

## Science and Technology Cooperation: Shaping the Future of India-Vietnam Ties

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Building on long-standing cooperation, this forward-looking partnership brings S&T cooperation to the centre-stage, reflecting a shared commitment to innovation-led development and addressing common challenges through collaborative research and capacity building aligned with emerging technologies and sustainable development priorities. India and Vietnam have also agreed to implement this enhanced comprehensive partnership through exchange of experiences in formulating scientific research policies and commercialising technology, also promoting joint funding for research, expanding sharing of research infrastructure and laboratory systems. Sneha Sinha writes.

India and Vietnam elevated their ties to ‘Enhanced Comprehensive Strategic Partnership’ during Vietnamese President To Lam’s state visit to India. Significantly, the Joint Statement and President Lam’s address at the *Vietnam-India Innovation Forum* underlined how both countries see science and technology cooperation as the defining pillar of their bilateral ties, in a rapidly changing Indo-Pacific, together with growing techno-nationalism, tech-sovereignty and competition, supply-chain realignments, climate vulnerabilities, and emerging technologies. In his address, President Lam highlighted that rapid technological breakthroughs are transforming production methods, and thereby science, technology and innovation are critical for strengthening countries’ development capacity. Recognising convergence between the two countries, the President called for technology cooperation in the deep-tech sector, focusing on artificial intelligence, semiconductors, digital technology, biotechnology, clean energy and smart manufacturing. He also emphasised co-research, co-development, co-production and a technology talent corridor.

India-Vietnam relations, established formally in 1972, have expanded from political engagement to cooperation in defence, trade, maritime security, and development. Science and technology cooperation initiated in the late 1970s, has since evolved into areas such as ICT, biotechnology, space applications, and digital infrastructure. In 2021, first-ever MoU on scientific and technical cooperation in marine science and ecology was signed. It thus brings together the two countries in exploring the blue economy and technology sharing in the maritime sector. India and Vietnam work together on science and technology through a bilateral cooperation program that supports exchanges between scientists and researchers. The programme is overseen by the Joint Science & Technology Committee. Additionally, the two countries also collaborate through the India-ASEAN Science & Technology program, with provisions for human capacity building and joint research projects in priority areas of research.

This year marks a decade of Comprehensive Strategic Partnership between India and Vietnam. As both countries emphasise technological self-reliance, face climate and natural disaster vulnerabilities, the joint statement places science and technology, including critical and emerging technologies as a core

pillar of bilateral ties. Beyond economic and defence sectors, greater emphasis is on future-oriented domains such as DPI, artificial intelligence, 6G, space and nuclear technology, marine sciences, biotechnology, pharmaceuticals, advanced materials and critical minerals. The focus extends to practical initiatives including joint research, R&D centres and product development, highlighting a greater integration of innovation systems of both countries. Their bilateral S&T cooperation sees continuity in sectors such as nuclear science cooperation, ICT capacity building, human resource development under programmes such as ITEC, together with evolving emphasis from training and technical capacity building to co-development and co-creation of technologies. Digital and emerging technologies are seen enabling areas including payments, MSMEs, healthcare, etc.

At the same time, emerging areas such as rare earths and semiconductors also reflect shared interest in supply chain resilience and strategic technologies. An agreement has also been concluded between the Institute of Rare Earth Technology (ITRRE) of Vietnam and IREL India Limited for cooperation in research, deep processing, and refining of rare earths, through the establishment of a joint research group, data exchange, ore sample analysis, and the development of technical standards linked to environmental protection and sustainable development. With both countries' energy transition priorities, focus on energy and climate technologies, creates space for technological cooperation in renewable energy, green hydrogen, biofuels, and disaster-resilience infrastructure.

The two countries have also agreed to implement this comprehensive partnership by sharing experiences in developing scientific research policies and commercializing technology, promoting joint funding for research, expanding sharing of research infrastructure and laboratory systems, and strengthening cooperation on scientific integrity. The Science Ministers of the two countries have also agreed to elevate the chairmanship of the Joint Science & Technology Committee to the Secretary level. Building on long-standing cooperation, this forward-looking partnership brings S&T cooperation to the centre-stage, reflecting a shared commitment to innovation-led development and addressing common challenges through collaborative research and capacity building aligned with emerging technologies and sustainable development priorities.

