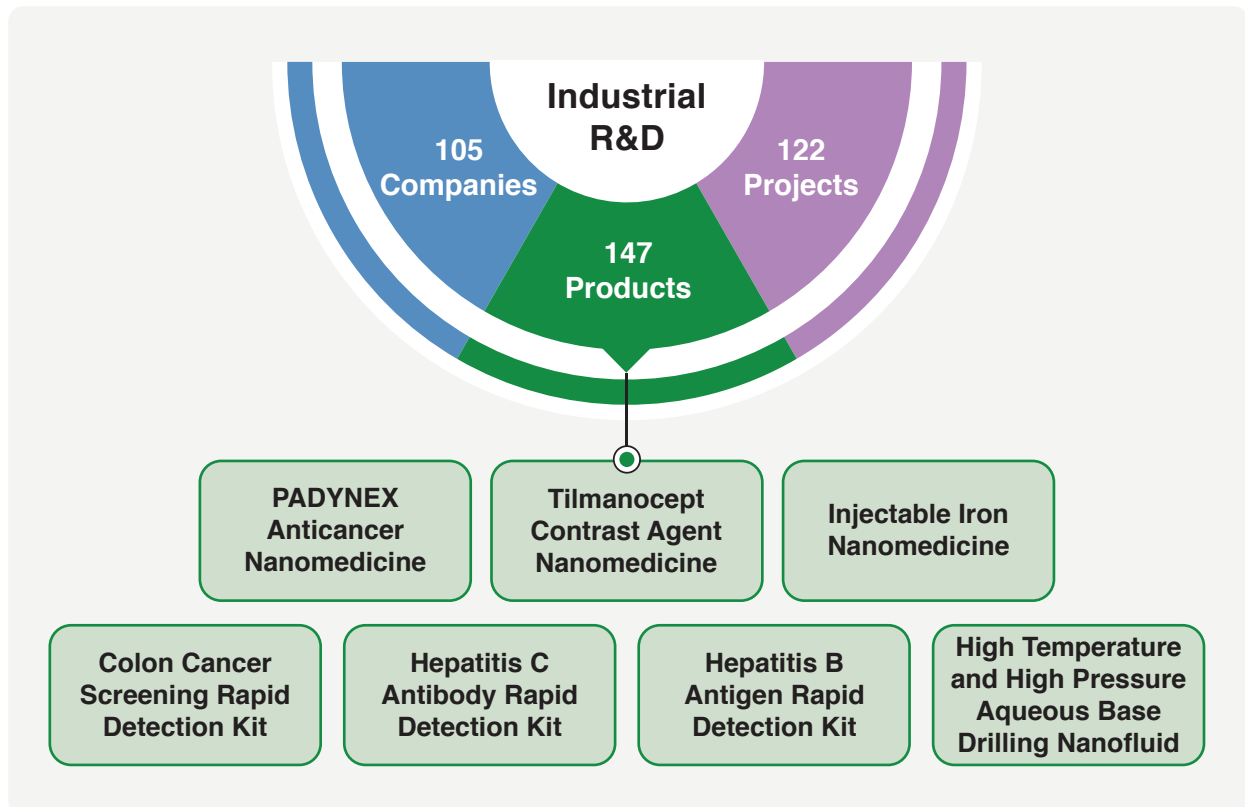
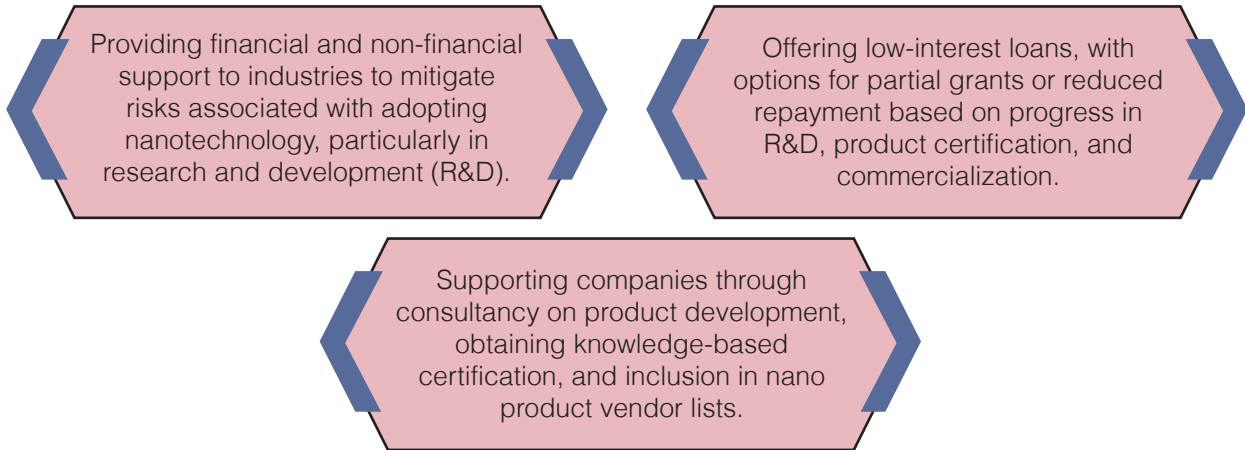
Identifying and addressing technological needs of industries using domestic companies and research institutions.

Offering innovation challenges, consulting for technology management and nano-scale certification, and guidance for obtaining tax credits and knowledge-based certification.



