India's Deep Tech Surge: 5 Trends Shaping the Future

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Around the world, deep tech is reconfiguring the foundations of economic and geopolitical power. From artificial intelligence arms races to chip manufacturing reshaping supply chains, we are entering a decade where core science and frontier engineering will drive global competitiveness. In this context, India's push into deep tech is critical. The convergence of national security, industrial indigenisation, and interest from capital markets has created a unique opportunity for India to emerge as a top five global innovator.

India is at the dawn of its deep technology revolution. What began as isolated scientific endeavors is rapidly maturing into a high-potential competitive advantage. With state-backed grants, a new class of technology entrepreneurs, and widening interest from institutional investors, India is evolving from a user of imported technologies into a builder of sovereign IP across AI, quantum, space, defense, materials, and synthetic biology. Deep tech is emerging as a distinct diversification vector, demanding new valuation models, patient capital, and a rethinking of what long-term strategic value looks like.

This article outlines five key trends driving India's deep tech ascent and explores how they are reshaping the contours of capital market investment.

Trend 1: India's Deep Tech Startups Are Building for Strategic Autonomy

For decades, India's startup ecosystem focused on application-layer software, SaaS, and consumer and platform businesses. But the last five years have ushered in a quiet shift: a growing number of Indian startups are now building **core technologies**—from novel semiconductor device designs to indigenous drones, AI-driven medical devices, launch vehicles, and synthetic biology platforms.

Startups like **Dozee** (AI medical devices), **ideaForge** (unmanned aerial systems), and **Fermbox Bio** (synbio-based ethanol manufacturing) exemplify this movement. Space-tech companies like **Agnikul** and **GalaxEye** are building India's edge in satellites and orbital imaging, while startups like **Agnit Semiconductors** are developing Gallium-based semiconductor devices with proprietary process IP. These businesses are strategic ventures operating at the intersection of science, engineering, and national interest. They ventures reflect a wider pivot—from derivative tech to original innovation.

Unlike rapid-scale consumer startups, these companies often have longer gestation cycles, higher upfront R&D spend, and sometimes a dual-use application model—serving both strategic and commercial markets. As state procurement becomes more supportive, the line between public purpose and private enterprise is undergoing strategic super-positioning.

Trend 2: The Indian State Is Shaping Up as a Systemic Enabler of Deep Tech Development

The government's role in catalysing India's deep tech push cannot be overstated. Recognizing that deep tech requires long-cycle capital and coordinated risk absorption, the Indian state has started catalysing policy, funding, and infrastructure shifts to support its development.

Key initiatives include:

- **₹76,000 crore semiconductor PLI scheme** to develop fab and packaging ecosystems.
- **Research Development and Innovation (RDI) Scheme** to provide INR 1 lakh crore to encourage the private sector to scale up research, development, and innovation (RDI) in sunrise domains.
- **National Quantum Mission** with ₹6,000 crore for quantum computing, sensing, and encryption.
- **ISRO's IN-SPACe framework** opening space to private players, resulting in nearly 200 emerging startups.
- **Deep Tech Startup Policy (Draft 2023)** laying the foundation for regulatory sandboxes, IP ownership norms, and R&D-linked incentives. Formalizing and implementing this dormant policy will accelerate the ecosystem.

Most notably, **Union Budget 2025–26** announced a **₹1 lakh crore RDI corpus** for long-term innovation financing—a 50-year interest-free loan to spur research in sunrise sectors. This signals that the state is committed to playing the infinite game of technology sovereignty and could well be India's DARPA moment if it is backed by sustained follow-on capital and policy improvement year after year.

India has long had deep tech capabilities within government-led institutions like DRDO and ISRO. However, the current wave is distinct—it is decentralized, entrepreneur-led, and designed for dual-use scale. What was once confined

to PSUs is now emerging from campuses, private R&D, and startup incubators, unlocking a new innovation flywheel.

The government and bureaucracy must study how **DARPA, NSF**, and other public funding vehicles have systematically supported scientific innovation in the US and implement the same here, in scale and intent. Further, it must unlock new pools of domestic capital by enabling Indian institutions—like pension funds and insurance companies—to invest in India's maturing startup and emerging deep tech stories.

Trend 3: Talent and Academic IP Engines Are Going Mainstream

India's academic and research institutions are now deeply plugged into global deep tech ecosystems. The IITs, IISc, IISERs, and leading private universities and R&D hubs have seen a sharp rise in IP filings, tech transfer collaborations, and startup spin-offs. Many of India's deep tech founders today are PhDs with global research experience—often returning diaspora talent looking to build with purpose.

This talent shift is unlocking new modes of innovation:

- Startups like **Agnit Semi, ePlane,** and **Planys** are led by technologists who understand both global science and Indian constraints.
- Research is increasingly commercialized through institutions like **C-CAMP, IISC,** and **T-Hub,** supported by state innovation missions.

