

Business Standard

India's R&D inflection moment

India's R&D spending has hit a record 0.84% of GDP, but reaching the global technology frontier will require much higher private-sector investment and smarter public funding

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(Photo: Pexels)

The Department of Science and Technology just released figures showing India's research & development (R&D) investment crossed 0.84 per cent of gross domestic product (GDP) in 2023-24, an all-time high that's projected to go up further. R&D intensity had been stuck between 0.6 per cent and 0.7 per cent of GDP for nearly a decade, and the latest figures mark a real break from the past. Buried inside that headline number is another shift deserving equal attention: The private sector's share rose from 32 per cent in 2020-21 to 45 per cent in just three years.

For most of independent India's history, research has been a government affair. A private sector growing at this pace indicates an economy expanding in confidence, and industry beginning to bet seriously on its own ideas. That milestone deserves recognition. So does the distance still to travel.

Since 1990, only 34 middle-income economies have reached high-income status; 108 remain stuck. Among economies that made the leap without the windfall of oil or minerals — Japan, South Korea, Taiwan, and others — the pattern is the same. Each invested heavily in research when its incomes were around where India's is today, and each accelerated that investment as growth compounded. The countries that didn't — Brazil, South Africa, and Thailand — are still stuck in the middle-income trap decades later.

R&D intensity is not a byproduct of reaching the frontier. It is how you get there.

One comparison matters most. In 2007, China's GDP per capita was \$2,700 — very close to where India stands today — but its R&D intensity was nearly double of India's at 1.49 per cent of GDP. Between 2007 and 2024 China's GDP grew 5.5 times, but its private-sector R&D grew more than 10 times. Industry was investing ahead of growth even as it contributed to growth — which transformed China into the tech superpower it is today.

India's Viksit Bharat ambition, therefore, is at a pivotal moment: When a middle-income economy either invests its way to the frontier, or settles into the slow lane. To realise that ambition, India needs to reach 2 per cent of GDP in R&D by 2035, with industry providing 70 per cent of that. And along the way, there is a meaningful milestone for 2030: 1.3 per cent of GDP, with corporate share rising to at least 60 per cent.

The government has begun moving — the Anusandhan National Research Fund (ANRF) and Research, Development and Innovation Fund (RDIF) exist to absorb early-stage research risk and give industry catalytic capital to build on. That is a good start, not a finish line. Three things need to follow.

Spend more. Government R&D expenditure needs to reach at least 0.5 per cent of GDP by 2030, on the way to 0.6 per cent by 2035 — a real increase from roughly 0.4 per cent today.

Fund the right things, in the right way. Three agencies — the Defence Research & Development Organisation (DRDO), Department of Space (DOS), and Department of Atomic Energy (DAE) — account for over 60 per cent of central scientific spending, most of it circulating inside their own labs. Higher education, the seedbed of foundational research that feeds every applied breakthrough downstream and creates the talent pipeline, receives just 12.6 per cent of India's R&D spend. Government funding needs to flow to independent researchers, startups, and firms; and focus on critical sectors, as the DRDO's iDEX demonstrates. The vehicle should be fewer, larger, longer-horizon, technology capability-focused national missions rather than fragmented grants, with matched private capital, and a serious translational layer between lab-scale research and market-ready product. Budgetary allocation to higher education institutes needs to increase to 15-20 per cent.

Create the conditions for industry to take risk. Policy has moved in the wrong direction on industry-facing instruments: The weighted deduction for R&D spend was rolled back in 2016, the goods and services tax treatment of R&D inputs remains punitive, and intellectual-property ownership for research conducted with public funds has no clear framework. The fix: Pair research-linked incentives with advance market commitments that pre-commit public procurement for products meeting performance milestones.

Indian industry is reaching genuine scale, new trade agreements are opening up global markets, and tariff barriers are coming down — which means competing at the global frontier, for which industry will have to innovate and back risky ideas.

A small number of firms already show what is possible. Glenmark made a sustained \$1 billion commitment over a decade to a single proprietary antibody platform. That produced ISB 2001, an antibody for treating advanced blood cancers, licensed to AbbVie in 2025 for up to \$1.9 billion. Skyroot Aerospace built its own rocket propulsion technology from scratch; its Vikram-1 became the first privately developed Indian rocket to reach orbit, making India only the third country with private orbital launch capability. The company is now valued at over \$1.1 billion.

The playbook exists. Industry now needs to decide whether to use it. India's Viksit Bharat hopes rest on both the amount and manner of its R&D deployment, with the private sector doing much more of the heavy lifting even as government policy and the public sector do their bit.

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