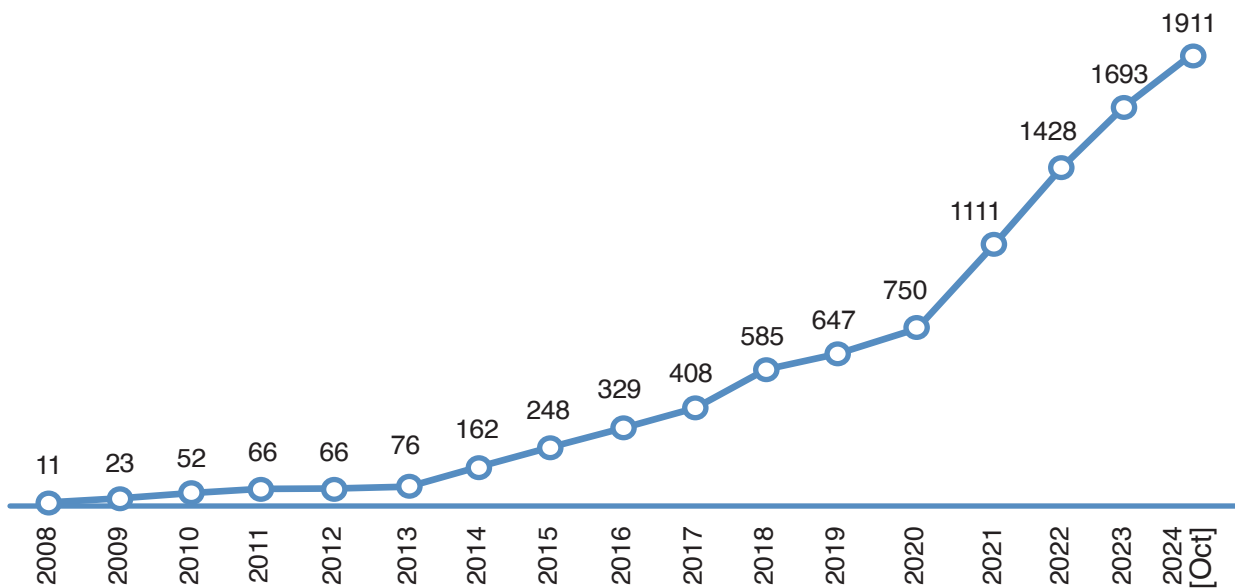


Nanotechnology Industrial R&D

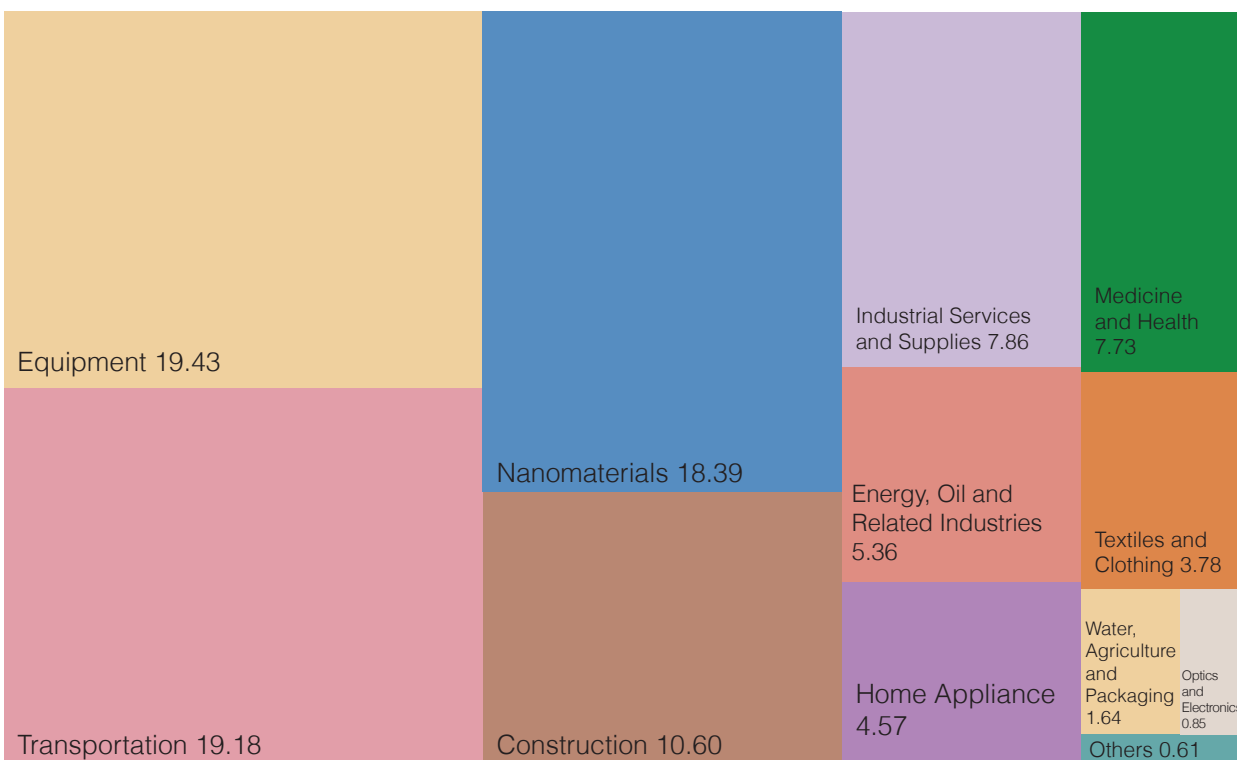


Nanoproducts

The Number of Iran Nanoproducts (2008-2024 [Oct])

