



# India's Leap in Research and Innovation

## ₹1 lakh crore RDI Scheme boosting India's research and development drive

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### Key Takeaways

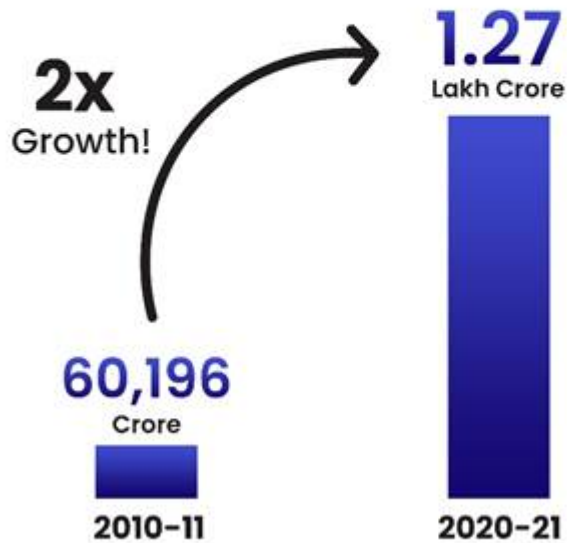
- **₹1 lakh crore** RDI Scheme launched, will boost private-led innovation.
- India's expenditure on R&D rose from ₹60,196 crore in 2010–11 to **₹1.27 lakh crore** in 2020–21.
- Central Government contributes **43.7%** of total R&D expenditure.

### Introduction

India's research and development (R&D) ecosystem is witnessing rapid transformation, fuelled by a strong national focus on innovation-led growth. Investments in science and technology have increased steadily, supported by clear policy direction, strategic funding, and institutional reforms. This reflects India's ambition to build a self-reliant, knowledge-driven economy that tackles key challenges through research and innovation.

# Growth in India's

Gross Expenditure on Research  
and Development



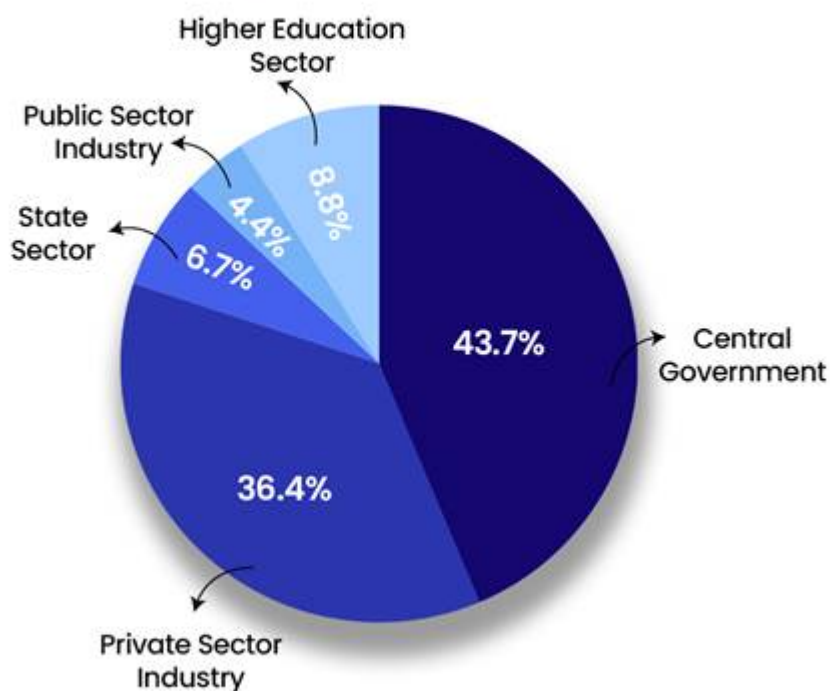
Source: Department of Science & Technology

The Government has placed R&D at the heart of its journey towards *Viksit Bharat@2047*. It recognises that science and technology drive progress in health, energy, digital transformation, and manufacturing. Efforts to deepen public and private participation, strengthen links between academia and industry, and promote emerging technologies have created a dynamic innovation ecosystem. As India marches ahead, research and innovation will remain central to achieving sustainable and inclusive growth.

## India's R&D Expenditure and Growth Trends

India's commitment to research and innovation has strengthened steadily over the past decade. The Government's sustained policy focus and institutional reforms have contributed to a consistent rise in R&D spending.