Unlike the "jugaad" era of frugal hacks, the deep tech wave is **IP-first**—with patent portfolios, design-led defensibility, and export ambitions embedded from day one. This fundamentally changes how investors must assess value—not by revenue multiples alone, but by the strength of the tech moat and its ability to scale globally over time.

India's academic innovation pipeline is now producing world-class outputs. Patent filings in AI, robotics, and semiconductor tech are increasing year on year. The flywheel between lab and market—traditionally unsupported in India—is beginning to accelerate.

Trend 4: Public Market Pathways Are Opening Up

ideaForge's 2023 IPO was a milestone—it showed that India's public markets can price in frontier technologies when supported by clear fundamentals. Defense-ready products, robust order books, and clear visibility into government procurement cycles made the case compelling for public investors.

This is now opening doors for others:

- **Raphe mPhibr, Aereo**, and other drone tech contenders are building towards public listings.
- **Aether, Ola, Exponent Energy, Yulu,** and other EV systems companies are building towards scale, with their IPOs already setting the standard comps for the emerging sector.
- SEBI has eased **listing norms** for technology-heavy firms and introduced sandboxes for algorithmic models and regulatory pilots.
- Efforts at **GIFT City's IFSC** aim to attract global institutional capital into India's sunrise sectors by offering easier repatriation, sandboxed regulatory environments, and long-term tax clarity.

Regulatory frameworks must evolve in tandem. SEBI's **Innovators Growth Platform (IGP)** was designed to enable high-risk tech startups to list earlier, but uptake has been limited. Simplifying compliance, reducing minimum listing thresholds, incentivizing domestic capital, and allowing revenue-light IP companies to go public could open doors for deep tech IPOs.

These reforms could bridge the current financing gap between lab-scale innovation and commercial scale-up. Deep tech companies often have few peers, long revenue runways, and require investor education. But once successful, they anchor entire industrial ecosystems.

Trend 5: Indian Deep Tech Is Gaining Global Traction

The maturation of Indian deep tech is evident in growing **international demand** and **strategic partnerships**. Startups once seen as experimental are now supplying components, platforms, or IP to global players. This external validation accelerates product refinement and gives Indian firms commercial scale early in their lifecycle.

For example, **ideaForge** and **ePlane** have secured export orders for their drones and aerial vehicles. Space-tech companies like **Pixxel** and **GalaxEye** have global clients using their hyperspectral imaging data. **Dozee**, an AI medtech startup, has partnered with hospitals and point of care facilities in the US and Africa to deploy its AI-powered patient monitoring solutions.

India's membership in the **Quad**, its deepening strategic ties with countries like the US and Japan, and its positioning as a democratic alternative to authoritarian innovation models are furthering this momentum. These relationships open doors for **co-development, tech sharing,** and **joint procurement**—giving Indian deep tech a strategic edge in international corridors.

Capital Markets: Deep Tech as a New Diversification Vector

India's deep tech ecosystem is pushing capital markets toward a rethink. Traditional valuation frameworks—focused on EBITDA, cash flows, or user metrics—are ill-suited for technology ventures that may take 7–10 years to commercialize but build enduring, defensible IP.

The market needs new approaches:

- **Technology Readiness Levels (TRLs)** must be understood and integrated into diligence.
- Investment theses must allow for **R&D-heavy burn cycles** with non-linear scaling post-validation.

- **Sovereign co-investment** models may emerge, where public funds derisk early innovation and private investors fund scale.

There is also scope for **thematic deep tech funds, dual-use innovation grants,** and **long-hold private equity vehicles** focused on frontier sectors. Institutional investors, family offices, and large allocators must begin building **deep tech literacy**—both for alpha generation and for playing a role in shaping India's strategic future.

Conclusion: The Long Game Is India's to Win

India missed the Industrial Revolution and played catch-up during the information age. But in deep tech—where software meets science, and long-term strategy trumps short-term metrics—India has a unique chance to compete.

With a young and globally competitive talent base, promising state commitment, a maturing private capital ecosystem, and global tailwinds demanding technological diversification beyond China, the moment is now. Deep tech can serve as the **backbone of India's industrial renewal**, defense readiness, and export competitiveness in an increasingly multipolar world.

To realize its deep tech potential, India must commit across three fronts. The **State** must play the long game—funding patient capital, de-risking early research, and streamlining procurement. The **Market** must evolve to value intangibles like IP, dual-use potential, and scientific defensibility. And **Society**—from universities to media—must celebrate technologists and scientific builders, creating cultural capital around invention.

For Indian investors, the message is clear: deep tech is a fast-expanding investment area where significant value is to be realized. Over the last ten years, deep tech companies like Nvidia and Tesla have generated astronomical returns for investors in the American economy. This is the opportunity awaiting Indian investors. Those who build conviction early, and price risk differently, will capture the upside of India's next innovation wave.

As the contours of India@100 take shape, deep tech will fuel the engine of India's long-term growth and sovereign competitiveness.