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SCIENCE & tECHNOLOGY SCHEMES 2026 PRELIMS

The Union Government has significantly restructured its science and technology (S&T) landscape for the 2025–2026 period, primarily through the consolidation of existing programs into the **Vigyan Dhara** umbrella and the launch of the massive **₹1 Lakh Crore Research, Development and Innovation (RDI) Fund**.

1. Vigyan Dhara (Launched Jan 16, 2025):

Vigyan Dhara is an **umbrella central sector scheme** launched in January 2025 to unify and streamline India's Science, Technology, and Innovation (STI) ecosystem. It consolidates three previous major umbrella schemes of the Department of Science and Technology (DST) into a single framework to enhance operational efficiency and fund utilization.

Core Identity & Administration

- **Ministry:** Ministry of Science and Technology.
- **Implementing Agency:** Department of Science and Technology (DST).
- **Scheme Type: Central Sector Scheme** (100% funded by the Union Government).
- **Status:** It is a **flagship umbrella scheme**.

Aims and Objectives

The primary goal is to strengthen the national STI ecosystem to realize the vision of **Viksit Bharat 2047**.

- **Capacity Building:** Strengthening institutional infrastructure and the human resource pool.
- **Research & Development:** Promoting basic and translational research in critical sectors like sustainable energy and water.
- **Innovation:** Fostering technology development and deployment from schools to startups.
- **Gender Parity:** Increasing the participation of women in Science and Technology.

Funding Mechanism

- **Total Outlay: ₹10,579.84 crore** approved for the 15th Finance Commission period (2021-22 to 2025-26).
- **Budgetary Growth:** The annual allocation saw a significant jump from ₹330.75 crore in 2024-25 to **₹1,425 crore in 2025-26**.

Key Features

The scheme is structured into three broad components:

1. **S&T Institutional and Human Capacity Building:** Focuses on well-equipped R&D labs in academic institutions.
2. **Research and Development:** Aligned with the Anusandhan National Research Foundation (ANRF) to support global-standard research.
3. **Innovation, Technology Development, and Deployment:** Supports startups and promotes industry-academia collaboration.

Achievements (Updated May 2026)

- **Beneficiary Reach:** Over **57,000 individual beneficiaries** supported as of March 2025.
- **Startup Support:** 36 Technology Business Incubators (TBIs) provided seed funds to 72 startups under the NIDHI-SEED program.
- **Student Engagement:** Continued success of the **INSPIRE-MANAK** program, attracting students aged 10-15 toward research careers.
- **Regional Growth:** High participation in states like **Uttar Pradesh** (13,195 beneficiaries) and **Rajasthan** (12,424 beneficiaries).

Criticism & Challenges

- **Rebranding Concerns:** Critics have viewed it as a repackaging of existing DST initiatives rather than a fundamentally new approach.
- **Implementation Gaps:** While total utilization reached over ₹1,256 crore by August 2025, some regions (like Lakshadweep and Mizoram) show very low participation rates, indicating a need for better regional balance.
- **Duplication Risks:** Despite merging schemes to reduce duplication, there are ongoing concerns about synchronizing its R&D component effectively with the newly established ANRF

2. S&T Institutional and Human Capacity Building

As of 2026, **S&T Institutional and Human Capacity Building** serves as a core component of the unified **Vigyan Dhara** scheme. This initiative focuses on strengthening India's research infrastructure and expanding its scientific talent pool to meet the goals of **Viksit Bharat 2047**.

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Quick Facts Table

eature	**Details**
Ministry	**Ministry of Science and Technology**
mplementing Agency	**Department of Science and Technology (DST)**
cheme Type	**Central Sector Scheme**
lassification	**Umbrella Component** under the broader **Vigyan Dhara** flagship
Outlay (2021-2026)	**₹10,579.84 crore** (Total for Vigyan Dhara)

Aims and Objectives

The primary goal is to foster a robust Science, Technology, and Innovation (STI) ecosystem by:

- **Infrastructure Support**: Strengthening R&D labs in academic institutions and universities.
- **Human Capital Development**: Expanding the researcher pool (improving Full-Time Equivalent count) through various fellowships.
- **Inclusive Participation**: Increasing the participation of women (targeting gender parity) and underrepresented groups like Scheduled Castes (SC).
- **Global Integration**: Promoting collaborative research through international bilateral and multilateral cooperation.

Funding Mechanism & Key Features

The scheme operates through several specialized sub-programmes:

- **Competitive Funding**: Grants like **FIST** (Fund for Improvement of S&T Infrastructure) provide tiered support ranging from ₹1.5 crore to ₹20 crore.
- **Shared Facilities**: Programs like **SATHI** (Sophisticated Analytical & Technical Help Institutes) create shared, professionally managed high-end infrastructure accessible to startups and industry.
- **Human Resource Pillars**:
  - **INSPIRE**: Attracting talent to science from school level to PhD.
  - **WISE-KIRAN**: Dedicated support for women scientists to ensure career continuity.
  - **STUTI**: Capacity building through training workshops on advanced instrumentation.
- **State Alignment**: The **State S&T Programme (SSTP)** helps state councils develop local STI ecosystems.

Achievements (2025-26)

- **Global Innovation Index (GII)**: India climbed to the **38th position** among 139 economies as of 2025.
- **Scientific Output**: India remains **3rd globally** in scientific paper publications and has reached **6th** in patent filing activities.
- **Startup Ecosystem**: Maintained its position as the **3rd largest startup ecosystem** in the world.
- **Consolidation**: Successfully merged over 20 sub-schemes into the **Vigyan Dhara** framework to improve fund utilization and operational efficiency.

Criticisms and Challenges

- **Fund Utilization**: Historical challenges with the "flexibility of funds flow" led to the 2025 merger, suggesting previous administrative bottlenecks.
- **Gender Gap**: While focused interventions exist, achieving true gender parity in senior scientific leadership remains a slow-moving target.
- **Private Sector Lag**: R&D spending is still heavily government-driven; incentivizing consistent private-sector investment in institutional capacity remains a hurdle.

3. Innovation, Technology Development and Deployment:

The **Innovation, Technology Development and Deployment (ITDD)** programme is a critical component of the **Vigyan Dhara** unified scheme. It aims to bridge the gap between scientific research and commercial viability by supporting the transition of lab-scale technologies into market-ready products.

Core Identity & Administration

- **Ministry:** Ministry of Science and Technology.
- **Nodal Department:** Department of Science and Technology (DST).
- **Implementing Agency:** DST, often through specialised arms like the **Technology Development Board (TDB)** for larger commercialisation projects and **Anusandhan National Research Foundation (ANRF)** for high-impact research funding.
- **Scheme Type: Central Sector Scheme**.
- **Classification:** It is one of the three primary components under the **Vigyan Dhara umbrella scheme**, which was created by merging existing programs to enhance fund utilization and synchronization.

Aims & Objectives

- **Promote Innovation:** Foster a culture of innovation from schools to the industrial sector.
- **Technology Maturation:** Support technology development at **Technology Readiness Levels (TRL) 4 and above**.
- **Indigenous Capability:** Reduce import dependency in strategic areas like deep-tech, AI, and green energy.
- **Ecosystem Integration:** Strengthen collaborations between academia, government, and the private sector.

Funding Mechanism & Features

- **Financial Outlay:** Part of the ₹10,579.84 crore outlay for Vigyan Dhara (2021–22 to 2025–26). Additionally, the new **Research, Development and Innovation (RDI) Scheme** (2025–2031) provides an outlay of **₹1 lakh crore** over six years.
- **Funding Type:** Primarily involves **grants-in-aid**, though recent updates for 2026 emphasize **long-term low/zero-interest loans** and **equity investments** through a "Deep-Tech Fund of Funds" to leverage private capital.
- **Target Groups:** MSMEs, startups, individual innovators, and academic/research institutions.
- **Key Features:** Milestone-based fund release, support for prototype development, and emphasis on "dual-use" technologies (both civil and defence).

2026 Update: Achievements & Status

- **Integration with ANRF:** As of 2026, the program is tightly integrated with the **Anusandhan National Research Foundation (ANRF)**, which now serves as the Level 1 fund custodian for R&D initiatives.
- **Strategic Expansion:** Expansion into sunrise sectors like **Quantum Computing**, **Semiconductors**, and **Climate Action**.
- **Milestone Achievements:**
  - Operationalized a ₹1 lakh crore RDI fund to catalyze private sector participation.
  - Significant focus on **Tier-II and Tier-III cities** through programs like NIDHI-iTBI to ensure inclusive innovation.
  - Success in indigenous defense technology development through the related **Technology Development Fund (TDF)**, supporting over 150+ projects.

Criticisms

- **Private Sector Lag:** Despite new incentives, India's private sector R&D contribution remains low (approx. 35–36%) compared to global peers.
- **Bureaucratic Hurdles:** Critics often point to complex application processes and delays in milestone-based fund disbursement for early-stage startups.
- **Low GERD:** Gross Expenditure on R&D (GERD) remains stagnant at roughly **0.64% of GDP**, which is considered insufficient for a global innovation hub

4. Anusandhan National Research Foundation (ANRF): The **Anusandhan National Research Foundation (ANRF)** is India's apex statutory body established to provide high-level strategic direction to scientific research in the country. Established by the **ANRF Act, 2023**, it became operational in early 2024 and has since subsumed the Science and Engineering Research Board (SERB).

Core Identity and Governance

- **Ministry:** Under the administrative control of the **Department of Science and Technology (DST)**.
- **Implementing Agency:** The **ANRF Executive Council** manages day-to-day operations and fund allocation.
- **Scheme Type:** It is a **Central Sector Scheme**, entirely funded by the Central Government through the Consolidated Fund of India.
- **Nature:** It serves as an **Umbrella Scheme** that integrates several mission-mode and grant programs under one strategic framework.
- **Leadership:** Chaired by the **Prime Minister** (President) with the Ministers of Science & Technology and Education as Vice Presidents.

Aims and Objectives

1. **Strategic Direction:** Provide high-level guidance for research in natural sciences, engineering, agriculture, and social sciences.
2. **Bridging Gaps:** Link academia with industry and government to foster a culture of entrepreneurship.
3. **Democratising Research:** Shift focus from elite labs to **State Universities and Colleges** (Tier-II/III institutions) to seed research capacity where it is nascent.
4. **Viksit Bharat 2047:** Align research goals with national development priorities for the next two decades.

Funding Mechanism

- **Total Budget:** Envisaged with a budget of ₹50,000 crore over five years (2023–2028).
- **Sources:** Approximately ₹14,000 crore comes from the government, while the remaining ₹36,000 crore is expected from **private sector contributions**, philanthropic organisations, and international collaborations.
- **Innovation Fund (RDI):** A separate **₹1 Lakh Crore Research, Development and Innovation (RDI) Fund** was approved in 2025 to provide long-term, low-interest financing for private sector-driven R&D.

Key Features and Programs (2026 Update)

- **MAHA (Mission for Advancement in High-impact Areas):** Focuses on mission-mode research in sectors like **Electric Vehicles (MAHA-EV)**, **Drones**, **Water**, and **6G**.
- **PAIR (Partnerships for Accelerated Innovation and Research):** A hub-and-spoke model where top-tier institutions mentor emerging state universities.
- **SARAL AI:** An AI-powered platform launched in 2026 to simplify research processes and administrative compliance for scientists.
- **Inclusive Grants:** The **Inclusivity Research Grant (IRG)** specifically supports SC/ST researchers in frontier science areas.