## Sector-wise Share in India's National R&D Expenditure (2020–21)



Source – Department of Science & Technology

### Key Trends and Figures:

- India's Gross Expenditure on Research and Development (GERD) has more than doubled in ten years from ₹60,196.75 crore in 2010–11 to **₹1,27,380.96 crore** in 2020–21.
- Per capita R&D expenditure has also shown consistent growth, increasing from PPP\$ 29.2 in 2007–08 to **PPP\$ 42.0 in 2020–21**. (PPP refers to Purchasing Power Parity, which adjusts for differences in price levels between countries, allowing more accurate comparison of spending power.)
- The Government sector contributes around **64% of total GERD**, while the private sector accounts for about 36%.
- As per Science and Engineering (S&E) Indicators 2022 by NSF, USA, India awarded 40,813 doctorates in 2018–19, of which 24,474 (60%) were in Science and Technology. **India ranks 3rd globally in S&E PhDs**, after the USA (41,071) and China (39,768).
- The number of patents filed in India increased nearly three times from 24,326 in 2020–21 to **68,176 in 2024–25**, highlighting a major surge in domestic innovation.

### Research Development and Innovation (RDI) Scheme

Launched on November 3, 2025, the Research Development and Innovation (RDI) Scheme Fund of **₹1 lakh crore** marks a landmark step in strengthening India's research and development ecosystem. The scheme aims to build a private sector-driven innovation environment that can accelerate the nation's scientific and technological progress.

## ESTIC 2025

The Research, Development and Innovation (RDI) Scheme was launched on 3 November 2025 during the inauguration of the Emerging Science, Technology and Innovation Conclave (ESTIC) 2025.

ESTIC-2025 is currently being held at Bharat Mandapam, New Delhi, from 3 to 5 November 2025. Envisioned as India's premier annual flagship platform for advancing scientific collaboration and innovation, it brings together over 3,000 participants from academia, research institutions, industry, and government, along with Nobel Laureates, leading scientists, innovators, and policymakers.

Centred on the theme “Viksit Bharat 2047 – Pioneering Sustainable Innovation, Technological Advancement and Empowerment,” ESTIC features several key components, including plenary talks by Nobel Laureates and global thought leaders, 11 thematic technical sessions, panel discussions, exhibitions showcasing 35+ deep-tech start-ups and sponsors stalls, and poster presentations by young scientists. Together, these components aim to inspire innovation, promote collaboration, and shape India's roadmap for science and technology towards Viksit Bharat @2047.

Recognising the critical role of the private sector in driving innovation and commercialising research, the RDI Scheme provides long-term financing or refinancing support with extended tenors at low or nil interest rates. The initiative aims to encourage greater private investment in RDI, particularly in sunrise and strategic sectors.

The scheme also addresses existing challenges in funding private research by offering growth and risk capital. It focuses on facilitating innovation, promoting technology adoption, and improving competitiveness across emerging areas.



The key objectives of the RDI Scheme are as follows:

- **Encourage private sector participation:** To scale up research, development, and innovation in sunrise domains and other sectors vital for economic security, strategic purpose, and self-reliance.
- **Finance transformative projects:** To support projects at higher levels of technology readiness for faster translation from concept to market.
- **Support acquisition of critical technologies:** To enable access to technologies of high strategic importance.
- **Facilitate Deep-Tech Fund of Funds:** To strengthen the financing ecosystem for deep technology start-ups and innovation-driven enterprises.

### **Institutional and Policy Framework for Innovation**

India's innovation journey has been guided by a strong institutional framework and forward-looking policy measures. Over the last few years, the Government has undertaken a series of reforms to strengthen scientific research, promote private participation, and create an enabling environment for technology-led growth. These initiatives are aimed at making India a global hub for research, innovation, and entrepreneurship across emerging sectors.

#### **Anusandhan National Research Foundation (ANRF)**

The Anusandhan National Research Foundation (ANRF), established through the Anusandhan National Research Foundation Act, 2023 (25 of 2023), came into force on 5 February 2024. It provides high-level strategic direction for research, innovation, and entrepreneurship in science and technology.

The Foundation aims to mobilise funds amounting to ₹50,000 crore during 2023–28 through multiple streams, including the ANRF Fund, Innovation Fund, Science and Engineering Research Fund, and Special Purpose Funds. Of this, ₹14,000 crore will come from the Central Government, while the remaining support is expected from non-governmental sources such as industry and philanthropists. The ANRF is designed to strengthen the link between academia and industry and promote high-impact research that aligns with national priorities.

#### **National Geospatial Policy, 2022**

The National Geospatial Policy, notified on 28 December 2022, seeks to position India as a global leader in the geospatial sector by 2035. The policy liberalises access to geospatial data, encouraging its use in governance, business, and research. It promotes the development of geospatial infrastructure, services, and platforms at national and sub-national levels.

A key goal of the policy is to establish a high-resolution topographical survey and mapping system, along with a comprehensive Digital Elevation Model for the entire country by 2030. The policy follows a citizen-centric approach, ensuring that data generated through public funds remains open and accessible to all stakeholders.