## **SCIENCE POLICY & DIPLOMACY**

### **International S&T Cooperation**

#### [India-Japan Deepen Health Cooperation at Joint Committee Meeting](#)

The 3rd India-Japan Joint Committee Meeting held in New Delhi focused on strengthening resilient and inclusive health systems. Key discussions covered non-communicable diseases, pharmaceutical and medical supply-chain resilience, AI-enabled digital health ecosystems, and healthcare workforce development, further deepening bilateral health partnership.

## [India-EU Launch Initiative to Strengthen EV Battery Recycling under Trade and Technology Council](#)

Under the India-EU TTC, India and the European Union launched a €15.2 million joint call to advance EV battery recycling and circular economy solutions. It will support advanced recycling technologies, pilot-scale projects, and secure critical raw materials like lithium, cobalt and graphite.

## [India-France to Expand Cooperation in Space, AI and Emerging Technologies](#)

In the bilateral meeting, both sides highlighted growing collaboration between ISRO and CNES, including joint missions and future opportunities in human spaceflight and ocean research. The discussion reaffirmed the 2026 Indo-French Year of Innovation as a key milestone to deepen institutional, research and industry partnerships in emerging technology domains.

## [Canada-India Cooperation on Critical Minerals Strengthened during CSIR-IMMT Visit](#)

High Commissioner of Canada to India, visited CSIR-Institute of Minerals and Materials Technology to explore deeper collaboration in critical minerals research and sustainable processing. Discussions focused on joint R&D, technology transfer, and capacity building, strengthening Indo-Canada cooperation for resilient critical mineral supply chains and clean energy technologies.

## [India-Spain S&T Cooperation Meeting](#)

A Spanish delegation led by Dr. Eva Ortega-Paíno met Dr. Jitendra Singh to strengthen India-Spain cooperation in science and technology. Discussions focused on astrophysics, AI, space, and biotech, aiming to boost joint research, innovation, and industry partnerships.

## [India-Norway Strengthen Science & Innovation Partnership](#)

India and Norway signed multiple agreements to boost cooperation in clean energy, offshore wind, sustainability, geosciences, and academic research under CSIR-led partnerships. The collaboration focuses on joint R&D, renewable energy technologies, circular economy, and researcher exchange to support innovation-driven sustainable development.

## **Emerging Tech & Governance**

### [EU and Japan Deepen Digital Cooperation across AI, Quantum, Chips and Data Governance](#)

At the EU-Japan Digital Partnership Council in Brussels, both sides agreed to deepen cooperation in AI, data, quantum, semiconductors, and digital infrastructure. They launched new initiatives on data governance, digital identity, and AI research. The partnership also advances joint work on quantum project *Q-Neko*, 6G, and semiconductor supply chains to strengthen innovation and digital resilience.

### [India–Italy Boost Cooperation in Emerging Technologies & Innovation](#)

India and Italy agreed to deepen collaboration in AI, startups, quantum, semiconductors, and space technologies, and announced INNOVIT India to support innovation, research, and startup partnerships. Both sides also committed to stronger scientific cooperation and human-centric, trustworthy AI development.

### [IIT Madras Announces \\$7.5 million Silicon Valley Deep-tech Hub](#)

At the SelectUSA Investment Summit, IIT Madras Global Research Foundation announced its first U.S. center in Menlo Park, California, with a planned investment of \$7.5 million. The hub aims to help Indian deep-tech startups access global markets, venture capital, mentorship, and industry partnerships.

### [India–Netherlands Deepen Partnership in Emerging Technologies, Science & Innovation](#)

India and the Netherlands elevated their relations to a Strategic Partnership, expanding cooperation in semiconductors, AI, quantum technologies, space, cyber, and other emerging technologies. Both sides agreed to strengthen joint R&D, startup ecosystems, talent mobility, and industry–academia collaboration to drive innovation-led growth.

