



KAMARAJ IAS ACADEMY
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India's thriving innovation and entrepreneurship ecosystem

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Context: As India celebrates National Technology Day on May 11, it is an opportunity to appreciate the visionary leadership of Prime Minister Narendra Modi who has championed science, technology, and innovation since 2014. PM Modi's personal indulgence and constant support, in nine years, have made India a leading nation in the field.

Government efforts

1 Atal Innovation Mission

The Atal Innovation Mission (AIM), established under NITI Aayog, has made significant strides in fostering a robust entrepreneurial landscape in India.

AIM achieves its vision through various programmes such as Atal Tinkering Labs (ATLs) for schools, Atal Incubation Centres (AICs) for start-ups and entrepreneurs, Atal Community Innovation Centres (ACICs) for grassroots innovation, Atal New India Challenges (ANICs) for national-impact innovations, and Mentor India for change agents.

There's also a key partnership between iCreate, India's premier non-academic institution dedicated to nurturing technology-based start-ups, and Atal Tinkering Labs.

This collaboration aims to provide students with resources, mentorship, funding, industry expertise, and training in entrepreneurship and innovation.

The initiative involves a wide range of stakeholders, including ATL schools, incubation centres, community innovation centres, higher education institutions, NGOs, foundations, start-ups, industry associations, and central and state government ministries.

Role of CSIR

The Council of Scientific & Industrial Research (CSIR) plays a crucial role in supporting not only industrial R&D for established industries but also startups and MSMEs.

CSIR's recent efforts in the startup ecosystem include showcasing selected technologies to boost collaborative confidence, highlighting startups incubated in CSIR laboratories, conducting interactive lecture sessions to strengthen CSIR-industry relationships and gathering valuable feedback from startups.

The National Institute of Ocean Technology (NIOT)

The National Institute of Ocean Technology (NIOT), an autonomous body under the Ministry of Earth Sciences, is dedicated to designing, developing, and demonstrating technologies for the sustainable utilisation of ocean resources.

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With a significant impact on the industry, NIOT has signed 32 technology licensing agreements and is set to finalise two more in May.

The institute showcases various innovative models, including the Matsya 6000, WxCTD, seawater lamp, desalinisation plants, and remote-operable vehicles, highlighting its commitment to sustainable ocean technology.

Furthermore, live interactions with scientists in Antarctica using a VR system and informative posters and models demonstrate the institute's invaluable services to the public.

The Department of Atomic Energy (DAE)

The Department of Atomic Energy (DAE) has established itself as a technology powerhouse. Committed to deploying atomic power for improving life quality and fostering national development, DAE contributes to carbon-free electricity, healthcare (particularly cancer care), food preservation, crop-variety development, and environmental waste management.

Moreover, DAE supports basic research and international cooperation in nuclear energy-related fields. Among its achievements, the Tata Memorial Centre (TMC) provides affordable patient care services and cutting-edge research in multiple Indian states. With the dedication of new facilities, TMC is expected to treat up to 1.6 lakh patients at nominal rates or for free.

DAE has inaugurated several cancer treatment and research facilities, laid the foundation for upcoming centres and introduced cost-effective alternatives for cancer diagnosis and treatment.

Furthermore, DAE has developed indigenous production methods for rare earth permanent magnets and laid the foundation for a Tata Institute of Fundamental Research campus in Hyderabad and the Laser Interferometer Gravitational-Wave Observatory-India (LIGO-India) project.

The Indian Space Research Organisation (ISRO)

The Indian Space Research Organisation (ISRO), under the Department of Space, is actively promoting space education through initiatives such as Space Tutor, which involves 55 NGOs and educational institutions establishing space clubs and organising hands-on events.

They are also building capacity in the geospatial domain, providing training on satellite data usage for various applications.

Space science data from missions like Chandrayaan and Mangalyaan is used for hackathons and workshops. The virtual space park, SPARK, offers students exposure to space programmes, while ISRO's STEM portal, Jigyasa, encourages online education and innovation.

The Space on Wheels programme consists of mobile space museums aimed at promoting awareness and education for rural students in collaboration with various institutions and organisations. Ever since the space department opened for public-private partnerships, the number of startups at ISRO has been going up each day.