#### **Indian Space Policy, 2023**

The Indian Space Policy, approved in 2023, provides a unified and forward-looking framework for India's space sector. It builds on the space reforms introduced in 2020, which opened the domain to non-governmental entities for end-to-end participation. The policy aims to enhance space capabilities,

promote a flourishing commercial space industry, and foster collaboration between public and private entities. It seeks to ensure socio-economic development, environmental protection, and peaceful exploration of outer space.

A key feature of the policy is the establishment of **IN-SPACe**, an autonomous government organisation responsible for promoting, guiding, and authorising space activities. IN-SPACe issues guidelines to ensure ease of doing business and provides a level playing field for all participants in the space ecosystem.

### **BioE3 Policy, 2024**

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The BioE3 Policy, approved in August 2024, represents a major reform in India's biotechnology sector. Standing for Biotechnology for Economy, Environment and Employment, the policy seeks to advance innovation-driven research and entrepreneurship in six thematic areas. It encourages the creation of Biomanufacturing and Bio-AI hubs, along with a national Biofoundry network, to accelerate technology development and commercialisation.

The policy promotes the industrialisation of biology to support sustainable and circular economy practices. It addresses key national challenges such as climate change, food security, and public health while building a resilient biomanufacturing ecosystem that enables cutting-edge bio-based innovation.

### **Atal Innovation Mission (AIM) 2.0**

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The Atal Innovation Mission, launched in 2016 under NITI Aayog, continues to be the flagship initiative for fostering innovation and entrepreneurship across India. It works to ensure creation of a problem-solving innovative mindset in schools and an ecosystem of entrepreneurship in universities, research institutions, private and MSME sector. The Mission includes setting up of Atal Tinkering Labs in schools and Atal Incubation Centres in universities, institutions and corporate. The Cabinet recently approved the continuation of the mission till March 2028 with a budget allocation of **₹2,750 crore**. AIM has taken a holistic approach to nurturing a culture of problem-solving and innovation in schools, universities, research institutions, and industries.

Under AIM 2.0, the mission aims to expand its reach, strengthen existing incubation networks, and deepen its engagement with micro, small and medium enterprises. The initiative aligns with the vision of a developed India by creating an inclusive ecosystem that nurtures young innovators and supports emerging startups.

### **National Missions Driving Frontier Research**

India's pursuit of global leadership in science and technology is being driven by a series of national missions that target emerging and high-impact sectors. These missions are designed to strengthen indigenous R&D capabilities, promote public-private collaboration, and build advanced infrastructure across frontier domains. Each mission contributes to building a self-reliant innovation ecosystem and positions India as a key player in next-generation technologies.

### **National Quantum Mission (NQM)**



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Approved by the Union Cabinet on 19 April 2023, the National Quantum Mission represents a bold step in advancing India's presence in quantum technology. Spanning from **2023–24 to 2030–31**, with an allocation of **₹6,003.65 crore**, the mission seeks to develop quantum computers, secure communication systems, and advanced materials. It focuses on strengthening quantum research infrastructure and promoting collaboration between academia, startups, and industries to ensure that India becomes a global hub for quantum innovation.

#### **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**



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The NM-ICPS, approved by the Cabinet on 6 December 2018, is implemented by the Department of Science and Technology with a total outlay of **₹3,660 crore**. The mission supports development in emerging areas such as Artificial Intelligence, Robotics, Internet of Things, and Cybersecurity.

Twenty-five Technology Innovation Hubs have been established in leading academic institutions, each specialising in a core technology domain. The mission also nurtures skilled manpower through targeted human resource programmes, encourages entrepreneurship, and promotes international collaboration to ensure that India keeps pace with global technological shifts.

#### **National Supercomputing Mission (NSM)**



Launched in 2015, the National Supercomputing Mission aims to make India self-reliant in high-performance computing. The initiative empowers universities, research institutions, and government agencies with state-of-the-art supercomputing systems connected through the National Knowledge Network.

Beyond hardware, the mission invests in building a skilled workforce through five dedicated training centres located in Pune, Kharagpur, Chennai, Palakkad, and Goa. These centres train students and researchers in high-performance computing applications, ensuring India's participation in global scientific advancements.

## India Semiconductor Mission (ISM)

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Established in 2021, the India Semiconductor Mission seeks to build a robust ecosystem for semiconductor and display manufacturing. Backed by a ₹76,000 crore Production Linked Incentive scheme, of which ₹65,000 crore has already been committed, the mission supports investments in chip design, fabrication, and advanced packaging.

India has already approved **10 semiconductor projects** across six states, including the first commercial Silicon Carbide fabrication facility in Odisha. With total investments of ₹1.60 lakh crore, ISM positions India as a key link in the global semiconductor supply chain and a major destination for electronics manufacturing.