Achievements as of May 2026

- **Rapid Processing:** Evaluated nearly **20,000 research proposals** in just four months during late 2025/early 2026.
- **Administrative Reform:** Appointed **nodal officers in 250 institutions** to reduce bureaucratic delays and assist principal investigators.
- **Translational Success:** Established **ATRI centres** to push technologies from Lab (TRL 4) to Market (TRL 7).
- **Global Talent Attraction:** Relaunched the **Ramanujan Fellowship** and **Prime Minister Professorship** to bring Indian-origin scientists back from abroad.

Criticisms and Challenges

- Private Funding Dependency: Critics point out the heavy reliance on private sector contributions (72% of the budget), questioning if industries will invest in basic research versus purely commercial projects.
- Bureaucratic Layers: While simplified, the two-tiered funding structure involving "Second Level Fund Managers" has been seen by some as adding extra steps for startups seeking direct investment.
- Low GDP Share: Despite the ₹1 lakh crore fund, India's overall R&D spending remains stagnant at 0.6–0.7% of GDP, which is significantly lower than global leaders like the US or China.

5. SATHI (Sophisticated Analytical & Technical Help Institutes)

As of **May 2026**, **SATHI** (**Sophisticated Analytical & Technical Help Institutes**) remains a central initiative aimed at democratising access to high-end scientific infrastructure across India.

Overview of SATHI (Department of Science & Technology)

- **Ministry:** Ministry of Science and Technology (under the Department of Science & Technology - DST).
- **Implementing Agency: Department of Science & Technology (DST)**, which selects host institutes (like IITs or central universities) to house and manage the facilities.
- **Scheme Type:** It is a **Central Sector Scheme**, meaning it is 100% funded and managed by the Central Government.
- **Classification:** It is considered a **flagship scheme** of the DST for building research infrastructure.

Aims and Objectives

- **Shared Infrastructure:** To establish professionally managed Science and Technology (S&T) facilities accessible to academia, startups, MSMEs, and R&D labs.
- **Resource Efficiency:** To address the problems of accessibility, maintenance, and redundancy of expensive equipment.
- **Self-Reliance:** To reduce dependency on foreign sources for high-end analytical testing, supporting the **Atmanirbhar Bharat** vision.
- **Open Access:** To provide 24/7 service with a transparent, open-access policy, particularly for external users from less-endowed organisations.

Funding Mechanism & Features

- **Funding Model:** Since 2022-23, it has transitioned to a **75:25 sharing model**, where DST provides 75% of the funds and the host institute/consortium contributes 25%.
- **Grant Limit:** The upper limit for DST's share is approximately **₹60 crore** (previously up to ₹125 crore for earlier centers like IIT Delhi and BHU).
- **Host Selection:** Awarded through a competitive "cluster/consortium" approach where a lead host institute partners with several nearby institutions.
- **Facilities:** Equipped with cutting-edge analytical instruments (e.g., high-resolution electron microscopes) and advanced manufacturing units not typically available at individual colleges.

Achievements (Updated 2026)

- **Expansion of Centers:** Beyond the initial centers at **IIT Delhi, IIT Kharagpur, and BHU**, newer centers like **IIT Hyderabad** and **BITS Pilani** are now operational as of 2025-2026.
- **Startup Growth:** Over 100+ startups have utilized SATHI facilities for prototyping and material characterization, significantly lowering their initial R&D costs.
- **Research Output:** Hosted institutions have seen a rise in high-impact research publications due to 24/7 access to real-time characterization tools.

Criticisms

- **Operational Sustainability:** Critics point out that the high recurring costs (maintenance, AMC) often exceed the provided grants, putting financial pressure on host institutions after the initial 4-year funding period.
- **Regional Imbalance:** While intended for all, most centers are concentrated in Tier-1 cities or premier IITs, making it difficult for researchers in rural or remote areas to access them physically.
- **Training Gap:** There is a noted shortage of skilled technical personnel capable of operating these sophisticated machines, leading to occasional downtime despite the "round-the-clock" goal

6. **INSPIRE** (Innovation in Science Pursuit for Inspired Research) is a **flagship scheme** of the Government of India. It is a **Central Sector Scheme**, meaning it is 100% funded by the Union Government.

Core Details (As of 2026)

- **Ministry:** Ministry of Science & Technology.
- **Implementing Agency:** Department of Science and Technology (DST).
- **Funding Mechanism:** 100% Central funding, recently updated to the **Hybrid TSA Model-1A** as of January 2025 to streamline direct benefit transfers to scholars and host institutions.

Aims and Objectives

The primary goal is to **attract talent to science** at an early age and build a critical human resource pool for strengthening India's R&D base.

1. **Early Attraction:** Communicate the excitement of science to youth.
2. **Merit-Based Nurturing:** Support meritorious students without requiring competitive entrance exams, relying instead on existing academic performance.
3. **Career Retention:** Motivate talented youth to choose scientific research over lucrative alternative careers like IT or finance.

Key Features & Components

INSPIRE covers a wide age range from **10 to 32 years** across three major programs:

- **SEATS (Scheme for Early Attraction of Talent):** Includes **INSPIRE Awards - MANAK** (₹10,000 for school projects) and **Internships** (5-day camps with Nobel Laureates for the top 1% of 10th graders).
- **SHE (Scholarship for Higher Education):** Provides **₹80,000 per year** (including a mentorship grant) for undergraduate and postgraduate studies in basic sciences.
- **AORC (Assured Opportunity for Research Careers):**
  - **INSPIRE Fellowship:** Supports PhD students with monthly stipends (₹37,000–₹42,000) equivalent to NET-JRF/SRF.
  - **INSPIRE Faculty Fellowship:** Offers post-doctoral researchers ₹1.25 lakh/month and a **₹35 lakh research grant** over 5 years.

Achievements (Updated to 2026)

- **Scale:** Targets roughly **one million original ideas** annually through the MANAK component from over 5 lakh schools.
- **Innovation:** In regions like Uttar Pradesh, the scheme has successfully supported 93 ideas through prototype funding, with several granted **patents**.
- **Reach:** Extensive coverage in rural areas; for example, over 1,000 students from Bihar were supported for higher education in the last five years alone.

- **Mentorship:** Integration with **Atal Tinkering Labs (ATLs)** and premier institutions like IITs/NITs to refine student prototypes into scalable products.

Criticism & Challenges

- **Disbursal Delays:** Scholars have reported significant delays in fellowship payments, sometimes ranging from **8 to 13 months**.
- **Administrative Hurdles:** The transition to new fund flow models (like the Hybrid TSA) initially caused bottlenecks as host institutions had to complete lengthy onboarding processes.
- **Career Uncertainty:** The Faculty Fellowship, while lucrative, provides a 5-year contractual position but does **not guarantee permanent placement** in academic institutions afterward

7. The **Women in Science and Engineering-KIRAN (WISE-KIRAN)** is a **Central Sector Scheme** and an **umbrella initiative** implemented by the **Department of Science and Technology (DST)** under the **Ministry of Science and Technology**.

Aims and Objectives

The primary goal is to achieve **gender parity** in the Science and Technology (S&T) sector. Key objectives include:

- **Empowering Women:** Supporting women from all walks of life to participate in STEM (Science, Technology, Engineering, and Mathematics).
- **Addressing Career Breaks:** Providing opportunities for women scientists and technologists who have had a "break in career" due to motherhood or family responsibilities.
- **Skill Development:** Offering training in frontier areas like Intellectual Property Rights (IPR) and translational research.

Funding Mechanism & Agency

- **Funding Agency:** The **Department of Science and Technology (DST)** provides 100% funding as a Central Sector Scheme.
- **Financial Support:** Provides fellowships ranging from **₹37,000 to ₹85,000 per month** depending on the specific program (e.g., PhD, PDF, or WIDUSHI), along with research grants and institutional overheads.

Key Features (Sub-schemes)

As of 2026, the umbrella scheme includes restructured and new initiatives:

- **WISE-PhD:** Supports women (ages 27–45) pursuing doctoral research in basic and applied sciences.
- **WISE-PDF:** Provides post-doctoral fellowships for women (ages 27–60).
- **WISE-SCOPE:** Focuses on societal challenges through "lab-to-land" translational research.
- **WIDUSHI:** A new initiative for **senior women scientists** (up to 62 years) who are retiring or retired to continue their research.
- **WISE-IPR:** One-year training in Intellectual Property Rights.

Achievements (Updated 2026)

- **Widespread Impact:** Over **1,962 women scientists** benefited from the Women Scientist Scheme alone between 2018 and late 2023.
- **Broad Reach:** Beneficiaries span across all Indian States and UTs, with high concentrations in Maharashtra (215), Delhi (214), and Tamil Nadu (198).
- **Fiscal Commitment:** The budgetary allocation for 2023–24 was approximately **₹131.20 crore**.
- **Vigyan Dhara Merger:** From January 2025, the scheme became part of the larger **Vigyan Dhara** umbrella to streamline science and technology funding.

Criticism & Challenges

- **Delayed Disbursements:** Reports indicate significant delays in fellowship results and fund disbursement, sometimes up to **18 months**, causing financial hardship for researchers.
- **Industry-Academia Gap:** The program is critiqued for focusing primarily on academic research rather than industry collaboration.
- **Bureaucratic Delays:** Complex application processes and administrative hurdles in host institutions often slow down project implementation.
- **Lack of Institutional Support:** Many research institutions still lack essential gender-sensitive policies like flexible hours or childcare, making work-life balance difficult despite the fellowship

8. The **Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI)** is a human resource and capacity-building initiative. It is designed to provide open access to state-of-the-art Science and Technology (S&T) infrastructure across India.

Core Identity & Administration

- **Ministry:** Ministry of Science and Technology.
- **Implementing Agency:** Department of Science & Technology (DST), acting as the apex body. It identifies specific **Project Management Units (PMUs)** (hubs) at institutes already benefiting from other DST infrastructure schemes (e.g., FIST, PURSE).
- **Scheme Category:** It is a **Central Sector Scheme**, as it is 100% funded and directly implemented by the Central Government via the DST.
- **Scheme Type:** It serves as a **sub-scheme** or dedicated human capacity-building component within the larger umbrella of DST's R&D Infrastructure division.

Aims, Objectives & Features

- **Primary Aim:** To build human resources and knowledge capacity by providing open access to sophisticated S&T infrastructure.
- **Key Objectives:**
  - Sensitise participants to state-of-the-art equipment through hands-on training.
  - Encourage the sharing of R&D facilities to ensure transparent access.
  - Develop a critical mass of researchers, faculty, and scientists skilled in high-end instrumentation.

- **Funding Mechanism:** The DST provides 100% grants to PMUs. These grants cover:
  - Training program costs (lodging, boarding, and travel for participants).
  - Honorariums for faculty and kits/materials.
  - Grants for PMU staff management and event coordination.
- **Operational Model:** Uses a **hub-and-spoke model** where PMUs (hubs) coordinate with host institutes (spokes) to deliver training in their respective catchment areas.

