

Making India a Top 3 S&T Nation: Building a Virtuous Institute Industry Ecosystem Cycle: A Panel Discussion

Hosted by the Foundation for Advancing Science and Technology (FAST India)

Panellists:

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Introduction

The discussions aimed at catalysing India's ascent to a leading position in global science and technology (S&T). Hosted under the theme "Making India a Top 3 S&T Nation: Building a Virtuous Institute-Industry Ecosystem Cycle," the discussion convened eminent experts to deliberate on strategic pathways for India's transformative journey.

Acknowledging India's current S&T standings between 9th to 15th globally, the dialogue focused on fostering an exponential leap forward. Key areas of focus included enhancing government interventions, reforming institutional frameworks, and strengthening industry-academia collaborations to propel India towards global S&T leadership.

This brief encapsulates critical insights and recommendations derived from the session.

Summary of the discussion

- Explored various innovation models such as recombinant innovation and DARPA, adapting them to India's context for enhancing research efficacy and outcomes.

- Suggested need to bridge innovation and research and development for economic growth with stronger industry engagement with institutions.
- Identified the need for educational reforms to align with global standards, attract top talent, and facilitate technology transfer from academia to industry.
- Discussed the integration of emerging technologies like AI into research fields, emphasising their role in driving disruptive advancements and competitive edge.
- Addressed the importance of fostering public trust in science and promoting the societal benefits of research, essential for sustained investment and growth.
- Concluded by suggesting development of a roadmap emphasising flexible, incentivized policies that harness India's inherent strengths in innovation and promote self-organisation in the S&T sector. Some of the elements of such a roadmap as discussed are described below.

Summary of new policy suggestions discussed:

- Mandate industries to allocate a percentage of their revenue to academic research through CSR funds.
- Standardise and improve the competitiveness and transparency of funding processes.
- Funding agencies should prioritise meeting timelines for research grant disbursement.
- Promote research to be conducted by a variety of stakeholders, including civilian scientists.
- Develop policies to mandate and incentivize industry-academia partnerships, similar to the Uccharat Avishkar Yojana (UAY).
- Relax restrictions on hiring non-Indian passport holders and allow academic staff to supplement salaries through industry engagement to retain talent.
- Leverage public support in sectors like space and pharmaceuticals to build trust in basic science and increase philanthropic contributions by way of stronger science communication efforts.
- Create policies to enhance the ease of conducting scientific research and incentivize innovative and inquisitive efforts.
- Enable institutions to generate revenue from research overheads, following models used by top global institutions.
- Utilise AI and technology to design new research methodologies and innovations.
- Streamline and simplify regulatory processes impacting the ease of doing science to reduce bureaucratic delays.

Challenges discussed

Low Industry Investment in R&D

- India's investment in science and technology in R&D for academia comes to around 0.3% of the GDP (after allocations to DRDO and ISRO) while still having numerous spending regulations hindering effective use.
- Mandate industries to spend a certain percentage of their revenue on academic research as suggested in ANRF. For example, by directing Corporate Social Responsibility (CSR) funds towards academic institutions.

Funding and Resource Allocation

- The Vannevar Bush Model (The “research contract,” whereby public funds are awarded to civilian scientists and engineers based on effort, not just outcomes) privileges the PI approach and favours a peer- review process. It could potentially work for India.
- Inefficient and inconsistent allocation of research funds, often delayed and insufficient to meet the needs of researchers.
- Make funding processes more competitive, transparent, and standardised.

Lack of Collaboration between Academia and Industry

- India ranks poorly in investments in higher education and academia-industry collaboration. The focus should shift from merely publishing papers to fostering impactful and disruptive science.
- Create government policies that mandate and incentivize industry-academia partnerships similar to the Uchatar Avishkar Yojana (UAY).

Low Global Ranking of Indian Institutions

- Indian institutions rarely rank in the top 100 globally. The U.S. serves as a model, with its higher education system such as MIT and Stanford being a major source of innovation
- Align missions and strategic goals with national innovation goals to attract global talent.
- To retain talent, relax government restrictions on hiring non-Indian passport holders and allow academic staff to augment salaries through industry engagement.

Public Trust in Science

- There is a need for increase in public engagement and communication about the importance of basic research.
- Leverage public support in popular sectors like space and pharma to extend trust to basic science to increase philanthropies, build opportunities in sciences backed by public mandate.

Structural and Policy Barriers

- Despite being the 5th largest economy and excelling in research publications, India's innovation ranking is low. Structural changes are needed to translate research into innovations.
- Develop flexible policies that adapt to changing global research trends.
- Create policies that incentivize self-organisation (mission mode programme) and innovation.
- Complex regulatory processes and bureaucratic red tape hinder the ease of doing research in India. There is a need to streamline and simplify regulatory processes to reduce bureaucratic delays.
- Create policies to improve the ease of doing science, similar to ease of doing business initiatives and incentivise researchers to be inquisitive and acquisitive.

Sustainable Financial Models

- Dependence on government funding or tuition fees is not sustainable in the long term. Timely dispersal of research funds is a critical issue. Researchers are not asking for increased R&D allocations but for timely access to promised funds. Consistent underfunding hampers scientific output and business ease.

- Private and philanthropic funding as suggested in the ANRF Act by the National Research Foundation to emulate the startup culture's success
- Allow institutions to generate revenue from research overheads, similar to models in top global institutions.

Integration of AI and Advanced Technologies

- There is limited integration of AI and other advanced technologies in research. Embracing AI and technology in research can drive significant advancements in innovation
- Today, AI is essential in designing CRISPR technology and other innovations. Utilise AI and technology in designing new research methodologies and innovations.

In conclusion, fostering innovation requires diverse models, well-designed schemes, appropriate incentives, and simplified rules. With these in place, self-organisation will naturally occur, leading to thriving science and technology sectors. Recent government support and policies indicate a positive trend, suggesting that with the right institutional designs, India's R&D can achieve great outcomes.