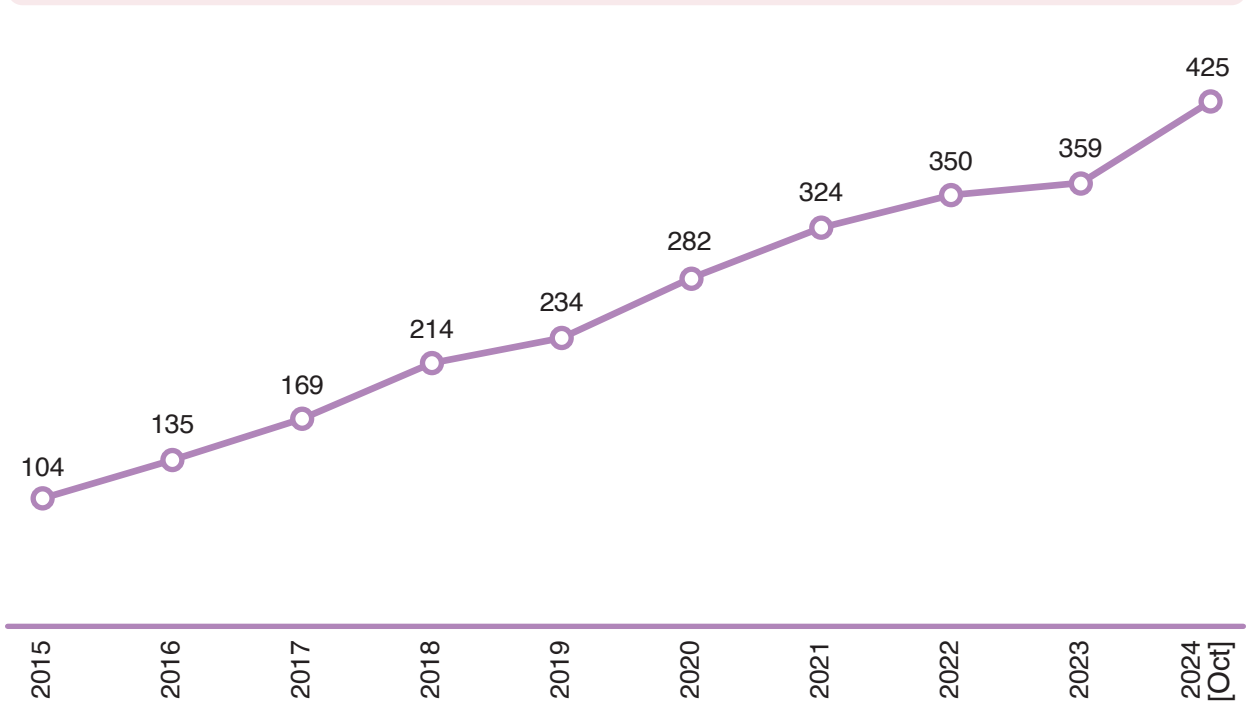


Share of Industrial Sectors in the Total Nanoproducts (%) (2024 [Oct])