Status & Achievements (Update as of 2026)

As of early 2026, the program remains highly active with an expanded calendar:

- **Training Expansion:** Approximately **248 training programs** and **132 awareness programs** have been successfully organized through **13 PMUs**.
- **New Focus Areas:** 2025-2026 calendars highlight specialized tracks like **MAGIC** (Scientists: Mothers and Girls Improving Capability) and **Nurturing Women Leadership in S&T**.
- **Infrastructure Synergy:** The scheme is now more tightly integrated with the **SATHI** (Sophisticated Analytical & Technical Help Institutes) centers at major IITs to maximize the utility of their multi-million dollar equipment.

Criticisms

- **Limited Reach:** Critics often point out that the "catchment area" model still leaves many rural or smaller tier-3 colleges underserved compared to major urban hubs.
- **High Barrier to Entry for Host Institutes:** Eligibility requires an institute to have an **H-index > 10** and **i10-index > 500**, which can exclude emerging institutions that need the most capacity building.
- **Short Duration:** The standard support for a PMU is only **12 months**, which critics argue may lead to a lack of long-term continuity in regional training ecosystems

9. The **State Science and Technology Programme (SSTP)** is a long-standing initiative by the Government of India designed to bridge the gap between central research capabilities and state-level developmental needs.

As of **May 2026**, the program continues to serve as the primary vehicle for fostering a decentralized Science, Technology, and Innovation (STI) ecosystem across all Indian States and Union Territories (UTs).

Core Identity & Administration

- **Ministry:** Ministry of Science and Technology.
- **Implementing Agency:** Department of Science and Technology (DST) through **State Science & Technology Councils (SSTCs)**.
- **Scheme Classification:** It is a **Central Sector Scheme**.
- **Status:** It is considered an **Umbrella Scheme** component (now integrated under the unified **"Vigyan Dhara"** scheme as of late 2024 to streamline STI activities).

Aims and Objectives

The primary goal is to **align state-level STI ecosystems with national priorities** while addressing region-specific challenges.

- **Catalyse Cooperation:** Foster Centre-State S&T cooperation to deliver solutions for state-specific issues.
- **Human Resource Development:** Promote scientific manpower and technical secretariats within states.
- **Technology Deployment:** Facilitate the demonstration and scaling of indigenous technologies for socio-economic development.
- **Intellectual Property:** Support Patent Information Centres (PICs) to increase awareness and protection of IPR at the state level.

Funding & Features

- **Funding Mechanism:** DST provides **budgetary support** (grants-in-aid) to the S&T Secretariats of 28 States and UTs. While the Centre provides core support, State Governments are expected to provide varying levels of additional funding.
- **Project-Based Support:** Funds are sanctioned for specific R&D projects, infrastructure building (e.g., labs in universities), and science popularisation events (e.g., National Science Day).
- **Decentralization:** Unlike some central schemes, it empowers States to identify their own thematic areas like agriculture, health, or waste management based on local needs.

Achievements (As of 2026)

- **Institutional Reach:** SSTCs have been established and are functional in **all States and UTs**.
- **Global Standing:** Contributed to India's rise to **38th in the Global Innovation Index (2025)** and **3rd in global startup ecosystems**.
- **IPR Growth:** India now ranks **6th globally in patent filing**, supported by the network of state-level Patent Information Centres.
- **Infrastructure:** Significant funding has been funneled into state universities (e.g., SASTRA University) to modernize R&D facilities.

Criticism & Challenges

- **Variable State Commitment:** Critics point to the significant disparity in S&T investment between states; some states have robust departments, while others remain heavily dependent on central DST grants.
- **Coordination Gaps:** Weak linkages between state councils, local industry, and academia often hinder the transition from research to commercial application.
- **Funding Constraints:** There is a persistent call for more district-specific allocations, as current funding is often centralized at the state capital level

10. PAIR (Partnerships for Accelerated Innovation and Research):

Partnerships for Accelerated Innovation and Research (PAIR) is a **flagship initiative** launched in **November 2024** to bridge the research gap between top-tier institutions and emerging universities in India.

Aims and Objectives

- **Capacity Building:** Upgrade research infrastructure and capabilities in universities where research is at a nascent stage.
- **Collaboration:** Foster productive networks between diverse institutions via a mentorship-driven framework.
- **Research Excellence:** Support internationally competitive research with high-impact outcomes and infuse best practices into the broader ecosystem.
- **NEP Alignment:** Align with the National Education Policy (NEP) 2020 to cultivate a nationwide research culture.

Mechanism and Features

- **Hub and Spoke Model:** High-performing "Hubs" mentor emerging "Spoke" institutions.
  - **Hubs:** Must be in the top 25 NIRF overall rankings or Institutions of National Importance ranked 26–50.
  - **Spokes:** Central and State Public Universities within the top 200 NIRF rankings.
- **Network Structure:** Each network typically consists of one Hub and up to seven Spokes. At least one Spoke must be from outside the Hub's home state to ensure regional diversity.
- **Indicative Themes:** Focus areas include **Energy & Sustainability**, **Industry 4.0** (AI, Cybersecurity), **Advanced Materials**, and **Health Care**.

Governance and Funding

- **Ministry:** Under the Ministry of Science and Technology.
- **Implementing Agency:** Anusandhan National Research Foundation (ANRF), a statutory body that replaced the Science and Engineering Research Board (SERB).
- **Scheme Type:** It is a **Central Sector Scheme**, as it is fully funded by the Central Government through the ANRF.
- **Funding Mechanism:**
  - Total earmark of **₹1,500 crore** for five years.
  - Up to **₹100 crore per network**.
  - **Budget Split:** 30% for Hubs and 70% for Spokes to ensure resources reach emerging institutions.

Status and Achievements (as of May 2026)

- **Network Selection:** By April 2025, the ANRF announced the selection of the first **seven PAIR Networks**, involving 7 Hubs and 45 Spokes.
- **Key Hubs:** Selected Hubs include IISc Bangalore, IIT Bombay, IIT Indore, and JNU.
- **Extended Support:** An additional **11 Hubs with 61 Spokes** were supported with limited budgets to maintain collaboration momentum.

- **Output Trends:** Preliminary reports from the National Workshop on Power Electronics (April 2026) and other forums suggest an uptick in multi-institutional research proposals and joint patent filings.

Criticism

- **Funding Concentration:** Critics argue that despite the 70% Spoke allocation, the strict eligibility criteria (top 200 NIRF) still exclude many rural and smaller state universities that need the most help.
- **Bureaucratic Delays:** Initial phase implementation saw slow fund release and selection processes, with some early reports noting no funds had been disbursed by December 2024.
- **Private Participation:** There are concerns regarding the mandatory **25% budget share** for private institutions acting as Hubs, which may deter participation from elite private research universities

11. **MAHA: MedTech Mission**: Focused on medical technology innovation.
The **MAHA (Mission for Advancement in High-impact Areas) - MedTech Mission** is an initiative launched in **October 2025** by the Government of India to revolutionize the domestic medical technology sector.

Aims and Objectives

The mission's primary goal is to transform India into a global hub for affordable, high-quality medical technologies.

- **Public Health Impact:** Supporting technologies that address national priority diseases like tuberculosis, cancer, and neonatal care.
- **Affordability & Access:** Fostering indigenous solutions that reduce reliance on high-cost imports, targeting a **3 to 5-fold cost reduction**.
- **Self-Reliance:** Strengthening the **Aatmanirbhar Bharat** vision by catalyzing domestic innovation and manufacturing.

Administrative Framework

- **Ministry:** Under the **Ministry of Science and Technology**.
- **Implementing Agency:** Managed by the Anusandhan National Research Foundation (ANRF) in collaboration with the **Indian Council of Medical Research (ICMR)** and the **Bill & Melinda Gates Foundation**.
- **Scheme Type:** It is a **Central Sector Scheme**, as it is fully funded and managed by central government entities (ANRF).
- **Classification:** It serves as a **flagship program** under the broader **MAHA umbrella** of the ANRF, which also includes missions for Electric Vehicles and AI.

Funding Mechanism

- **Total Outlay:** ₹750 crore over 5 years (2025–2030), with standard project grants of **₹5–25 crore** (up to ₹50 crore in special cases).

- **Disbursement:** Milestone-linked, with a 30% cost-sharing requirement for private entities, while exempting academic/startup partners

12. **AI for Science and Engineering (AI-SE)**.

The **AI for Science and Engineering (AI-SE)** mission is a newest flagship initiative launched under the **Mission for Advancement in High-Impact Areas (MAHA)** program of the Anusandhan National Research Foundation (ANRF).

1. Aims and Objectives

- **Core Vision:** To embed AI as a fundamental enabler in India's scientific and engineering ecosystem.
- **Scientific Discovery:** Accelerate discovery in fields like **Climate Science**, **Advanced Materials**, and **Biomanufacturing**.
- **Engineering Innovation:** Advance AI-driven modeling for flow dynamics, molecular structures, and engineering design.
- **Foundational Methods:** Develop next-generation AI methods like **physics-informed learning** and **domain-centric neural operators**.
- **Open Stack:** Build an "India stack" of open-source AI models and datasets for common use by the scientific community.

2. Implementing Agency and Ministry

- **Implementing Agency: Anusandhan National Research Foundation (ANRF)**.
- **Collaborating Ministry:** It is executed in partnership with the **Ministry of Electronics and Information Technology (MeitY)** and other scientific departments (DRDO, Department of Biotechnology).
- **Administrative Ministry: Ministry of Science and Technology**.

3. Scheme Details & Mechanism

- **Scheme Type:** It is a **Central Sector Scheme** under the broader ANRF umbrella.
- **Status:** A **flagship initiative** under the MAHA program.
- **Funding Mechanism:**
  - **Tiered Structure:** Operationalized through a **Special Purpose Fund (SPF)** within ANRF.
  - **Grants:** Research grants generally range up to **₹30 Crore**, with exceptional cases receiving up to **₹50 Crore** for 3 years.
  - **Resource Support:** Funding includes **GPU-as-a-Service** through MeitY's infrastructure (up to 70% of project cost).

4. 2026 Status and Achievements

- **Launch of AISEHack 2026:** A national-level hackathon for science and engineering held in collaboration with IBM and IIT Delhi.

- **IndiaAI Impact Summit 2026:** Showcased AI-SE's role in global AI governance and democratization of research resources.
- **New Policy Frameworks:** Released **Open License Frameworks** for software, datasets, and patents to ensure research translation.
- **Project Tracks:** Active tracks include **AI for Weather Modelling** and **AI for Bio and Life Sciences**.

5. Criticism and Challenges

- **Compute Access:** Critics have noted uneven access to high-performance compute and data centers for researchers outside top-tier institutes.
- **Workforce Shortage:** A significant gap remains in skilled AI-SE specialists compared to standard commercial AI developers.
- **Resource Allocation:** Dependence on shared "GPU-as-a-Service" means individual projects cannot purchase their own HPC equipment, which some argue limits long-term institutional capacity building.
- **Environmental Concerns:** Growing concerns about the environmental sustainability and energy consumption of large-scale AI models used in the mission

13. Research, Development and Innovation (RDI) Fund:

The **Research, Development and Innovation (RDI) Scheme**, launched in late 2025 with a landmark corpus of **₹1 lakh crore**, is India's premier initiative to catalyze a private-sector-led R&D ecosystem. As of May 2026, the scheme has moved from approval into an active implementation phase with specific funding calls already issued.

Core Identity & Administration

- **Ministry:** Department of Science & Technology (DST).
- **Implementing Agency:** Managed by the Anusandhan National Research Foundation (ANRF), which serves as the custodian through a Special Purpose Fund (SPF).
- **Scheme Type:** It is a **Central Sector Scheme** (100% funded by the Union Government) and is categorized as a **Flagship** initiative under the DST.

