

# India's march towards deep tech

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As India embraces the deep-tech revolution, the next wave of technological breakthroughs will come from the labs and start-ups in the space

**DEEP TECH REFERS** to deep technology that involves path-breaking scientific research and innovation. It is not the innovation itself but refers to the category of start-ups that create an impact through scientific discovery and engineering, creating an enabling power for their users. Deep tech cuts across areas, including processing and computing capabilities of a higher nature that support decision-making. They can power new designs, algorithms, techniques, and intelligence.

India's deep-tech journey has begun with new-age entrepreneurs daring to innovate into uncharted territories. India has been a software and consumer internet story so far. However, a growing need for high-impact, long-term solutions to global challenges such as climate change, healthcare, sustainable energy, and so on has fuelled a shift towards deep tech. Unlike traditional tech models that replicate global standards, deep-tech start-ups are pioneering new paradigms, creating first-of-its-kind solutions. Indian deep-tech start-ups are redefining the tech landscape and solving some of the world's most complex challenges.

India's deep-tech ecosystem, currently at around 4,000 start-ups, is expected to reach 10,000 by 2030 according to estimates by the department for promotion of industry and internal trade. The deep-tech start-ups are working towards tackling complex challenges through advanced technologies like artificial intelligence (AI), robotics, and biotechnology. Start-ups like Skyroot Aerospace, the first private Indian company to launch a rocket, and

ideaForge Technology, a leader in unmanned aerial vehicle (UAV) manufacturing, are setting benchmarks. These companies reflect a broader trend of Indian deep-tech start-ups emerging as global trendsetters, developing technologies that were once the exclusive domain of established international players.

Skyroot Aerospace's vision of lowering the cost of access to space led to the Hyderabad-based company's successful launch of the Vikram-S rocket in 2022, making it the first Indian private firm to achieve such a feat. ideaForge Technology is revolutionising the UAV market with its advanced drones which are used in defence, homeland security, and industrial applications. In the field of quantum computing, QNu Labs is leading the development of quantum-safe cryptographic solutions that ensure secure data transmission against quantum computer attacks, recognised globally for its work in secure communication. BosonQ Psi uses quantum computing to accelerate computational fluid dynamics simulation, essential for aerospace, automotive, and manufacturing sectors.

The rise of India's deep-tech sector has given birth to a new breed of entrepreneurs, the "deep-tech titans" who are not just aiming for financial success but are also driven by a mission to improve lives. They are creating technologies that challenge conventional boundaries, redefine

possibilities, and place India at the forefront of global tech leadership.

The government of India's policies have also helped nurture this ecosystem. Initiatives such as the National Mission on Quantum Technologies and Applications, with a budget of ₹8,000 crore, aim to elevate India's capabilities in quantum computing. The draft National Deep Tech Start-up Policy 2023 is targeted at accelerating technological growth, enhancing global competitive-

ness, and positioning India as a knowledge-driven economy. In addition, the Anusandhan National Research Foundation, with a dedicated ₹1 lakh-crore corpus, is investing heavily in research in various fields to ensure deep-tech innovations align with national goals.

Deep tech accounts for around 20% of annual venture capital investments worldwide, up from just 10% a decade ago. Despite global economic slowdowns, deep-tech start-ups raised nearly \$40 billion in 2023 alone.

Government emphasis on AI and machine learning is particularly significant. Initiatives such as the national strategy on AI and the establishment of AI research institutes are driving India's AI capabilities. Gnani.ai, a Bengaluru-based start-up, demonstrates the trend by developing conversational AI and voice biometric solutions that revolutionise customer service and fraud detection. Observe.AI

has raised over \$214 million to develop a conversational intelligence platform that sets new standards in AI-powered customer engagement.

Cell Propulsion, an electric vehicle technology start-up, is driving innovation in the logistics and transport sectors with its fully integrated electric mobility solutions. Biotech firms such as Biocon and Syngene are leading the way in genomics and personalised medicine research.

As deep-tech competition intensifies globally, India's unique strengths are being reflected. With a strong foundation in science, technology, engineering, and mathematics education, vibrant start-up culture, and a flourishing ecosystem of research institutions, India is positioned to assume leadership in the years to come. Already ranked sixth in the deep-tech ecosystem, the potential for India is immense, although challenges remain.

Start-ups continue to navigate a complex regulatory landscape besides trying to attract and retain top-tier talent and attempting to secure the much needed patient capital for long-term R&D. Deep-tech companies often face longer gestation periods and higher costs, requiring sustained investment and strategic partnerships to bring their innovations to market. Deep-tech start-ups are equipped to tackle India's most critical challenges.

As India continues to embrace the deep-tech revolution, the next wave of technological breakthroughs will come from the labs and start-ups in the space that has the potential to put the country ahead of the curve in innovation.

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