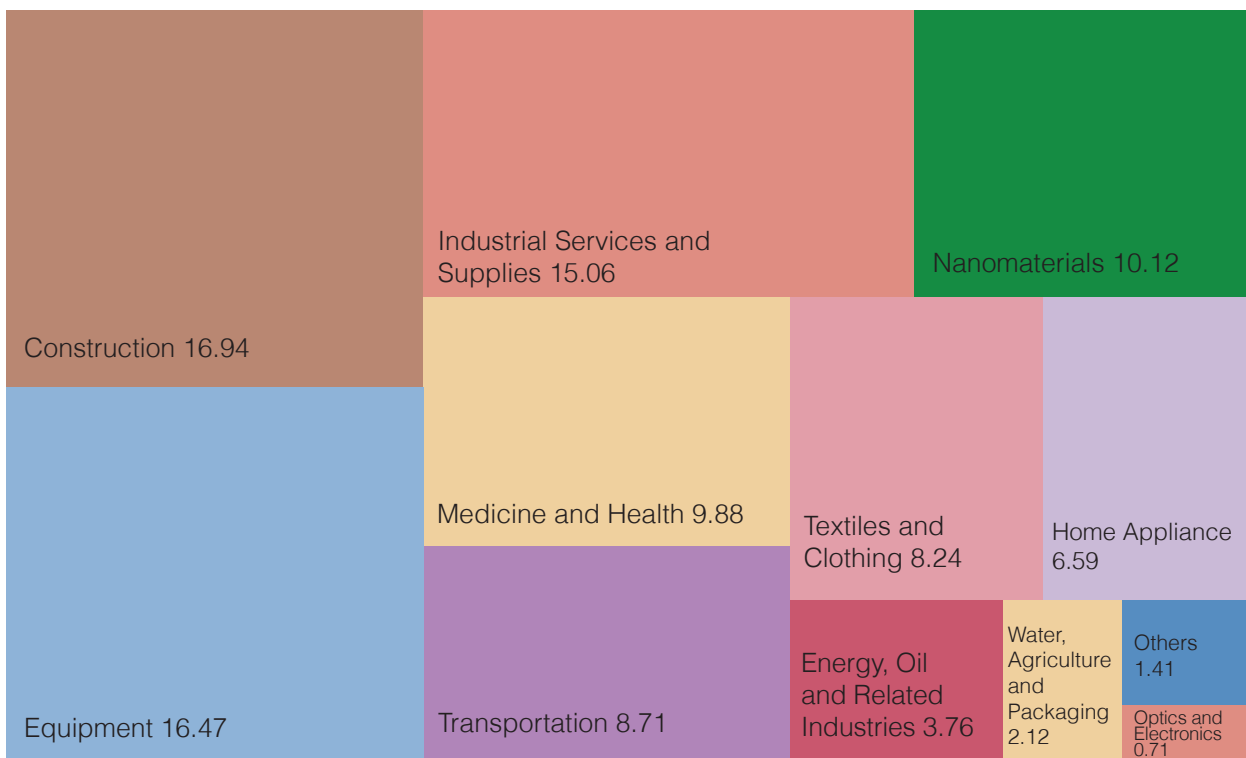


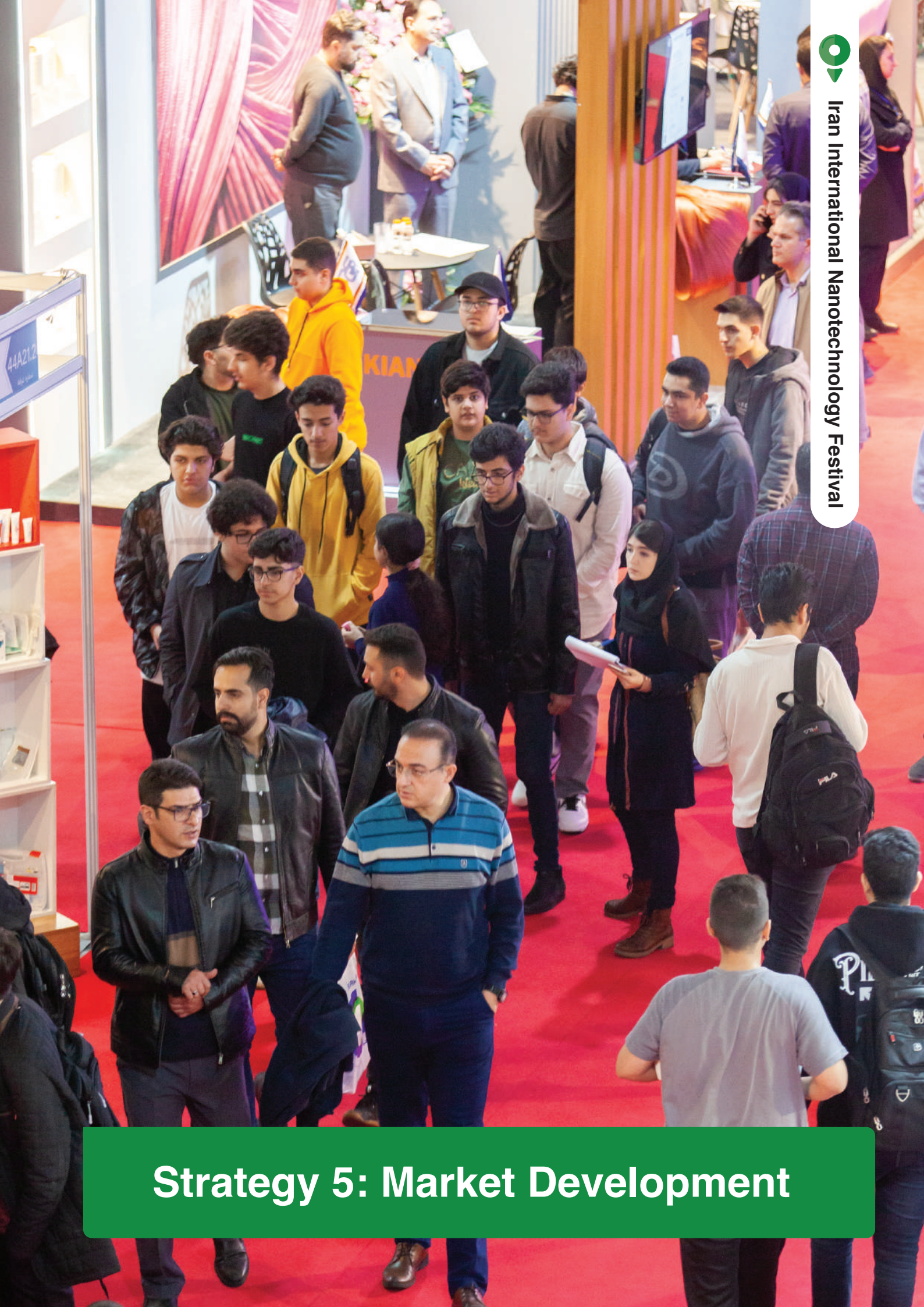


The Number of Iran Nano Companies (2015-2024 [Oct])

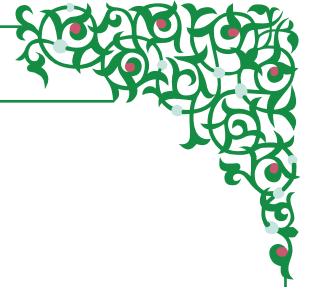


Share of Industrial Sectors in the Total Nano Companies (%) (2024 [Oct])