Aims and Objectives

The scheme is designed to bridge the gap between academic research and commercial viability:

- **Incentivise Private Investment:** Scale up RDI in **"sunrise" domains** like quantum computing, AI, and green energy.
- **High-TRL Support:** Focus on projects at **Technology Readiness Level (TRL) 4 and above**, facilitating the transition from prototypes to market-ready products.
- **Strategic Autonomy:** Support the acquisition and indigenous development of critical technologies to reduce import dependence and support *Atmanirbhar Bharat*.
- **Financial Facilitation:** Establish a **Deep-Tech Fund of Funds** to specifically support high-tech startups.

Funding Mechanism & Features

The RDI Fund operates through a unique **two-tier structure**:

1. **Tier 1 (Custodian):** The ANRF's Special Purpose Fund (SPF) holds the ₹1 lakh crore corpus.
2. **Tier 2 (Distribution):** Funds are channeled through **Second-Level Fund Managers (SLFMs)** such as Technology Development Board (TDB) and Biotechnology Industry Research Assistance Council (BIRAC).

eature	**Description**
inancial nstruments	Unsecured long-term concessional loans (low or zero interest) and equity-based financing for startups.
Duration	The corpus is intended for use over a **six-year period** (ending 2031).
ector Focus	nergy security, Deep-tech (Space, Robotics, Quantum), AI, iotechnology, and Digital Economy.

Update and Achievements (as of 2026)

- **Active Funding Calls:** In February 2026, BIRAC and TDB launched their first calls for project proposals. BIRAC's first call closed on March 31, 2026, with evaluations currently underway.
- **Budgetary Allocation:** For FY 2025-26, **₹20,000 crore** was allocated to kickstart operations.
- **Institutional Setup:** Guidelines and Special Financial Rules have been finalized in consultation with the Department of Expenditure.

Criticism and Challenges

While broadly welcomed, some observers have noted potential hurdles:

- **Absorption Capacity:** Concerns regarding whether the private sector can effectively absorb such a massive sudden influx of R&D capital given historical low investment levels.
- **Bureaucratic Layers:** Critics argue the two-tiered model might introduce administrative delays between the ANRF custodian and the end-user SLFMs.
- **Focus on High TRL:** By targeting TRL 4+, some argue the fund may neglect critical **basic research (TRL 1-3)** which is the foundation for future breakthroughs

14. India Semiconductor Mission (ISM) 2.0:

The **India Semiconductor Mission (ISM) 2.0** was launched in **February 2026** as a strategic expansion of its predecessor, shifting focus from building basic infrastructure to achieving **technological depth** and **global supply chain integration**.

Core Identity & Administration

- **Ministry:** Ministry of Electronics and Information Technology (MeitY).
- **Implementing Agency: India Semiconductor Mission (ISM)**, a specialized business division within the **Digital India Corporation**.
- **Scheme Type:** It is a **Central Sector Scheme** (100% funded and implemented by the Central Government).
- **Classification:** It serves as an **Umbrella Scheme** for various specialized programmes like the Design Linked Incentive (DLI) Scheme and the Scheme for Setting up of Semiconductor Fabs.

Aims and Objectives

The primary goal is to reach **70–75% self-reliance** in chips by 2030.

Indigenous Production: Manufacturing semiconductor equipment, specialty chemicals, gases, and raw materials domestically.

- **Full-Stack Indian IP:** Developing end-to-end Indian-owned Intellectual Property (IP) for secure chip solutions.
- **Global Integration:** Positioning India as a reliable alternative to China and Taiwan in the global value chain.
- **Market Growth:** Expanding the domestic semiconductor market to **$100–$110 billion** by 2030.

Funding Mechanism & Features

- **Budgetary Outlay:** A provision of **₹1,000 crore** was allocated for FY 2026–27 to kickstart ISM 2.0, while the broader "Modified Programme" for the semiconductor ecosystem has a total outlay of **₹8,000 crore** for the same period.
- **Fiscal Support:** Extends support of up to **50% of project costs** on a *pari-passu* (equal footing) basis to approved applicants.
- **Joint Ventures:** Allows foreign companies to partner with Indian firms, provided the Indian partner holds a majority stake to keep the IP domestic.
- **Focus Areas:** Prioritizes advanced technology nodes (e.g., **3nm and 2nm**) and expands support to MSMEs and ancillary players.

Achievements (as of May 2026)

- **Talent Pipeline:** Over **62,000 engineers** have been trained through initiatives like the SMART Lab at NIELIT.
- **Design Ecosystem:** The DLI scheme currently supports **24 semiconductor startups**, which have successfully raised approximately **₹430 crore** in venture capital.
- **Indigenous Processors:** Development of the **DHRUV64** processor under the DIR-V Programme, reducing dependence on foreign licenses.
- **Major Investments:** Groundbreaking for the **Tata Electronics** fab facility in Gujarat with an investment of over **₹91,000 crore**.

Criticisms & Challenges

- **Funding Scale:** While significant, the budget for ISM 2.0 is viewed by some industry experts as modest compared to the multi-billion dollar subsidies provided by the US (CHIPS Act) or China.

- **Complex Ecosystem:** Building a "full-stack" supply chain—including chemicals and equipment—is incredibly difficult and requires infrastructure (like ultra-pure water and stable power) that is still maturing in many parts of India.
- **Pace of Commercialization:** Although startups are being funded, critics point to the long lead times before Indian-designed chips are commercially viable at a global scale

15. Biopharma SHAKTI:

Announced in the **Union Budget 2026–27**, **Biopharma SHAKTI** (Strategy for Healthcare Advancement through Knowledge, Technology, and Innovation) is a **flagship central sector scheme** designed to transform India into a global powerhouse for high-value biologics and biosimilars.

Aims and Objectives

The primary goal is to shift India from a generics-led industry to an **innovation-driven biopharma hub**.

- **Boost Domestic Production:** Build a globally competitive ecosystem for biologics (e.g., vaccines, monoclonal antibodies) and biosimilars.
- **Import Substitution:** Reduce dependence on critical high-value imports in the pharmaceutical sector.
- **Affordable Healthcare:** Support domestic manufacturing of therapies for high-burden **Non-Communicable Diseases (NCDs)** like cancer and diabetes.
- **Global Share:** Aim to capture **5% of the global biopharmaceutical market share**.

Key Features

- **Non-Animal Methodologies (NAMs):** Transitions from traditional animal testing to advanced technologies like **organoids**, organ-on-a-chip, and 3D bioprinting.
- **Clinical Trials Network:** Establishes over **1,000 accredited clinical trial sites** nationwide under ICMR to accelerate drug development.
- **Institutional Upgradation:** Includes the establishment of **3 new NIPERs** and the upgradation of **7 existing ones** into centres of excellence.
- **Regulatory Reform:** Strengthening the **CDSCO** by creating a "Scientific Review Cadre" to align approval timelines with international benchmarks.

Governance and Funding

- **Ministry:** Under the Ministry of Chemicals and Fertilizers (specifically the Department of Pharmaceuticals).
- **Implementing Agency:** The **Department of Pharmaceuticals** leads the initiative, supported by an inter-ministerial panel to design and oversee the hub.
- **Funding Mechanism:** A total financial outlay of **₹10,000 crore** over five years (starting FY 2026–27). It provides **discovery grants** and **equity support** for startups to bridge the gap from concept to clinical milestones.

- **Scheme Type:** It is a **Central Sector Scheme** (fully funded and implemented by the Central Government) and serves as a **flagship initiative**.

Update as of 2026: Achievements & Criticism

- **Achievements (Status):** As a newly launched scheme in 2026, initial achievements include the **formation of the Inter-Ministerial Committee** to monitor progress and the rollout of the **"Scientific Review Cadre"** within the CDSCO to streamline approvals. It is successfully integrated with the earlier **National Biopharma Mission** and **PRIP scheme** to ensure continuity.
- **Criticisms/Challenges:**
  - **High Entry Barriers:** Critics point to the **high capital and skill requirements** that may exclude smaller domestic players.
  - **Regulatory Agility:** Concerns exist regarding whether regulatory systems can maintain speed without compromising safety.
  - **Global Competition:** Facing stiff competition from established biopharma hubs in the US and Europe, which have more mature R&D ecosystems

16. **National Quantum Mission (NQM)**:

The **National Quantum Mission (NQM)** is a **flagship central sector scheme** launched by India in 2023 with a total outlay of **₹6,003.65 crore** for the period **2023-24 to 2030-31**. As of 2026, it is actively transitioning from foundational setup to large-scale technological demonstration.

Core Identity and Governance

- **Ministry:** Ministry of Science & Technology.
- **Implementing Agency:** Department of Science & Technology (DST).
- **Scheme Type: Central Sector Scheme** (100% funded by the Central Government) and acts as an **umbrella initiative** for quantum R&D in India.
- **Implementing Structure:** It uses a "Hub-and-Spoke" model with four **Thematic Hubs (T-Hubs)** incorporated as Section-8 companies to ensure effective governance.

Aims and Objectives

The NQM seeks to position India as a global leader in Quantum Technologies (QT) through four key pillars, targeting the development of 50–1,000 physical qubit computers, long-distance secure quantum communication (2,000+ km), advanced sensing/metrology, and material fabrication over eight years.

Status Update & Achievements (as of 2026)

- **Infrastructure:** Four T-Hubs are functional at premier institutes (IISc Bengaluru, IITs).
- **Key Milestones:** Early achievements include a 500 km quantum-safe network, testing of an indigenous 6-qubit computer, and a demonstrated 1,000-km quantum communication network.
- **Ecosystem:** Over 17 deep-tech startups supported; 23 institutions approved for quantum teaching labs.

Challenges and Outlook

- **Implementation & Talent:** Shortages in specialized talent and advanced fabrication facilities are major challenges.
- **Competition:** Despite being the 7th nation with a dedicated mission, India lags in total investment compared to leaders like the US and China.
- **Technical Hurdles:** Challenges include addressing qubit fragility and slow private sector risk-taking

17. Operation Dronagiri:

Operation Dronagiri, launched on November 13, 2024, is a pilot initiative of the Government of India designed to demonstrate the real-world applications of geospatial technologies. As of **May 2026**, the program has moved beyond its initial launch phase, with established state and district-level committees overseeing pilot projects across five selected states.

Core Framework

- **Ministry:** Under the Ministry of Science and Technology (MoST).
- **Implementing Agency:** Driven by the **Geospatial Innovation Cell** within the Department of Science and Technology (DST).
- **Operational Arms:** Overseen by the IIT Tirupati Navavishkar I-Hub Foundation (IITTNiF), with Geospatial Innovation Accelerators (GIAs) at **IIT Kanpur, IIT Bombay, IIM Calcutta, and IIT Ropar** serving as regional hubs.
- **Scheme Type:** It is a **Central Sector Scheme**, as it is a 100% centrally funded initiative under the National Geospatial Policy (NGP) 2022.
- **Classification:** It is considered a **Flagship Initiative** for the implementation of the National Geospatial Policy 2022.