Biotechnology

Over the past eight years, India's bio-economy has grown from \$10 billion to \$80 billion, increasing the number of biotech startups to 5,300.

The Department of Biotechnology (DBT) and Biotechnology Industry Research Assistance Council (BIRAC) have supported over 4,000 startups and 2,500 companies, resulting in 1,200 IP filings and 800 biotech products reaching the market.

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India is now a global leader in vaccine development, with initiatives like Mission COVID Suraksha and the development of vaccines like Zydus Cadila (ZyCoV-D). DBT has also focused on genomics to tackle health issues, through initiatives such as INSACOG, Dare2eraD TB, and GenomeIndia projects. Genome-editing technologies are being applied to healthcare and agriculture.

The National Biopharma Mission (NBM), AI programmes, and the Imaging Bio-Bank for Cancer further boost the sector. In agriculture, 50 crop varieties have been developed using genomic tools.

The One Health Initiative and bioenergy projects support animal biotechnology and clean energy. Capacity-building programmes like Star College Scheme and Biotech Industrial Training Program (BITP) promote skill development and infrastructure.

Finally, the Indian Biological Data Centre (IBDC) ensures the storage and sharing of biological data.

The Department of Science & Technology (DST)

The Department of Science & Technology (DST) is India's nodal agency for promoting science and technology, elevating the country's ranking to the top 50 innovative economies globally.

DST fosters innovation and entrepreneurship through various programmes, including the National Initiative for Developing and Harnessing Innovations (NIDHI), which offers end-to-end support for startups.

DST manages various National Missions, such as Interdisciplinary Cyber-Physical Systems, National Quantum Mission, and Technology Missions.

The department has provided a platform for showcasing innovations and products from numerous programmes like INSPIRE MANAK, Nidhi Prayas, NIDHI Technology Business Incubator, and NIDHI Centre of Excellence, resulting in over seven lakh ideas from school children, more than 8,000 technology-based startups, and 1,300 plus patents.

Technology Development Board (TDB)

Over the past 26 years, the Technology Development Board (TDB) has played a crucial role in supporting startups, innovators, and entrepreneurs in transforming their innovations into market-ready products.

In the last nine years, TDB has provided Rs 907 crore to 78 projects, covering diverse sectors such as healthcare, infrastructure, and defence.

Notably, TDB supported the manufacturing of India's first RT-PCR Covid diagnostic kit and advanced SBRT-enabled Linear Accelerator, which obtained US FDA clearance.

The board also supported the development of indigenously manufactured drones, multi-beam E-band radio Gigamesh, and daylight harvesting technology for building atriums.

Furthermore, TDB extended support for manufacturing receiver modules essential for the NavIC App, strengthening India's technological leadership in strategic and economically significant areas.

Significance of the efforts

India's innovation and entrepreneurship ecosystem is thriving, thanks to various policy initiatives and programmes aimed at developing the nation by 2047.

Atal Tinkering Labs inspire younger generations to engage in scientific research, becoming agents of change for India's growth.

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The Atmanirbhar Bharat mission serves as a bridge to New India, emphasising demand, supply, and manufacturing.

The Make in India initiative focuses on fostering innovation, investment, skill development, and world-class manufacturing infrastructure. A self-reliant India stands on five pillars: Economy, infrastructure, technology-driven systems, vibrant demography, and demand.

Vocal for local encourages the promotion of local products, reducing import dependence, and increasing global market share. With a robust manufacturing sector and focus on local products, India's future shines bright as it proves its global competence and competitiveness.

The Prime Minister's leadership since 2014 has played a significant role in steering India towards this path of innovation and self-reliance.

Conclusion

The National Technology Day celebrations remind us of the immense potential India holds in various fields, from atomic energy to space exploration and biotechnology. By acknowledging the achievements of engineers, scientists, and innovators, we instil a sense of pride and responsibility in the younger generation. The central theme of this year's National Technology Week is a testament to the nation's unwavering commitment to nurturing and promoting a culture of innovation and entrepreneurship.