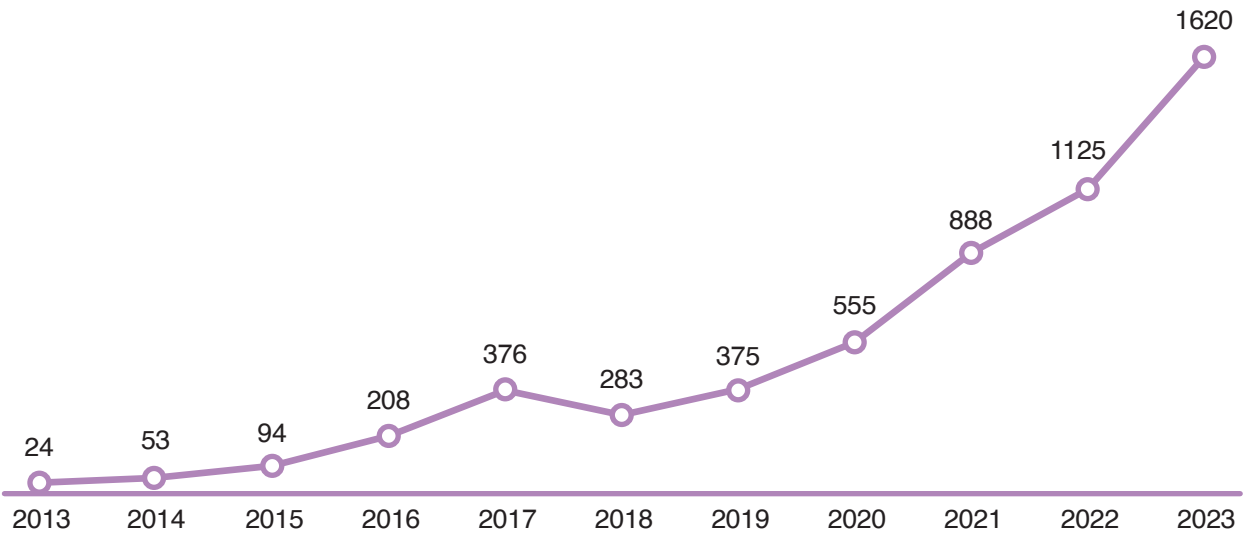


Strategy 5: Market Development

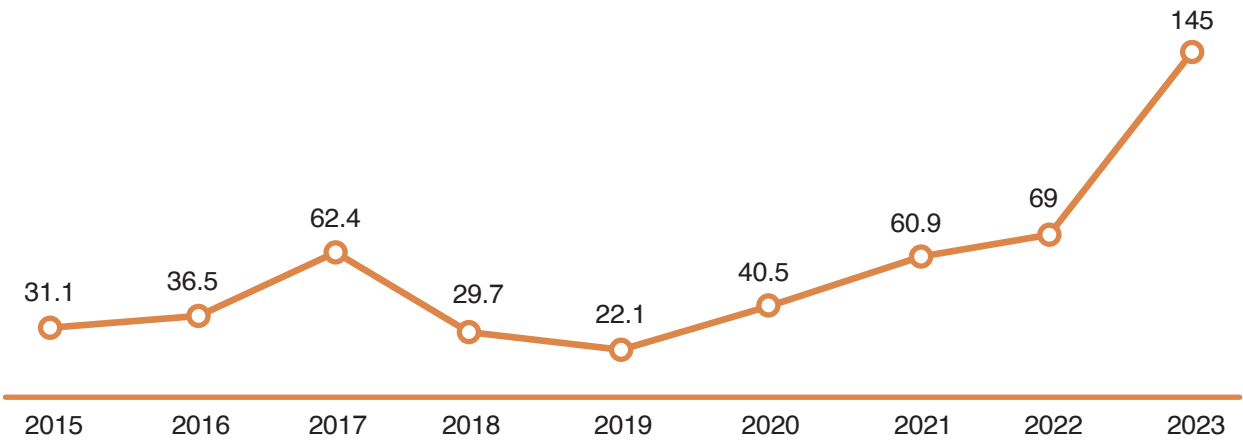


Nano Market Size

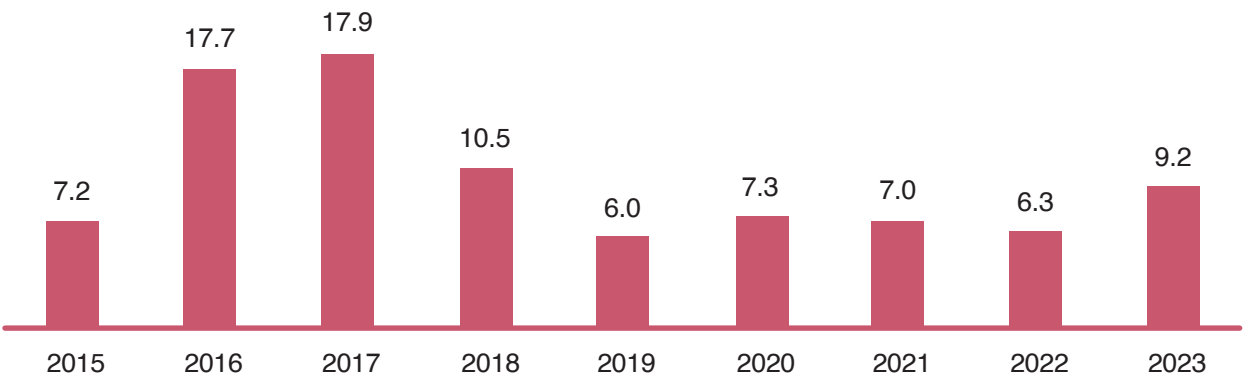
Iran Nanoproducts Market Size (Million \$) (2013-2023)



Iran Nanoproduct Export Size (Million \$) (2015-2023)



Share Of Export in The Total Market (%) (2015-2023)





Nanotechnology Standardization Mark



Strategy 6: Standardization



➔ National & International Nanotechnology Standards

2006

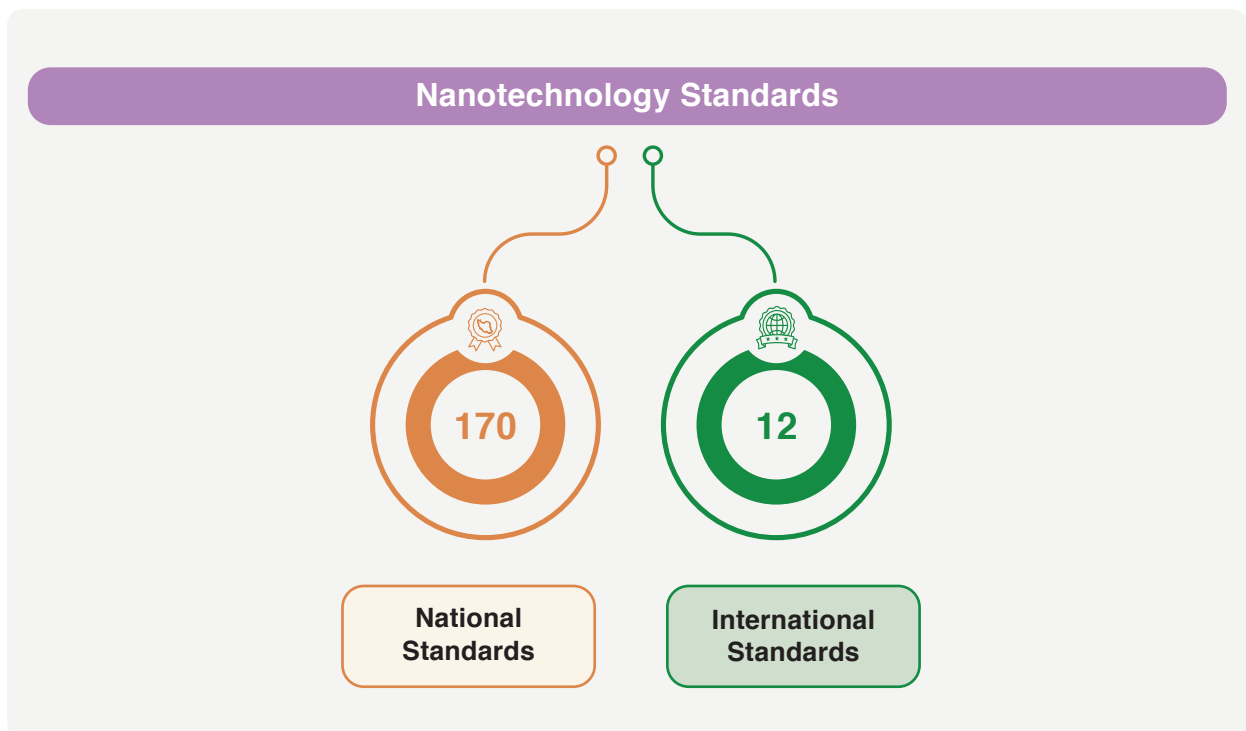
Establishment of Iran Nanotechnology Standardization Committee