Aims and Objectives

The primary goal is to integrate geospatial data and analytics into governance to improve quality of life and "Ease of Doing Business". Specific objectives include:

- **Demonstration of Use Cases:** Proving the utility of geospatial data in three key sectors: **Agriculture**, **Livelihoods & Skilling**, and **Logistics & Transport**.
- **Data Liberalisation:** Supporting the democratization of geospatial data to make it accessible to startups and private entities.
- **Innovation Ecosystem:** Fostering a robust network of startups and private partners to create a "UPI-like" transformation in the geospatial domain.

Key Features & Funding

- **Integrated Geospatial Data Sharing Interface (GDI):** A foundational digital backbone that enables seamless data sharing and analysis for urban planning and disaster management.
- **Geographic Focus:** Initial pilot phase implemented in six districts across **Uttar Pradesh, Haryana, Assam, Andhra Pradesh, and Maharashtra**.
- **Funding Mechanism:** Financed through the DST, specifically focusing on **funding and accelerating 25 startups** in the geospatial domain to drive POCs (Proofs of Concept).
- **PPP Model:** Implementation relies heavily on a Public-Private Partnership model to ensure scalability and innovation.

Achievements (as of May 2026)

- **Governance Integration:** State and district-level committees have been formalized in pilot states like Haryana to streamline local implementation.
- **Startup Engagement:** Successful deployment of geospatial solutions by startups such as ITC MAARS and LCB Fertilizers in sectors like farm advisory in Varanasi.
- **Data Availability:** Over 50 additional datasets have been onboarded to the GDI, including high-resolution drone imagery with 5cm precision.

Operation Dronagiri +2

Criticism and Challenges

- **Digital Divide:** Concerns regarding the ability of small-scale farmers and rural entrepreneurs to effectively utilize complex geospatial data without significant training.
- **Implementation Gaps:** As a pilot project, critics point to the potential difficulty in scaling these high-tech solutions from district-level pilots to a nationwide rollout across diverse topographies.
- **Data Privacy:** Although built with privacy-preserving features, the large-scale collection and sharing of spatial data raise ongoing concerns about sensitive location information

18. National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS):

The **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)** is a comprehensive initiative launched in December 2018 to position India as a global leader in Cyber-Physical Systems (CPS). As of **2026**, the mission has been extended to **December 2027** to further scale its technological and societal impact.

Core Details

- **Nodal Ministry:** Ministry of Science & Technology.
- **Implementing Agency:** Department of Science & Technology (DST).
- **Scheme Type:** It is a **Central Sector Scheme**, meaning it is 100% funded by the Union Government.
- **Mission Classification:** It is categorized as a **National Mission** (often described as an overarching or "umbrella" framework for CPS research and translation in India).

Aims and Objectives

The mission focuses on a four-pronged approach: technology development, entrepreneurship, human resource development, and international collaboration.

IMPRI Impact and Policy Research Institute

- **Translational Research:** Converting basic research into market-ready products with high Technology Readiness Levels (TRL).
- **Technology Hubs:** Establishing world-class interdisciplinary centers of excellence to serve as focal points for industry and policy.
- **Skilled Manpower:** Creating a base of high-end researchers and next-generation technocrats in CPS.
- **National Priorities:** Developing indigenous solutions for critical sectors like agriculture, water, health, and energy.

Funding and Features

- **Funding Mechanism:** Initially approved with an outlay of **₹3,660 crore** for five years. Funding is competitive and directed toward 25 Technology Innovation Hubs (TIHs).
- **Key Features:**
  - **TIH Network:** 25 TIHs established in premier institutes (e.g., IITs, IISc) focusing on verticals like AI, Robotics, IoT, and Cybersecurity.
  - **Technology Translation:** Four TIHs (at IIT Kanpur, IISc Bangalore, ISM Dhanbad, and IIT Indore) have been upgraded to **Technology Translation Research Parks (TTRPs)** to focus on scaling solutions for digital healthcare and mining.
  - **Section 8 Companies:** Each TIH operates as an independent Section 8 (not-for-profit) company to ensure professional management.

2026 Status & Achievements

The mission has demonstrated significant quantitative and qualitative growth by **mid-2026**:

- **Commercial Innovations:**
  - **BharatGen:** Launched domain-specific AI models for Ayurveda, Agriculture, Legal, and Finance.
  - **Indigenous Technology:** Developed **5G-Advanced ORAN** massive MIMO units for rural connectivity and **Smart Mining Edge-AI** solutions for drone-based monitoring.
  - **First Indian Chip:** Mindgrove Technologies created India's first commercial chip for secure IoT.
- **Ecosystem Growth:**
  - Over **1,500 technologies** and products developed.
  - Supported over **900 startups** and created nearly **16,000 jobs**.
  - Trained over **2.1 lakh individuals** and awarded **6,400+ fellowships**.
  - Successfully demonstrated a **drone swarm display** at the Beating Retreat ceremony (developed by Botlabs Dynamics).

Criticism and Challenges

While the mission is hailed as a success, certain areas remain under scrutiny:

- **Commercialization Gap:** Despite high publication and patent counts, critics argue that the bridge between prototype development and large-scale industrial adoption (the "valley of death") remains difficult for some TIHs to cross.
- **Sustainable Funding:** As the mission reaches its extended deadline in 2027, there are concerns regarding the long-term financial self-sustainability of the TIHs once government grants cease.
- **Uneven Geographic Focus:** Most TIHs are located within elite institutes (IITs/IISc), which some observers believe limits the trickle-down of technology to regional and smaller-tier academic institutions

19. TIDE 2.0 (Technology Incubation and Development of Entrepreneurs):

TIDE 2.0 (Technology Incubation and Development of Entrepreneurs) is a **Central Sector Scheme** under the **Ministry of Electronics and Information Technology (MeitY)**. It is a **flagship initiative** designed to build a holistic ecosystem for ICT startups leveraging emerging technologies like AI, IoT, and Blockchain.
MeitY Startup +3

Aims and Objectives

- **Foster Tech Entrepreneurship**: Promote the use of emerging technologies (AI, Robotics, IoT, etc.) to solve societal challenges in seven priority areas: Healthcare, Agriculture, Education, Financial Inclusion, Transportation, Environment, and Clean Energy.
- **Capacity Building**: Empower **51 selected incubators** (Group 1, 2, and 3 centres) across India to provide technical and financial handholding to startups.
- **Idea-to-Market Support**: Bridging the gap between academic research and commercial applications by supporting startups through their entire lifecycle.
MeitY Startup +2

Funding Mechanism

The scheme has a total approved outlay of **₹264.62 crore** over five years (initially 2019–2024, now active through 2026). Funding is distributed as follows:
Bajaj Finserv +1

- **Entrepreneur-in-Residence (EiR)**: A grant of up to **₹4 Lakhs** for individuals or students to develop a Proof of Concept (PoC) from an idea.
- **Grant-in-Aid**: Up to **₹7 Lakhs** provided to nascent startups with a definite PoC to develop a Minimum Viable Product (MVP).
- **Seed Funding**: Opportunities for larger financial infusions upon successful completion of the incubation stages.
iimv field +2

Implementing Agency

The **MeitY Startup Hub (MSH)** is the primary implementing and coordinating agency. It ensures linkages between TIDE 2.0 centres, Centres of Excellence (CoEs), and industry collaborative platforms.
MeitY Startup +3

Key Features

- **Layered Incubation**: Incubators are categorized into three groups (G1, G2, G3) based on their capacity, with G1 centres (like IIM Calcutta and IIMA) mentoring G2 and G3 centres.
- **Regional Inclusion**: Explicit focus on encouraging innovation from **Tier-II and Tier-III cities** to democratise the startup ecosystem.
- **Societal Impact**: Prioritises product-oriented innovation over service-only models to address national concerns.
  Tata Capital +2

Update as of May 2026: Achievements & Progress

- **Startup Support**: As of late 2025/early 2026, over **1,700 startups** have been supported, nearing the original target of 2,000.
- **Global Scaling**: More than **150 incubated startups** have successfully expanded their operations to international markets.
- **Ecosystem Integration**: TIDE 2.0 has been successfully integrated with other flagship missions like **GENESIS** and **SAMRIDH** to provide a "whole-of-government" support framework.
  Vajiram & Ravi +2

Criticism & Challenges

- **Funding Gaps**: Some early-stage startups report that the ₹4–7 lakh grant is often insufficient for deep-tech hardware prototyping, which requires higher capital intensive R&D.
- **Variable Mentor Quality**: While G1 centres provide world-class mentoring, there have been concerns regarding the consistency of support and industry linkages provided by some newly established G3 centres.
- **Commercialisation Hurdle**: Despite strong support for MVP development, many startups still struggle with the "valley of death"—securing larger Series A funding to scale after the government grant ends.

20. Bio-RIDE (DBT):

The **Biotechnology Research Innovation and Entrepreneurship Development (Bio-RIDE)** is a unified **Central Sector Scheme** under the **Ministry of Science and Technology**. It was approved in September 2024 as an **umbrella scheme** that merges two existing initiatives—Biotechnology Research and Development (R&D) and Industrial & Entrepreneurship Development (I&ED)—while adding a major new component: **Biomanufacturing and Biofoundry**.

Core Details (As of 2026)

- **Ministry:** Ministry of Science & Technology.
- **Implementing Agency:** Department of Biotechnology (DBT) and its Public Sector Undertaking, the Biotechnology Industry Research Assistance Council (BIRAC).
- **Scheme Type:** A **Central Sector Scheme** (100% funded by the central government) and an **umbrella/flagship initiative**.
- **Total Outlay:** ₹9,197 crore for the 15th Finance Commission period (2021-22 to 2025-26).
  PIB +3

Aims and Objectives

The primary goal is to transform India into a **US$300 billion Bioeconomy by 2030** and support the vision of **Viksit Bharat 2047**.

- **Foster Innovation:** Provide grants and incentives for high-end research in areas like synthetic biology, biopharmaceuticals, and bioenergy.
- **Promote Entrepreneurship:** Support startups through seed funding, incubation (via the BioNEST network), and technical mentorship.
- **Bridge the Gap:** Accelerate the transition of academic research into industrial and commercial applications.
- **Sustainable Biomanufacturing:** Establish Biofoundries to produce eco-friendly, bio-based products in line with the **LiFE (Lifestyle for Environment)** initiative.

Key Features & Funding Mechanism

- **Integrated Components:** Merges R&D, entrepreneurship, and biomanufacturing into a single, synergistic platform.
- **Extramural Funding:** Provides financial support to universities, public research institutes, and private R&D labs.
- **Biofoundries:** Uses automated platforms to manipulate DNA for manufacturing commercially viable biomolecules.
- **Funding Flows:** Direct grants for R&D, equity-based support for scale-up (e.g., LEAP Fund), and seed funding for early-stage startups.

Achievements (Updated to March 2026)

According to official reports, significant milestones include:

- **Startup Support:** Over **1,000 early-stage startups** and innovators supported.
- **Innovation:** Completion of India's first indigenous antibiotic (**Nafithromycin**) and breakthrough human gene therapy for **Hemophilia A**.
- **Financial Impact:** Mobilized more than **₹3,500 crore** in follow-on funding and created 3,500+ skilled jobs.
- **Public Health:** Delivery of indigenous **MRI scanners**, ventilators, and COVID-19 vaccines (ZyCoV D and Corbevax) under the associated National Biopharma Mission.
- **Data Sharing:** Launch of the **Indian Biological Data Centre (IBDC)**, providing access to 10,000 whole genome samples.