### [IndiaAI and ICMR Sign MoU to Advance Responsible AI Adoption in Healthcare](#)

The partnership combines IndiaAI’s data infrastructure with ICMR’s biomedical research expertise to accelerate AI-driven health solutions and innovation. The collaboration will enable shared datasets via the AIKosh platform, expanded high-performance computing access, and co-development of AI use cases for public health, while strengthening ethical and regulatory frameworks for trustworthy AI in healthcare.

### [Wadhvani-IISc Innovation Centre Launched](#)

The Centre aims to boost India’s quantum and deep-tech innovation ecosystem. The initiative, along with the InQubate platform, aims to translate quantum research into startups and scalable technologies through incubation and industry collaboration.

## **Events & Meetings**

### [Third India-Nordic Summit Held in Oslo](#)

The Third India–Nordic Summit, held in Oslo, elevated India–Nordic relations to a Green Technology and Innovation Strategic Partnership. The Summit expanded cooperation in clean energy, digital technologies, trade, climate action, blue economy, Arctic research, and defence, while strengthening economic and technological ties between India and the Nordic countries.

### [Fifth One Health Steering Committee Meeting Held](#)

The Fifth Steering Committee meeting of the National One Health Mission, chaired by the Principal Scientific Adviser (PSA), was held in New Delhi to strengthen coordination across human, animal, and environmental health systems. It reviewed efforts on disease surveillance, AI-based detection, and preparedness for zoonotic and emerging health threats.

### [IIT Madras Technology Summit](#)

The Summit inaugurated in New Delhi under the theme ‘From IIT M. For Bharat. Building Together’ aimed to foster industry-academia-government partnerships to design, develop, and deploy technologies supporting India’s journey toward *Viksit Bharat*. New research centres NTPC Limited, Bharat Petrol Corporation Limited, and HSBC focused on healthcare technology, robotic surgery, and sustainable energy solutions were also announced.

### [79th World Health Assembly Held in Geneva](#)

The 79th World Health Assembly (WHA79) was held in Geneva from 18–23 May 2026, bringing together WHO Member States to discuss global health priorities. The Assembly focused on strengthening health systems, advancing universal health coverage, addressing climate–health challenges, and improving pandemic preparedness in a rapidly evolving global health landscape.

## **INDIAN SCIENCE NEWS**

### [PSA Office and FICCI Sign MoU to Strengthen India’s R&D Ecosystem](#)

The MoU aims to build a stronger, innovation-driven R&D ecosystem. The partnership focuses on bridging industry, academia and research institutions, along with accelerating commercialisation and translation of research into applications.

### [Carbon-free Ferrocene Alternative Opens up New Possibilities for Future Materials](#)

Researchers at IISc and IIT-M have created the world’s first carbon-free alternative to ferrocene. Using osmium and boron-hydrogen rings, the team developed a stable “sandwich” molecule that mimics ferrocene’s structure while showing even stronger bonding. It could pave the way for advanced boron-based materials with applications in electronics, catalysis, and next-generation nanomaterials that may eventually rival graphene.

### [WHO Designates THSTI as Regional Biomanufacturing Training Center](#)

The World Health Organization has designated India’s Translational Health Science and Technology Institute as the Regional Biomanufacturing Training Center for the South-East Asia region. THSTI will help bridge critical skill gaps in bioprocessing, regulatory science, and local manufacturing, supporting equitable access to health technologies and improving global health security.

## RIS and CSIR-NIScPR Sign MoU to advance Science, Technology, Innovation Policy and Science Diplomacy

The MoU aims to strengthen cooperation in science, technology, innovation policy, and science diplomacy. The partnership will focus on joint research, policy analysis, capacity building, and knowledge sharing to support inclusive and sustainable development, particularly across the Global South.

## ICMR Launches Patent Mitra I2I Connect

ICMR launched the initiative to boost biomedical innovation and industry collaboration. The event enabled transfer of 41 public health technologies including vaccines, diagnostics, and medical devices, along with first-ever transfer of KFD and Chandipura biomaterials to industry, strengthening India's healthcare innovation ecosystem.