ISO/TC229

A Member of ISO Technical Committee on Nanotechnologies

Developing national nanotechnology standards in collaboration with the National Standard Organization of Iran and experts from universities, research institutes, and industrial companies through specialized sessions.

Iran participates in international nanotechnology standardization by establishing a national committee aligned with ISO/TC229, becoming one of the top ten countries responsible for developing international standards.

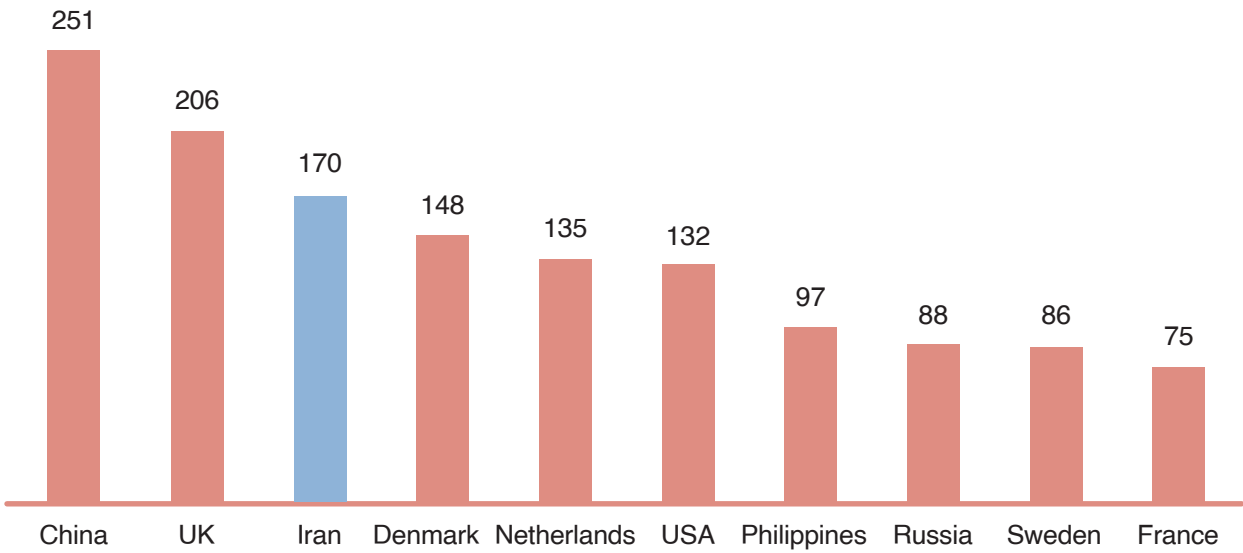


International nanotechnology standards under Iran's leadership

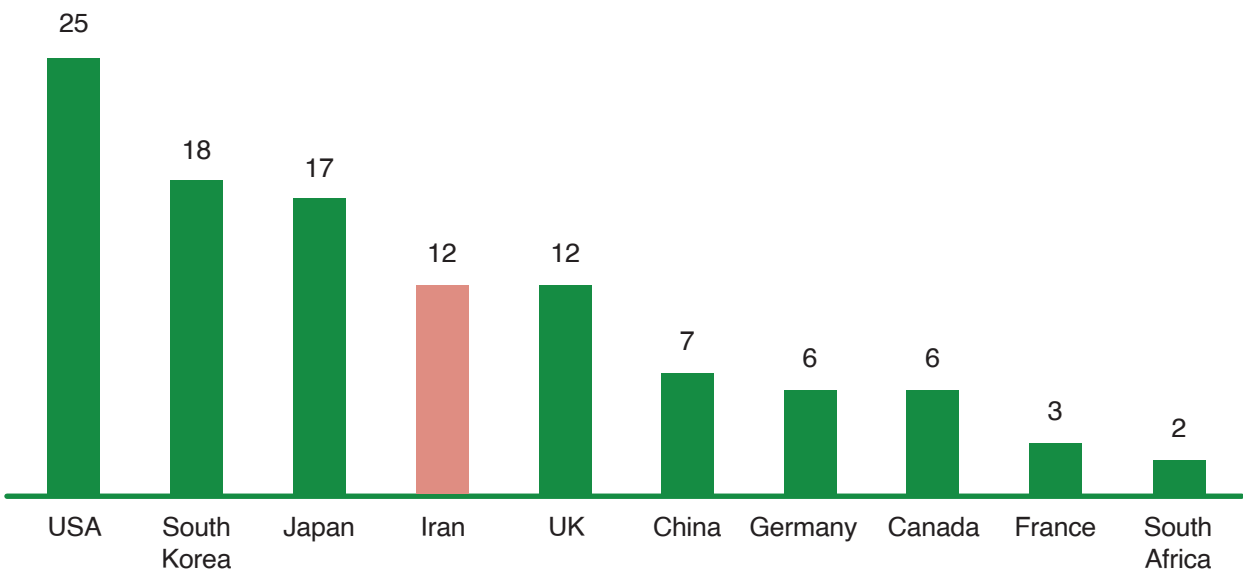
Number	Title	Year
ISO/TR 11360	Nanotechnologies — Methodology for the classification and categorization of nanomaterials	2010
ISO/TS 16550	Nanotechnologies — Determination of silver nanoparticles potency by release of muramic acid from <i>Staphylococcus aureus</i>	2014
ISO/TS 18110	Nanotechnologies — Vocabularies for science, technology and innovation indicators	2015
ISO/TS 20787	Nanotechnologies — Aquatic toxicity assessment of manufactured nanomaterials in salt-water lakes using <i>Artemia sp.</i> Nauplii	2017
ISO/TS 21236-1	Nanotechnologies — Clay nanomaterials — Part 1: Specification of characteristics and measurement methods for layered clay nanomaterials	2019
ISO/TS 21237	Nanotechnologies — Air filter media containing polymeric nanofibres — Specification of characteristics and measurement methods	2020
ISO/TS 21975	Nanotechnologies — Polymeric nanocomposite films for food packaging with barrier properties — Specification of characteristics and measurement methods	2020
ISO/TS 23459	Nanotechnologies — Assessment of protein secondary structure during an interaction with nanomaterials using ultraviolet circular dichroism	2021
ISO/TS 23650	Nanotechnologies — Evaluation of the antimicrobial performance of textiles containing manufactured nanomaterials	2021
ISO/TS 4988	Nanotechnologies — Toxicity assessment and bioassimilation of manufactured nano-objects in suspension using the unicellular organism <i>Tetrahymena sp.</i>	2022
ISO/TS 10818	Nanotechnologies — Textiles containing nanomaterials and nanostructures — Superhydrophobic characteristics and durability assessment	2023
ISO/TS 10689	Nanotechnologies — Superhydrophobic surfaces and coatings: Characteristics and performance assessment	2023