Criticism & Challenges

- **Budgetary Volatility:** Parliamentary committees have noted persistent volatility between initial budget allocations and final expenditures.
- **Monitoring Gaps:** Recommendations have been made to establish more robust, **real-time monitoring frameworks** for the newly merged components.

- **Translation Hurdles:** Despite high patent filings (800+), the gap between laboratory success and large-scale industrial commercialization remains a critical challenge

21. MedTech Mission (MAHA).

The **MAHA-MedTech Mission** (Mission for Advancement in High-Impact Areas – Medical Technology) is a strategic initiative launched in October 2025 to accelerate indigenous innovation and reduce import dependence in India's medical technology sector.

Core Details (Update as of 2026)

- **Ministry:** Under the **Ministry of Science and Technology**.
- **Implementing Agency:** Managed by the Anusandhan National Research Foundation (ANRF) in collaboration with the **Indian Council of Medical Research (ICMR)** and the **Bill & Melinda Gates Foundation**.
- **Scheme Type:** It functions as a **Central Sector Scheme** model, with 100% funding and management coming from central bodies and international partners, rather than being a cost-sharing scheme with states.
- **Classification:** It is considered a **flagship mission** designed to provide strategic direction for research and development in high-impact areas.

Aims and Objectives

1. **Public Health Impact:** Supporting technologies that address priority disease areas like tuberculosis, cancer, and neonatal care.
2. **Affordability & Access:** Ensuring high-quality medical devices are available at lower costs compared to expensive imports.
3. **Self-Reliance (Atmanirbhar Bharat):** Strengthening domestic manufacturing and industry-academia collaboration to make India a global MedTech hub.

Key Features and Funding Mechanism

- **Total Outlay:** ₹750 crore over a 5-year duration.
- **Grant Support:** Milestone-linked funding ranging from **₹5 crore to ₹25 crore** per project, extending up to **₹50 crore** for exceptional high-impact technologies.
- **Target Entities:** Open to startups, MSMEs, academic/R&D institutions, and hospitals.
- **Scope:** Covers diagnostic imaging, robotics, AI/ML-enabled platforms, minimally invasive technologies, and point-of-care diagnostics.
- **Support Ecosystem:**
  - **Patent Mitra:** Assists with intellectual property protection.
  - **MedTech Mitra:** Provides regulatory guidance and market clearances.
  - **Clinical Trial Network:** Facilitates clinical validation of new technologies.

Achievements (by early 2026)

- **Project Pipeline:** By February 2026, the mission shifted from concept screening to full-proposal evaluation, focusing on AI-driven MedTech innovation.
- **Global Positioning:** Positioned India as a potential exporter of affordable medical technologies to low- and middle-income countries.
- **Indigenous Progress:** Successfully bridged the "valley of death" for several deep-tech startups by providing the necessary TRL-3+ (Proof of Concept) funding.

Criticisms and Challenges

- **High Eligibility Bar:** Strictly excluding projects at TRL-1 or TRL-2 may leave early-stage basic research without adequate support under this specific mission.
- **Private Cost-Sharing:** Private sector entities must contribute a **minimum of 30%** cost-share, which can be a barrier for smaller MSMEs despite the available grant.
- **Implementation Speed:** While conceptually strong, critics often point to the complexity of multi-agency coordination (ANRF, ICMR, Gates Foundation) potentially slowing down disbursement

22. EV Mission

As of May 2026, the primary "EV Mission" in India is the **PM E-DRIVE** (PM Electric Drive Revolution in Innovative Vehicle Enhancement) scheme. It serves as the latest iteration of the government's push for electric mobility, effectively replacing the FAME II scheme.

ICICI Direct +3

1. Aims and Objectives

- **Decarbonisation**: Reduce the environmental impact of the transport sector and greenhouse gas emissions.
- **Fuel Security**: Lessen dependence on imported fossil fuels.
- **Mass Adoption**: Accelerate the uptake of EVs (especially 2-wheelers and 3-wheelers) by reducing upfront costs through incentives.
- **Local Ecosystem**: Strengthen domestic manufacturing (Aatmanirbhar Bharat) and localized innovation.
- **Public Transit**: Prioritize electrification of public transport like buses and trucks.

2. Core Governance & Implementation

- **Ministry**: Ministry of Heavy Industries (MHI).
- **Implementing Agency**: MHI directly oversees implementation, with specialized research support from the Anusandhan National Research Foundation (ANRF) for R&D (under the MAHA-EV program).
- **Scheme Type**: It is a **Central Sector Scheme** (100% funded by the Union Government).
- **Status**: It is a **Flagship Scheme** under the broader **National Electric Mobility Mission Plan (NEMMP)** umbrella.

3. Funding & Features (Update 2026)

- **Outlay**: ₹10,900 crore for a two-year period (April 2024 to March 2026).

- **Funding Mechanism**: Direct demand incentives (subsidies) to buyers and grants for capital assets.
- **E-Vouchers**: Buyers receive an Aadhaar-linked e-voucher at the time of purchase to avail of incentives.
- **Key Features**:
  - **Subsidies**: Covers 24.79 lakh e-2Ws, 3.16 lakh e-3Ws, and new segments like e-ambulances and e-trucks (₹500 crore each).
  - **Public Transport**: ₹4,391 crore for 14,028 electric buses.
  - **Infrastructure**: ₹2,000 crore for installing 72,300 public charging stations.
  - **Institutional Support**: ₹780 crore for upgrading testing agencies.

4. Achievements & Criticisms (As of 2026)

Achievements	Criticisms
Sales Growth: Over 16.7 lakh EVs supported by early 2026; e-2W sales reached 5.7 lakh units in FY25 alone.	**Exclusion of Cars**: Private e-4Ws (cars) were largely excluded from direct demand incentives in PM E-DRIVE, focusing only on mass/commercial transit.
Charging Network: Over 9,159 public charging stations installed under FAME II/PM E-DRIVE as of Jan 2026.	**Subsidy Reductions**: Critics argue the gradual reduction of per-vehicle subsidy amounts slows the adoption rate for cost-sensitive buyers.
Indigenous R&D: Launch of 7 "e-Nodes" at IITs/Research Centers to build local battery and motor tech.	**Range Anxiety**: Despite infrastructure growth, many users still cite a lack of uniform charging density on highways as a barrier.

23. One Day One Genome Initiative:

The **One Day One Genome (ODOG)** initiative is a central scientific program launched on **November 9, 2024**, to explore and publicly share India's vast microbial genetic diversity.

Core Details & Administration

- **Ministry:** Under the Ministry of Science & Technology (Department of Biotechnology).
- **Implementing Agency:** Coordinated by the **Biotechnology Research and Innovation Council (BRIC)** in collaboration with the National Institute of Biomedical Genomics (NIBMG), West Bengal.
- **Funding Mechanism:** Supported through the **Department of Biotechnology (DBT)** under the unified governance of BRIC, which utilizes **intra-mural core grants** and institutional resources from its 14 merged autonomous institutions.

- **Scheme Type:** It functions as a **Central Sector Initiative** (100% funded and implemented by the Central Government) rather than a centrally sponsored scheme involving state-level matching.
- **Status:** It is a **flagship initiative** under India's BioE3 Policy (Biotechnology for Economy, Environment and Employment).

Aims and Objectives

- **Harness Microbial Potential:** Highlight unique bacterial species in India and their roles in agriculture, human health, and environment.
- **Democratise Data:** Release one **fully annotated bacterial genome** every day to make complex genomic data accessible to the public and researchers.
- **Scientific Innovation:** Provide datasets, infographics, and summaries to stimulate industrial use and scientific breakthroughs.

Key Features

- **The BHARAT Pipeline:** Uses the **Bacterial Hybrid genome Assembly and Rapid Annotation Toolset** for streamlined, high-quality genome assembly.
- **Collaborative Data:** Integrates genomic data from **13 BRIC institutions** and autonomous bodies like ICGEB and RCB.
- **Open Access:** All data is freely available to the public to encourage community-driven innovation.

2026 Update & Achievements

- **Milestone Reached:** As of late 2025/early 2026, the initiative has successfully released over **200 bacterial genomes**.
- **Diverse Sources:** Genomes have been sequenced from extreme and unique Indian environments, including **Rann of Kutch**, the **Andaman Sea**, **Lonar Lake**, and the **Indian Arctic expedition**.
- **Practical Insights:** Successfully identified genes related to **antimicrobial resistance (AMR)**, toxins, and soil-beneficial properties.

Criticisms and Challenges

- **Data Translation Gap:** Concerns remain about whether raw genomic data is being effectively translated into commercial biotech products or pharmaceutical drugs fast enough.
- **Compute Limitations:** The high throughput of "one genome per day" puts significant strain on centralized bioinformatics infrastructure and data storage facilities.
- **Bacterial Focus:** Some experts have noted the initiative's current heavy focus on **bacterial species**, potentially neglecting other crucial microbial components like fungi or viruses.

24. **Carbon Capture, Utilisation and Storage (CCUS) Scheme:**

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The **Carbon Capture, Utilisation and Storage (CCUS) Scheme** was officially expanded into a major policy-backed deployment in the **Union Budget 2026-27** with a dedicated outlay of **₹20,000 crore**. It serves as a critical pillar for India to reach its net-zero emissions target by 2070 while allowing heavy industries to continue operating.

Core Details of the Scheme

- **Aims and Objectives**: To decarbonize "hard-to-abate" industrial sectors (where emissions are a byproduct of the process itself) by capturing CO2 and either reusing it or storing it permanently underground.
- **Type of Scheme**: It is a **Central Sector Scheme**, entirely funded by the Central Government with an initial five-year allocation.
- **Ministry & Agency**: The **Department of Science and Technology (DST)** under the Ministry of Science and Technology is the primary implementing and coordinating agency.
- **Classification**: It functions as a **Flagship Scheme** for industrial decarbonization, aligning with India's broader climate strategy and the "Viksit Bharat@2047" vision.

Key Features & Funding Mechanism

- **Target Sectors**: Primarily focuses on five high-emitting industries: **Power, Steel, Cement, Refineries, and Chemicals**.
- **Funding Mechanism**: Uses a mix of direct budgetary support (outlay of **₹20,000 crore**) and proposed **Viability Gap Funding (VGF)** to lower high initial capture costs.
- **CCUS Hubs & Clusters**: Establishment of regional hubs (e.g., in Gujarat and Odisha) where industries share the infrastructure for CO2 transport and storage to reduce costs.
- **Technology Mix**: Includes both **pre-combustion** (gasification-based) and **post-combustion** (solvent-based) capture methods.

2026 Status & Achievements

- **R&D Roadmap 2025-2045**: Launched in December 2025, it outlines a phased scale-up from pilot projects to full commercialization by 2035.
- **Operational Pilots**: **ONGC** initiated its first dedicated CCUS pilot at the Gandhar oil field in Gujarat in **January 2026**.
- **Centres of Excellence**: Established at **IIT Bombay** and **JNCASR, Bengaluru** to facilitate indigenous R&D and capacity building.
- **Test Beds**: The DST is setting up **five CCUS test beds** across the country to study real-world applications.

