

5. India's Science & Technology Ecosystem- Science & Technology

Department of Science and Technology- Year Ender 2025 India's science and technology landscape in 2025 is marked by rising global rankings (38th in GII) and major strategic missions like ANRF and the National Quantum Mission. However, the sector continues to grapple with structural challenges, primarily limited private sector investment in R&D and the persistent issue of brain drain.

The 2025 Momentum

India's S&T landscape in 2025 is characterized by significant momentum, driven by improved global rankings, massive financial infusion for research, and a strategic focus on frontier technologies. The year marks a shift towards deep-tech capabilities and a stronger innovation ecosystem.

Rising Global Standing in Science and Innovation- India has solidified its position on the global stage through consistent improvements in key indices

Global Innovation Index (GII) 2025- India secured the 38th position, reflecting steady progress and cementing its status among the world's most innovative economies.

Intellectual Property (IP) Filings- Ranked 6th globally, indicating a surge in domestic innovation output and patent creation.

Network Readiness Index- Improved significantly, rising from 79th in 2019 to 49th in 2024, showcasing better digital infrastructure and readiness.

Research Output- Placed third globally in research publications, highlighting an expanding academic and scientific footprint.

Major Government Initiatives

Funding and Strategic Direction

Research, Development and Innovation (RDI) Scheme

Outlay- Approved with a total budget of ₹1 lakh crore over six years.

Objective- Designed to attract private-sector participation in R&D.

Focus Areas- "Sunrise sectors" such as Artificial Intelligence (AI), Quantum Technologies, Clean Energy, Biotechnology, Space, and the Digital Economy.

Anusandhan National Research Foundation (ANRF)

Establishment- Established under the ANRF Act, 2023.

Goal- To seed, grow, and promote R&D and foster a culture of innovation across universities, colleges, and research labs.

Role- Acts as the apex body providing high-level strategic direction for scientific research, aligning with the National Education Policy (NEP).

National Missions on Frontier Technologies

To achieve self-reliance and global leadership, specific missions have been launched with substantial budgetary support

Mission Name	Budget Outlay	Key Objective
National Quantum Mission	₹6,003.65 crore	To make India a leading nation in the development of Quantum Technologies & Applications.
India Semiconductor Mission	₹76,000 crore	To build a robust semiconductor ecosystem (manufacturing, design, and packaging) within India.
India AI Mission	₹10,372 crore	To strengthen domestic AI capabilities and compute infrastructure.
NM-ICPS	[N/A in text]	National Mission on Interdisciplinary Cyber Physical Systems focused on robotics, healthcare, cybersecurity, and mining technologies.

Innovation, Startups, and Inclusive Science

Atal Innovation Mission (AIM)- Continues to encourage entrepreneurship and innovation among students and professionals.

NIDHI (National Initiative for Developing and Harnessing Innovations)

Expansion- Expanded startup incubation to Tier II and Tier III cities.

Support- Set up new incubators, Entrepreneur-in-Residence centres, and supported innovation in advanced manufacturing and medical devices.

Research Parks- Established at IIT Delhi, Guwahati, Kharagpur, Kanpur, and Chennai.

Purpose- Provide an interface between industry and entrepreneurship, allowing companies to set up R&D units in collaboration with IIT students and faculty.

Key Challenges

Despite the progress, structural bottlenecks remain-

Funding Constraints- Private sector investment in R&D remains limited compared to global benchmarks; the heavy lifting is still done by the government.

Talent Retention (Brain Drain)- Skilled researchers continue to migrate abroad due to better infrastructure, funding, and career advancement opportunities.

Weak Industry-Academia Linkages- The disconnect between universities and industries hinders the commercialization of research; lab innovations often struggle to reach the market.

Skilled Workforce Deficit- There is a shortage of trained R&D professionals specifically in deep-tech and interdisciplinary fields.

Way Ahead

Strategic Vision- The concerted efforts reflect a vision to become a global leader in S&T.

Accelerating Capabilities- India must fast-track development in frontier technologies to maintain its improved standing.

Future Priorities- Focus on talent retention (reversing brain drain). Enhancing technology commercialization. Building global partnerships to address shared challenges. Driving technological self-reliance for sustainable growth.

Source- <https://ddnews.gov.in/en/explainer-how-indias-science-and-technology-ecosystem-strengthened-in-2025/>