10 Leading Countries in National Nanotechnology Standards (Cumulative-2023))



10 Leading Countries in International Nanotechnology Standards (Cumulative (2023))





Strategy 7: Enhancing International Cooperations



Interaction among International Organizations

Significant collaborations have been carried out among various international organizations to promote advancements in nanotechnology safety, standardization, and innovation.

International partnerships aim to address global challenges and foster cooperation across regions.

INN¹

- › Signing MOU between INIC and INN to develop human resources and improve nanotechnology management in Islamic nations
- › Establishing digital infrastructure, including websites and social media, to enhance information exchange among member countries

ECO²

- › Hosting two steering committee meetings, both in-person and virtual
- › Establishing a website to enhance networking and information exchange
- › Conducting the project titled "Prefeasibility Study of Application of Nanotechnology in Arsenic Removal" in ECO Countries

INO³

- › Creating a global network of students and startup teams to solve world challenges
- › Hosting 1st INO

BRICS-NCMSN⁴

- › Presenting proposals for enhancing collaboration in nanotechnology standardization and nanotechnology laboratory network (at the sixth BRICS working group meeting)

EU-Asia Dialogue on Nanosafety

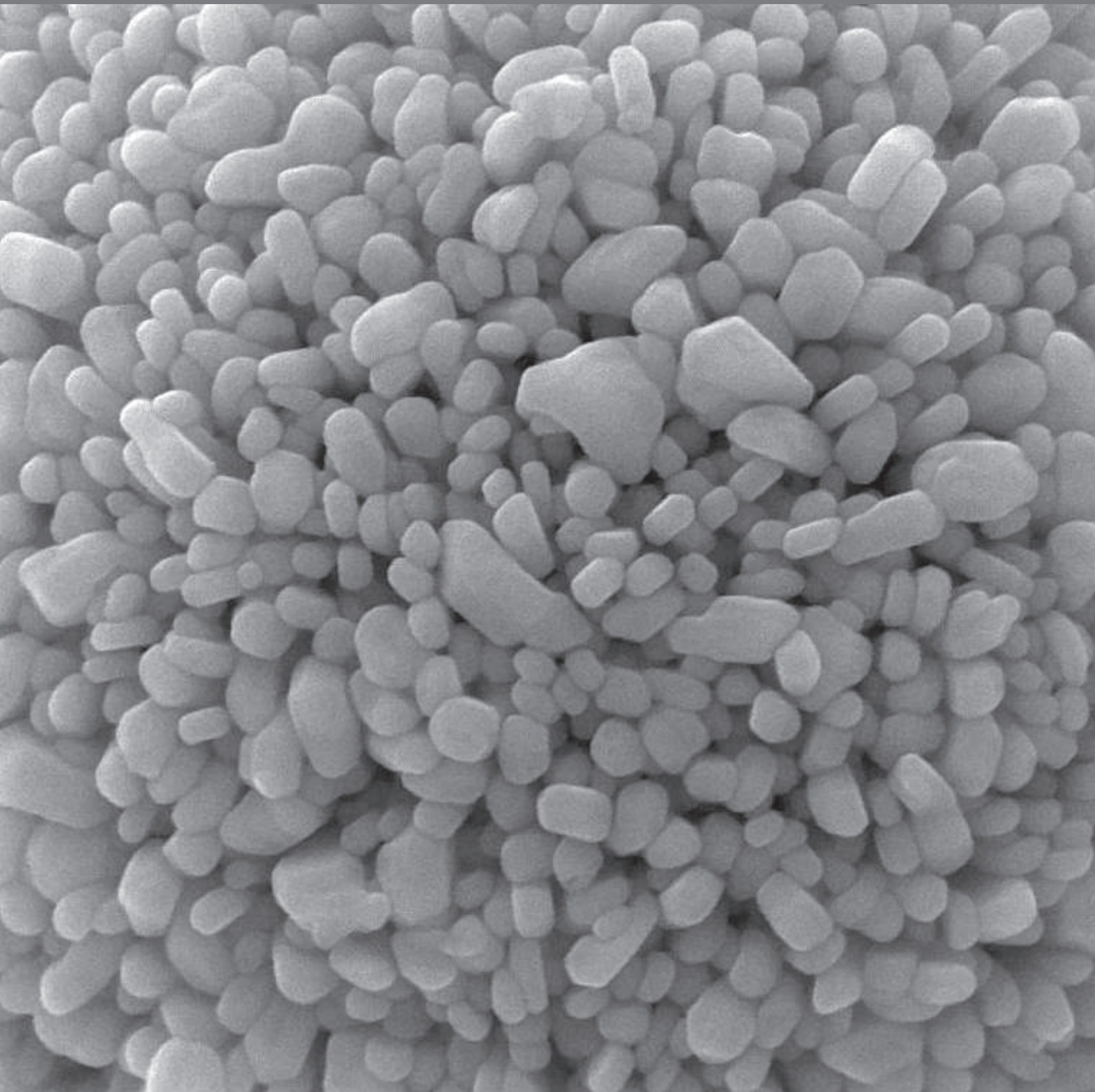
- › Hosting the first Dialogue event to present countries' plans for nano-standardization and safety, and the evaluation and certification method of nanoproducts
- › Presenting a proposal to create a cooperation nanosafety platform in the fourth Dialogue event
- › Developing the conceptual design of nano safety standards and infrastructure sharing along the formation of INISS
- › Taking the responsibility for the standard pillar
- › Holding a workshop on the international needs and challenges of nanotechnology standardization and safety