Criticism & Challenges

- **High Economic Cost**: The high capital expenditure and "energy penalty" (additional power needed for capture) remain significant barriers.
- **Weak Incentives**: Market participants have noted a lack of robust carbon pricing and weak end-user demand for captured CO2.
- **Governance Complexity**: There are concerns regarding the legal and safety frameworks for long-term underground CO2 storage.
- **Competing Priorities**: Some critics point to a lack of clarity between industrial CCUS and nature-based solutions like soil sequestration for farmers, which are currently being debated in policy circles

25. **Mega-Science Facilities:** As of 2026, India's **Mega-Science Facilities** (often referred to as the **Mega Facilities for Basic Research (MFBR)**) function as critical drivers of high-end basic research through domestic infrastructure and international collaborations.

Overview of Mega-Science Facilities (2026)

Feature	**Details**
Aims & Objectives	To provide Indian researchers access to world-class research infrastructure; to participate as equal partners in high-cost, technically complex international projects; and to foster deep industrial-scientific linkages.
Ministry	Jointly guided by the **Department of Science & Technology (DST)** and the **Department of Atomic Energy (DAE)**.
Implementing Agency	Agencies vary by project (e.g., **Indian Institute of Astrophysics** for TMT, **Bose Institute** for FAIR, **NCRA-TIFR** for SKA).
Funding Mechanism	Primarily funded by the Government of India through the DST and DAE. Often involves **"in-kind" contributions** (supplying high-tech components like power converters or software) for international projects.
Scheme Type	It is a **Central Sector Scheme**. As of August 2024, it was merged into the **"Vigyan Dhara"** umbrella scheme.
Scheme Status	Part of the **Vigyan Dhara Umbrella Scheme** (a unified scheme that merged earlier research and capacity-building programs).

Key Projects & Recent Updates (2026)

The **Union Budget 2026–27** provided a significant push for these facilities, specifically announcing or upgrading **four major telescope infrastructures** to bolster the astronomy ecosystem: LinkedIn·DEPARTMENT OF SCIENCE & TECHNOLOGY GOVT. OF INDIA (DST) +1

- **National Large Solar Telescope (NLST):** Under construction near Pangong Lake to complement solar missions like Aditya-L1.
- **National Large Optical Infrared Telescope (NLOT):** A planned 30-metre class facility for deep-sky observation.
- **Square Kilometer Array (SKA):** India became a full member in 2024–2025, committing ₹1,250 Cr for the world's largest radio telescope.

- **Laser Interferometer Gravitational-Wave Observatory (LIGO-India):** Ongoing development in Hingoli, Maharashtra.

Achievements (as of 2026)

- **Global Standing:** India ranks **3rd globally** in research publications and **6th** in patent filing as of 2025–26.
- **Innovation Index:** Jumped to **38th** in the Global Innovation Index (GII) 2025 from 81st in 2015.
- **Technical Excellence:** Successfully delivered critical components for international facilities like **CERN (LHC)** and **ITER** (fusion reactor), proving India's "in-kind" manufacturing capability.
- **Inclusivity:** The **Vigyan Dhara** merger has streamlined funding, reducing administrative delays for multi-institutional research teams.

Criticism & Challenges

- **Site Delays:** Projects like the **India-based Neutrino Observatory (INO)** in Tamil Nadu have faced prolonged delays due to environmental concerns and local site-related issues.
- **Long Gestation Periods:** Many mega-projects (e.g., TMT) face "wait-and-watch" criticism as they remain in the construction or approval phase for over a decade.
- **High Costs vs. Ground Realities:** Critics often question the massive outlays for basic research when immediate socio-economic challenges require funding, though the government counters this with the "Viksit Bharat 2047" vision for a knowledge economy

26. India Science and Research Fellowship (ISRF) 2025–26:

The **India Science and Research Fellowship (ISRF)** is a strategic initiative by the Government of India designed to foster scientific cooperation with neighbouring countries. For the **2025–26** cycle, the call for proposals is open from **December 31, 2025, to March 31, 2026**.

Aims and Objectives

- **Scientific Cooperation:** To strengthen bilateral and regional scientific collaboration between India and its neighbours.
- **Capacity Building:** To provide researchers from partner countries access to India's premier research laboratories and state-of-the-art facilities.
- **Regional R&D:** To support joint R&D projects in frontier areas of science, technology, medicine, and agriculture.

Governance and Implementation

- **Ministry:** Department of Science & Technology (DST), under the **Ministry of Science and Technology**.
- **Implementing Agency:** Indian National Science Academy (INSA), New Delhi.
- **Scheme Type:** It is a **Central Sector Scheme** because it is 100% funded and implemented by the Central Government.
- **Status:** It is considered a **Flagship Program** for India's International Science and Technology Cooperation with neighbouring nations.

Key Features and Funding Mechanism

- **Eligible Countries:** Researchers from **Afghanistan, Bangladesh, Bhutan, Maldives, Myanmar, Nepal, Sri Lanka, and Thailand**.
- **Fellowship Duration:** Short-term research visits lasting **3 to 6 months**.
- **Financial Support (Values as of 2026):**
  - **Monthly Allowance:** ₹50,000 (includes accommodation and medical facilities).
  - **Contingency Grant:** One-time grant of ₹10,000 for the fellow and ₹20,000 for the host scientist in India.
  - **Travel:** Round-trip economy class airfare and visa fee reimbursement.
- **Annual Awards:** Up to **80 fellowships** (approximately 10 per country) are awarded each year.

Status and Update (2026)

The **2025–26 call** specifically targets researchers holding permanent positions or those registered for a PhD in their home country. The deadline for the current cycle is **March 31, 2026**.

Achievements and Criticisms

- **Achievements:**
  - Over **128 fellowships** were awarded between 2015 and 2019, leading to numerous quality research papers and international conference participations.
  - It has successfully provided a platform for researchers from countries with limited infrastructure to utilize Indian labs for "cutting-edge" research.
- **Criticisms/Limitations:**
  - **Limited Scope:** Participation is restricted to only 8 specific neighbouring countries, excluding other regional or global partners.
  - **Fixed Duration:** The 3-6 month window is sometimes viewed as too short for complex long-term scientific projects.
  - **Disruptions:** The program faced total suspension of awards during the pandemic, highlighting a lack of robust digital or hybrid alternatives at the time

27. Prime Minister Early Career Research Grant:

The **Prime Minister Early Career Research Grant (PM-ECRG)** is a **flagship initiative** launched by the **Anusandhan National Research Foundation (ANRF)**. It is designed to empower young researchers to establish independent research careers, providing them with the financial stability to pursue high-impact scientific and technological innovations.

Core Details (As of 2026)

- **Ministry:** Under the Ministry of Science & Technology.
- **Implementing Agency:** Anusandhan National Research Foundation (ANRF), which became operational in late 2024, replacing the former Science and Engineering Research Board (SERB).

- **Scheme Type:** It is a **Central Sector Scheme** (100% funded by the Union Government) and is considered a **flagship program** within the ANRF's broader mandate to seed and grow a research culture.

Aims and Objectives

- **Empowerment:** To support early-career researchers in initiating independent research at their host institutions.
- **Global Leadership:** To position India as a global leader in science and technology by creating a vibrant research ecosystem.
- **Knowledge Expansion:** To encourage the production of high-quality research that brings in breakthrough ideas and explores new scientific frontiers.
- **Ease of Doing Research:** To provide an enabling environment with flexible funding and simplified administrative processes.

Funding Mechanism & Features

- **Grant Amount:** A one-time research grant of up to **₹60 lakh** (plus overheads).
- **Duration:** Support is provided for a fixed period of **3 years**, with no provision for extension.
- **Coverage:** Funds cover research personnel (stipends), equipment, consumables, national/international travel, and contingencies.
- **Flexibility:** Features a "flexible budget" allowing researchers to reallocate funds under the recurring head based on project needs.
- **Eligibility:** Applicants must hold a regular academic/research position, have a Ph.D./MD/MS, be within **2 years of joining** their institution, and be under **42 years** of age (with relaxations for reserved categories and women).

2026 Status and Achievements

- **Operational Scale:** By February 2026, the ANRF successfully completed its 2nd review cycle at IIT Hyderabad, evaluating nearly **3,400 proposals** with the help of over 140 domain experts.
- **Public Engagement:** Launched the **PMECRG Lightning Talk Series** in early 2026 to showcase the societal impact of young researchers' work to students and stakeholders.
- **Annual Targets:** The scheme aims to award approximately **700 grants per year** across all subject areas.

Criticisms

- **One-Time Nature:** The grant is strictly a **one-time** opportunity; researchers who have previously received certain SERB or ANRF project grants are ineligible.
- **Strict Age & Tenure Caps:** The requirement to apply within two years of joining an institution and the age limit of 42 can exclude talented researchers who entered academia later or faced career breaks.
- **No Extensions:** The rigid three-year duration without a provision for extension can be challenging for high-risk or complex long-term projects

28. National Technology Readiness Assessment Framework (NTRAF):

The **National Technology Readiness Assessment Framework (NTRAF)** was unveiled on **December 29, 2025**, as a standardised methodology to objectively measure the maturity of technology projects. As of May 2026, it serves as the "operational backbone" for evaluating and funding innovations across India's research and development (R&D) ecosystem.

Aims and Objectives

- **Unified Assessment**: Establish a common, evidence-based language between researchers, investors, and policymakers to evaluate technology maturity.
- **Bridge the "Valley of Death"**: Focus on **TRL 4 to TRL 7**, where many deep-tech innovations fail due to a lack of funding and perceived risks.
- **Credible Claims**: Ensure that startups claiming to be "market-ready" meet stringent industrial-grade validation standards.
- **Efficient Funding**: Enable precision in the allocation of public and private R&D resources.

Sanskriti IAS +4

Institutional Framework & Classification

- **Under Ministry**: **Office of the Principal Scientific Adviser (PSA)** to the Government of India.
- **Implementing Agency**: Developed by the **Office of the PSA** in collaboration with the **Confederation of Indian Industry (CII)**.
- **Scheme Type**: It is primarily a **procedural framework** rather than a traditional financial scheme; however, it functions as a **Central Sector** initiative as it is managed directly by the Central Government's PSA office.
- **Classification**: It is considered an **Umbrella Framework** because it is designed to be adopted across various national missions and departments (like the Anusandhan National Research Foundation) to standardise their respective funding and assessment protocols.

Key Features

- **9-Level TRL Scale**: Adopts the NASA-originated 9-level Technology Readiness Level (TRL) scale, ranging from basic laboratory research (TRL 1–3) to full commercial deployment (TRL 7–9).
- **Sector-Specific Nuances**: Includes specialised annexures for distinct sectors like **Healthcare & Pharmaceuticals** and **Software**.
- **Objectivity**: Replaces qualitative, subjective narratives with structured, evidence-based checklists for each development stage.
- **Self-Assessment Tool**: Provides an interactive tool for innovators to identify technical gaps before applying for funding.

Achievements & Progress (2026 Update)

- **Standardization**: Successfully replaced fragmented assessment methods previously used by different R&D organisations with a single national standard.
- **Integration with ANRF**: It has been integrated into the Anusandhan National Research Foundation (ANRF) to guide its large-scale R&D funding decisions.
- **Pilot Testing**: A pilot phase involving 20 selected technologies was initiated to cross-validate and stress-test the framework.

Criticism & Challenges

- **Complexity of Compliance**: Critics from small startups have noted that the "stringent standards" and "granular audits" may increase the administrative burden on early-stage innovators.
- **Market vs. Tech Focus**: Some experts suggest that while it measures technical maturity well, it may still require better integration with **market validation** metrics to ensure commercial success.
- **Sector Breadth**: While specialized annexures exist, there are concerns about whether the framework can adapt quickly enough to rapidly evolving fields like **Agentic AI** or synthetic biology

29. BharatGen Initiative:

The **BharatGen** initiative is India's first government-funded, sovereign Multimodal Large Language Model (LLM) project. Launched on **September 30, 2024**, it aims to create AI that is "by Bharat, for Bharat," prioritizing India's unique socio-cultural and linguistic diversity.