## ARCI Develops Advanced Thermal Energy Storage Material

Scientists at International Advanced Research Centre for Powder Metallurgy and New Materials (DST) have developed a cost-effective nanocomposite phase change material that improves thermal energy storage efficiency by up to 45 per cent. The innovation enables compact, efficient thermal batteries for solar energy and industrial heat recovery, supporting India's clean energy goals.

## TDB-DST Supports Indigenous STEM Activity Kit Commercialization

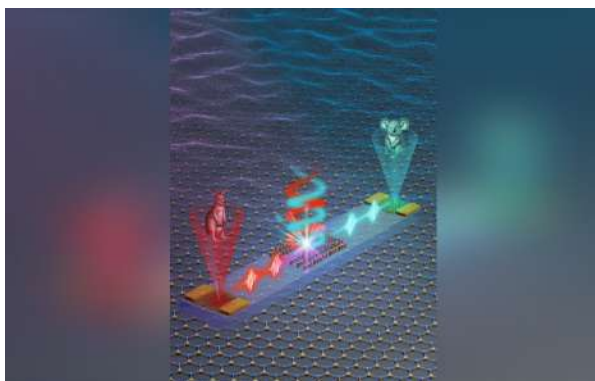
The Technology Development Board (DST) has supported Ansoz Creations Pvt. Ltd., Bhopal for commercializing electronics and IT-based STEM activity kits aimed at experiential learning for students aged 3–18 years. The initiative promotes hands-on, technology-driven education using AR, VR, and IoT, strengthening India's indigenous edtech ecosystem and advancing the goals of Aatmanirbhar Bharat.

## JNCASR Develops CLEAR Technology for Advanced Protein Imaging and Early Cancer Detection

Researchers at Jawaharlal Nehru Centre for Advanced Scientific Research have developed CLEAR (Cleaveable Light-Erased Antibody Reporter), a novel imaging technology that enables visualization of an unprecedented number of proteins in a single biological sample using just one fluorescent marker. The breakthrough could transform cancer and neurological disease diagnostics by providing detailed protein maps of cells and tissues, supporting earlier detection and deeper understanding of disease processes.

## ADVANCES IN S&T

### Tiny On-Chip Circuit Could Power Next-Generation Quantum and AI Technologies



**The Problem:** Valleytronics, an emerging field that uses the "valley degree of freedom" of materials to encode and process information, has been limited by a key bottleneck. Researchers could generate or detect valley-based light signals, but they could not

perform all the required functions within a single integrated device. Technical challenges associated with integrating ultrathin materials with photonic structures further restricted progress toward practical valleytronic systems.

**The Method:** Researchers from Monash University developed a nanoscale circuit capable of generating, directing, and reading light-based information on a single chip. The device combines ultra-thin materials, only a few atoms thick, with specially designed nanostructures known as metasurfaces that control light at extremely small scales. Using a straightforward stacking approach, the team integrated these ultrathin materials with metasurfaces, overcoming challenges related to direct material growth on photonic structures. The resulting system can generate special light signals, guide them in precise directions, and convert them into electrical signals with very high precision.

**Future Prospects:** The breakthrough opens the door to a new class of compact, programmable photonic devices and represents a significant step toward scalable technologies that use light instead of electricity to process information. Because the system operates at room temperature, it is more practical for real-world applications than many quantum technologies that require extreme cooling. The technology has potential applications in quantum computing, advanced imaging, and next-generation optical communication systems. The successful demonstration of simultaneously encoding and processing two different images also highlights its ability to handle multiple streams of information at once, paving the way for faster, more energy-efficient computing, secure communications, and fully integrated valleytronic systems.

### [Solar-Powered Process Turns Plastic Trash into Clean Hydrogen Fuel](#)

**The Problem:** Plastic pollution and the growing demand for clean energy are major global challenges. More than 460 million tonnes of plastic are produced worldwide each year, with large amounts polluting land and oceans. At the same time, the move away from fossil fuels has intensified the search for cleaner energy alternatives. Despite recent progress in converting plastic waste into fuels, challenges remain, including the complexity of plastic waste, interference from additives such as dyes and stabilisers, limitations in photocatalyst durability, difficulties in separating reaction products, and the gap between laboratory success and real-world application.