1- Inter-Islamic Network on Nanotechnology 3- International Nano Olympiad

2- Economic Cooperation Organization

4- The BRICS Network Centre for Materials Science and Nanotechnology

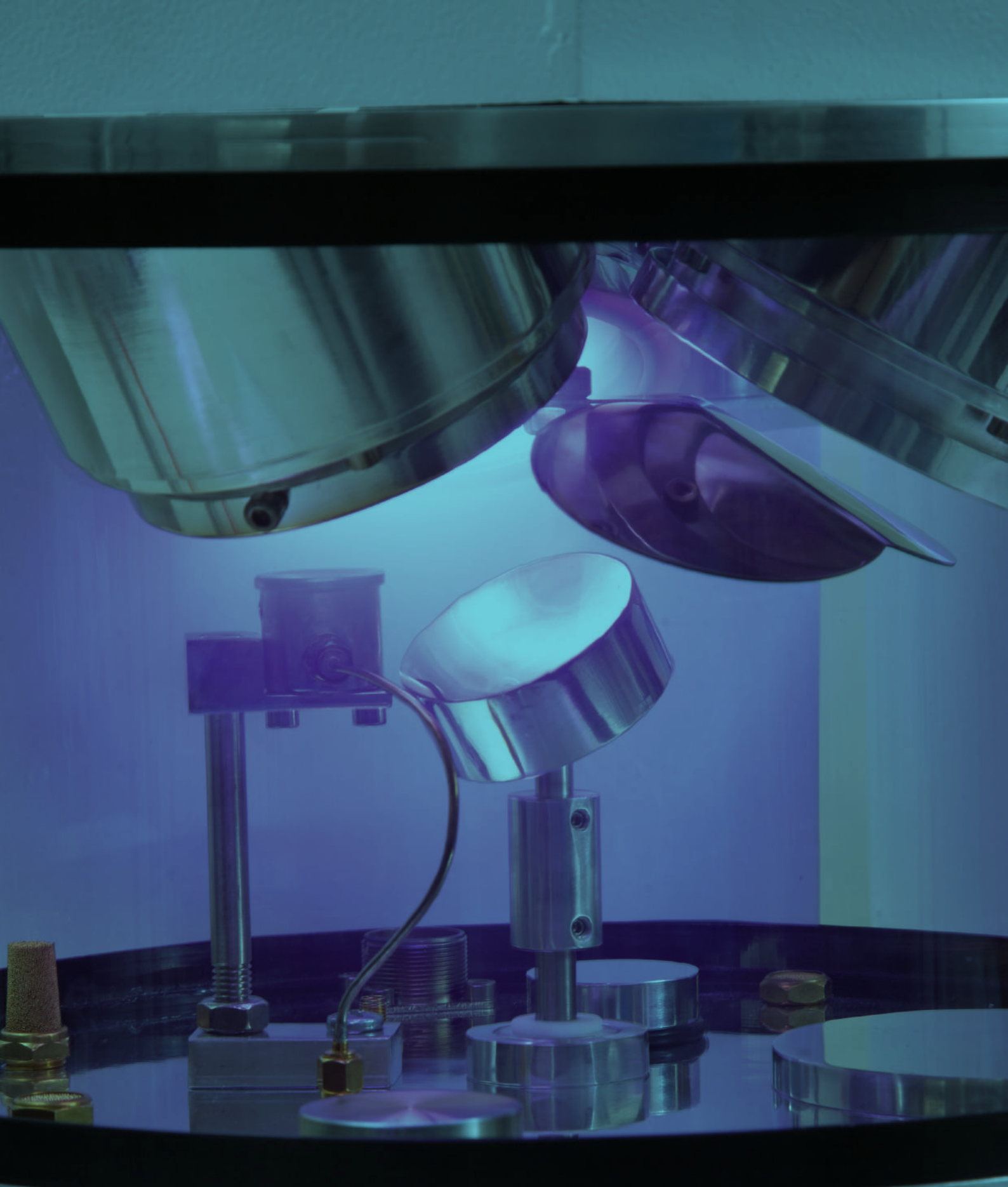




500 nm



Field Emission Scanning Electron Microscopy Image of Nano Silver Powder Taken by Iranian Equipment



Iranian Desk Scanning Electron Microscopy Coater



Iranian Electrospinning Machine



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Innovation Council
(INIC)**