### Deep Ocean Mission (DOM)

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The Deep Ocean Mission, launched on 7 September 2021 by the Ministry of Earth Sciences, aims to explore and utilise ocean resources sustainably. With an investment of ₹4,077 crore over five years, the mission integrates multiple sectors under India's Blue Economy vision.

It focuses on developing technologies for deep-sea exploration, resource mapping, and marine biodiversity conservation. Given India's vast coastline of 7,517 kilometres and strategic maritime position, the mission also contributes to global efforts under the UN Decade of Ocean Science for Sustainable Development (2021–2030).

### IndiaAI Mission

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Approved by the Cabinet in March 2024, with a budget outlay of ₹10,371.92 crore, the IndiaAI Mission embodies the vision of “Making AI in India and Making AI Work for India.” It is advancing rapidly, having already increased computing capacity from an initial target of **10,000 GPUs to 38,000 GPUs**, ensuring accessible AI infrastructure for startups, researchers, and industries. The mission also focuses on AI innovation, governance frameworks, and skill development, setting the stage for India to emerge as a global leader in artificial intelligence.

### Digital Public Infrastructure (DPI): Accelerating India's R&D Vision

India's Digital Public Infrastructure has emerged as a strong enabler of the nation's research and innovation ecosystem. By integrating technology with accessibility, transparency, and efficiency, it supports faster knowledge exchange, data-driven research, and inclusive participation in the digital economy. DPI provides the essential foundation on which scientific, technological, and entrepreneurial progress can thrive.

Built on interoperable platforms and open standards, India's DPI empowers innovators, researchers, and industries to collaborate and build at scale. From seamless financial transactions to secure identity verification and efficient service delivery, these platforms demonstrate how digital governance can drive scientific and economic advancement.

Some key DPIs in India include:

### Unified Payments Interface (UPI)

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Launched in 2016 by the National Payments Corporation of India, the Unified Payments Interface has transformed digital transactions in the country. It links multiple bank accounts in one app, enabling real-time money transfers and merchant payments. In August 2025, UPI handled more than **20 billion transactions**, amounting to ₹**24.85 lakh crore**. Today, it accounts for 85 per cent of India's digital payments and supports 18 billion transactions every month.



UPI has also expanded globally, becoming operational in seven countries including the UAE, Singapore, Bhutan, Nepal, Sri Lanka, France, and Mauritius. Its entry into France marks India's first step into the European payments landscape, showcasing the scalability and global relevance of Indian digital innovation.

### Co-WIN Platform

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The Co-WIN (COVID Vaccine Intelligence Network) platform showcased India's ability to apply digital tools for large-scale coordination. It managed one of the world's largest vaccination drives, delivering over **220 crore doses**. Co-WIN brought transparency, efficiency, and real-time data management to public health. Its success has drawn global interest, with several nations exploring its model for their own health systems.



Introduced in 2015 under the Digital India programme, DigiLocker enables citizens to access verified digital documents securely. It provides a digital storage space for certificates and official records issued by various departments. As of October 2025, over **60.35 crore users** have registered on the platform. DigiLocker has become a trusted tool for digital empowerment, easing documentation for education, employment, and research purposes.

### **Aadhaar and e-KYC System**

The Aadhaar-based e-KYC framework has made authentication easier, faster, and more reliable across sectors. It streamlines verification processes, cuts paperwork, and enhances transparency. As of October 2025, India has generated over **143 crore Aadhaar IDs**, providing a secure digital identity to almost every citizen. Aadhaar now forms the backbone of service delivery and digital inclusion, ensuring smooth access to welfare, banking, and innovation-linked platforms.

### **Direct Benefit Transfer (DBT)**

The Direct Benefit Transfer mechanism demonstrates how digital platforms can improve governance efficiency. Supported by Aadhaar authentication, DBT ensures subsidies and welfare payments reach citizens directly, minimising leakages and duplication. Between 2015 and March 2023, it saved the government more than ₹3.48 lakh crore. As of May 2025, cumulative transfers through DBT surpassed **₹43.95 lakh crore**, reinforcing transparency and accountability in public service delivery.

### **Conclusion**

India's growing focus on research, development, and innovation reflects its resolve to become a global hub of knowledge and technology. Through bold policy measures, strategic funding, and strong institutional support, the nation is laying a solid foundation for Viksit Bharat@2047. The synergy between initiatives such as ANRF, the RDI Scheme, and key national missions demonstrates a unified vision to advance frontier technologies while strengthening academia–industry collaboration. Digital Public Infrastructure has further amplified India's innovation capacity by making governance and data systems more accessible and efficient. Together, these efforts are transforming India's R&D landscape into one that is inclusive, future-ready, and globally competitive, driving sustainable growth and positioning India as a leading force in science, technology, and innovation.

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