**The Method:** Researchers at University of Adelaide investigated how solar-powered systems can convert waste plastics into hydrogen, syngas, and other industrial chemicals. The method, known as solar-driven photoreforming, uses light-sensitive materials called photocatalysts that harness sunlight to break down plastics at relatively low temperatures. Through this process, plastics can be transformed into hydrogen and other valuable chemicals. Recent experiments have reported high levels of hydrogen production as well as the formation of acetic acid and diesel-range hydrocarbons, with some systems operating continuously for more than 100 hours.

**Future Prospects:** The technology could help create a more sustainable, circular economy by giving new value to discarded plastics. To support wider adoption, researchers emphasize improvements in catalyst design, reactor engineering, and overall system optimization. Approaches being explored include continuous-flow reactors, systems that combine solar with thermal or electrical energy, and advanced monitoring tools. The team has also outlined steps for scaling up the technology, with goals of improving energy efficiency and enabling continuous industrial operation. With continued innovation, solar-powered plastic-to-fuel technologies could play a key role in building a sustainable, low-carbon future.

## **INSIGHTS & RESOURCES**

### [NITI Aayog Releases ‘Future of India’s Semiconductor Industry’ Roadmap](#)

The roadmap, released by NITI Aayog, outlines a long-term strategy to position India as a key player in the global semiconductor ecosystem by 2035. It emphasizes building domestic capabilities across semiconductor design, manufacturing, advanced packaging, research, and talent development while reducing import dependence and strengthening India’s technological and economic resilience.

Key findings:

- Semiconductors are strategic assets critical to India’s economic resilience, technological advancement, and national security, powering sectors such as artificial intelligence, telecommunications, electric mobility, defence, healthcare, and digital public infrastructure.
- India aims to build a USD 120–150 billion semiconductor value chain by 2035, transforming semiconductors from an import dependency into a source of economic strength, technological sovereignty, and global influence.
- The roadmap advocates a shift from merely “catching up” in advanced wafer fabrication to becoming indispensable in the “More-than-Moore” era, focusing on advanced packaging, system integration, and ecosystem leadership.
- The global semiconductor market is expected to exceed USD 1.5 trillion by 2035, while India’s semiconductor demand is projected to reach around USD 200 billion, creating a significant opportunity for domestic industry growth.
- India’s heavy reliance on imports remains a major strategic vulnerability, with nearly 90–95 per cent of domestic semiconductor demand currently met through imports, exposing critical sectors to supply-chain disruptions.
- The roadmap targets making India a top-three global destination for Outsourced Semiconductor Assembly and Test (OSAT) and advanced packaging, leveraging the country’s engineering talent, cost competitiveness, and manufacturing potential.
- A key manufacturing priority is achieving leadership in mature-node and compound semiconductors, including Silicon Carbide (SiC) and Gallium Nitride (GaN), which are

essential for electric vehicles, energy systems, telecommunications, industrial applications, and defence technologies.

- India seeks to emerge as a global leader in semiconductor design and system architecture, building on its strong design talent base and aiming to become a centre for innovation, chip design, and co-development of next-generation semiconductor solutions.
- The country also aims to become a trusted global supplier of critical semiconductor materials, particularly wide-bandgap materials and advanced packaging materials, enabling deeper integration into global semiconductor supply chains.
- The strategy is built around five pillars—Pioneering, Policy & Investment, Production, People, and Partnerships—and recommends investments in semiconductor IP, AI-enabled semiconductor engineering, sovereign access to EDA tools, advanced packaging, frontier research, and international collaboration.
- The roadmap emphasizes that strategic clarity, disciplined execution, and sustained long-term commitment, supported by the India Semiconductor Mission (ISM) 2.0, will be crucial for establishing India as an indispensable node in the global semiconductor ecosystem by 2035.