Core Identity & Administration

- **Ministry:** Under the Ministry of Science & Technology.
- **Umbrella Program:** Part of the **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**, a flagship mission of the Department of Science and Technology (DST).
- **Scheme Type:** It operates as a **Central Sector Scheme** project (fully government-funded) under the NM-ICPS.
- **Implementing Agency:** Spearheaded by **IIT Bombay** through its **TIH Foundation for IoT and IoE**, leading a consortium of academic partners including IIT Madras, IIT Kanpur, IIT Hyderabad, and IIIT Hyderabad.

Aims, Objectives & Features

- **Linguistic Sovereignty:** To develop foundational models capable of generating high-quality text, speech, and images in all **22 scheduled Indian languages** by June 2026.
- **Inclusive Innovation:** Ensuring AI technology reaches underserved communities and captures local dialects often ignored by global models.
- **Open-Source Ecosystem:** Providing an open platform and "technical recipes" for startups and researchers to build affordable AI applications.
- **India-Centric Data:** Creating Bharat Data Sagar, the world's largest repository of Indian text, speech, and images.

Funding Mechanism

The project utilizes a multi-layered funding approach totaling approximately **₹1,293 crore**:

- **Seed Funding:** ₹235 crore from the **DST** via the NM-ICPS mission.
- **Major Expansion:** An additional **₹1,058 crore** (approx. $125M) secured from the Ministry of Electronics & Information Technology (MeitY) under the **IndiaAI Mission** in late 2025.

Updates & Achievements (as of May 2026)

- **Language Milestone:** As of February 2026, models covered 15 Indian languages (including Hindi, Tamil, and Bengali), with a target to cover all 22 by **June 2026**.
- **Sectoral Pilots:** Successfully piloted domain-specific models:
  - **Agri Param:** For Indian agriculture.
  - **Legal Param:** For the Indian legal domain.
  - **Ayur Param:** Fine-tuned for Ayurveda.
- **BharatGen Summit (2025/2026):** Hosted major summits to drive public-private partnerships and hackathons for grassroots innovation.

Criticism & Challenges

- **Data Scarcity:** Challenges remain in sourcing high-quality digital data for "low-resource" Indian languages that lack a large online footprint.
- **Hardware Dependence:** Critics often point to India's continued reliance on foreign-made GPUs (hardware) to train these sovereign models.
- **Access & Adoption:** While developed as a "public good," concerns exist regarding whether rural populations will have the necessary digital literacy to use these advanced AI tools effectively.

30. Technology Translation Research Parks (TTRPs):

Technology Translation Research Parks (**TTRPs**) are advanced innovation hubs established by upgrading top-performing **Technology Innovation Hubs (TIHs)** to focus on the large-scale commercialisation and societal application of cyber-physical technologies.

Core Identity and Administration

- **Ministry:** Ministry of Science & Technology.
- **Implementing Agency:** Department of Science and Technology (DST).
- **Mission Context:** They operate under the **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**.
- **Scheme Type:** TTRPs are part of a **Central Sector Scheme** (NM-ICPS), meaning they are 100% funded and directly implemented by the Union Government.
- **Status:** NM-ICPS is an **umbrella mission** that coordinates diverse research, startup, and skill development activities through various hubs and parks.

Aims and Objectives

The primary goal is to bridge the "valley of death" between laboratory research and market-ready products:

- **Technology Translation:** Convert lab-scale R&D into validated, industry-ready prototypes and solutions.
- **Industry Engagement:** Foster deep-tech collaborations between academia, startups, and established industry players.

- **Scaling Impact:** Transition successful pilot deployments into scalable solutions for sectors like healthcare, mining, and security.
- **Commercialisation:** Accelerate the market entry of advanced technologies through dedicated business development support.

Key Features & Funding

- **Selection Criteria:** Upgraded from the best TIHs based on financial sustainability, operational roadmaps, and existing industry links.
- **Funding Mechanism:** Direct central grants. For FY 2025-26, allocated budgets ranged from **₹32.5 crore to ₹60 crore** per TTRP.
- **Hub & Spoke Model:** TTRPs act as central nodes connecting academia, industry, and multiple government ministries.

Current Status and Achievements (as of 2026)

As of early 2026, **four (04) TTRPs** have been officially established and funded:

TRP Location	ocus Area	ey Achievement/Project
Sc Bangalore	obotics & AI ystems	-HUB for Robotics Foundation; autonomous avigation systems.
T Kanpur	ybersecurity	3iHub; developing crypto-accelerators and drone ecurity.
T (ISM) hanbad	ining echnologies	EXMiN; digital twins of mines and green mining olutions.
T Indore	igital Healthcare	emote point-of-care diagnostics and AI-enabled ealth monitoring.

Global Achievement: A total of **98 major research projects** are currently active across these four parks.

Criticisms and Challenges

- **Utilization Gap:** Data for 2025-26 shows a gap between allocated and utilized funds; for instance, one park utilized only ₹14.01 crore out of ₹43.43 crore allocated.
- **Sustainability Concerns:** Critics point to the high dependence on central grants and the slow pace of private sector investment in high-risk deep-tech.

- **Geographic Concentration:** Initial TTRPs are concentrated in premier IITs/IISc, leading to concerns about regional imbalance in high-tech infrastructure development

31. SATHI & PURSE Programs:

As of **May 2026**, the **SATHI** and **PURSE** programs remain the cornerstone initiatives of the **Ministry of Science and Technology** designed to overhaul India's research and development (R&D) infrastructure.
Department of Science & Technology (DST) +3

1. SATHI (Sophisticated Analytical & Technical Help Institutes)

SATHI creates shared, professionally managed hubs housing high-end analytical equipment that individual institutions often cannot afford.

- **Ministry & Agency**: Under the **Ministry of Science & Technology**; implemented by the **Department of Science & Technology (DST)**.
- **Aims & Objectives**:
  - Building a shared, professionally managed R&D infrastructure.
  - Providing access to high-end equipment for academia, start-ups, and industry.
  - Reducing dependency on foreign sources for advanced testing.
- **Funding Mechanism**: Operates as a **Central Sector Scheme** (100% central funding). DST provides up to **₹60-125 crores** per centre for a duration of 4 years.
- **Key Features**:
  - **Consortium Mode**: Requires a cluster approach involving multiple institutions and the formation of a **Section-8 (Not-for-Profit) company**.
  - **Open Access**: Facilities must be accessible to external users (MSMEs, start-ups) on a nominal fee basis.
- **2026 Update & Achievements**:
  - Expansion beyond the initial three centres (IIT Delhi, IIT Kharagpur, BHU) to new hubs like **IIT Hyderabad, ICT Mumbai, and BITS Pilani**.
  - Integration with the **National Research Foundation (NRF)** framework to streamline national research priorities.
- **Criticism**:
  - **Funding Uncertainty**: Periodic cancellations of proposal calls have caused anxiety among researchers regarding long-term sustainability.
  - **Maintenance**: High operational and maintenance costs of sophisticated equipment remain a hurdle.

2. PURSE (Promotion of University Research and Scientific Excellence)

PURSE is a flagship program specifically tailored to boost the research performance of Indian universities.

- **Ministry & Agency**: Under the **Ministry of Science & Technology**; implemented by **DST**.
- **Aims & Objectives**:
  - Strengthening the research ecosystem of performing universities.
  - Providing support for research manpower, consumables, and minor equipment.
- **Funding Mechanism**: **Central Sector Scheme**. Funding is performance-based, determined by the university's **H-index**, **i10 index**, and **NIRF ranking**.

- **Key Features**:
  - **Exclusivity**: Dedicated solely to the university sector, including state, central, and private universities.
  - **Nature of Support**: Covers research facilities, consumables, travel, and organization of workshops for a period of **4 years**.
- **2026 Update & Achievements**:
  - By 2026, DST has supported over **91 universities** with a total investment exceeding **₹1,227 crores**.
  - Recent projects focus on "Mission Mode" research aligned with national priorities like **Clean Energy** and **Waste Processing**.
- **Criticism**:
  - **Strict Eligibility**: Stringent H-index requirements can disadvantage smaller or newer state universities.
  - **Bureaucratic Delays**: Universities often report delays in fund disbursement, affecting time-sensitive research cycles.

Comparison Summary

eature	**ATHI**	**URSE**
ype	**lagship Infrastructure Program**	**nstitutional Capacity Building**
ategory	entral Sector Scheme	entral Sector Scheme
arget	onsortia (Academia + Industry)	ndividual Universities
ocus	igh-end Shared Equipment	esearch Ecosystem & Manpower

32. Inclusivity Research Grant (IRG):

The **Inclusivity Research Grant (IRG)** is a dedicated funding initiative launched by the Anusandhan National Research Foundation (ANRF). It is designed specifically to support active researchers from the **Scheduled Caste (SC)** and **Scheduled Tribe (ST)** communities, providing them a platform to conduct high-impact research in frontier areas of science and engineering.

Core Framework (as of 2026)

- **Ministry:** Under the **Ministry of Science and Technology**, Government of India.
- **Implementing Agency: Anusandhan National Research Foundation (ANRF)** (which replaced the earlier Science and Engineering Research Board - SERB).
- **Scheme Type:** It is a **Central Sector Scheme**, as it is 100% funded and implemented by the Central Government via the ANRF.
- **Classification:** It is considered a **flagship scheme** of the ANRF for promoting social equity in the research ecosystem. It is not an "umbrella scheme" itself, but rather a focused program under the broader ANRF framework.

Key Features & Funding Mechanism

- **Aims & Objectives:** To facilitate equal participation of SC/ST researchers, enhance their research capacity, and help them transition into mainstream research programs.
- **Funding Support:** Provides up to **₹60 lakh plus overheads** for a duration of **three years**.
- **Operational Flexibility:** Includes support for manpower recruitment, recurring expenses, contingency, and publication fees.
- **Special Provisions:** Covers costs for patent filing and **international travel** related to the project.
- **Subsumed Scheme:** It has replaced the former **Empowerment and Equity Opportunities for Excellence in Science (EMEQ)** scheme.

Update as of 2026: Achievements & Progress

- **Sanctioned Projects:** As of late 2025/early 2026, **209 projects** have been sanctioned under the IRG.
- **Application Window:** Regular calls are issued annually; the 2025 window closed in July, and the **2026 funding cycle** is expected to follow similar timelines.
- **Institutional Reach:** The grant has expanded to researchers in state universities and local colleges, moving beyond just top-tier national labs.

Criticism & Challenges

- **Budgetary Gaps:** Despite its status, critics point to uneven progress in creating a truly innovation-driven ecosystem five years after the NEP release, noting gaps in institutional quality and equitable opportunities.
- **Institutional Capacity:** While funding is available, many SC/ST researchers at smaller state universities still struggle with a lack of **foundational infrastructure** at their host institutions, which must be provided by the institute itself rather than the grant.
- **Career Limitations:** A researcher can only avail of IRG support a maximum of **three times** in their career, including previous EMEQ grants, which some argue limits long-term growth for investigators in specialized field