ujiyari

UPSC & STATE PCS CURRENT AFFAIRS · UJIYARI.COM

EDITORIAL ANALYSIS

From Invention to Global Scale: India's Next Innovation Challenge

THE HINDU

24 June 2026 · SCIENCE & TECH · ECONOMY · GS3

CURATED & WRITTEN BY

Bharat Choudhary

UPSC Educator & Content Creator

linkedin.com/in/epicbharat

Ujiyari Current Affairs
Daily Current Affairs for UPSC & State PCS · ujiyari.com
EDITORIAL ANALYSIS
24 June 2026

From Invention to Global Scale: India's Next Innovation Challenge

The Hindu 24 June 2026 GS3

Source: ujiyari.com — researched, fact-checked & UPSC-mapped

INTERVIEW ANGLE

"India has world-class scientists and a thriving startup scene, yet few globally scaled technology champions. Is the binding constraint money, manufacturing depth, or the absence of patient, risk-tolerant capital?"

Every fact web-verified against primary sources (https://ujiyari.com/how-we-verify/)

WHY THIS EDITORIAL MATTERS

India no longer has an invention problem. The country files patents in growing numbers, runs one of the world's largest startup ecosystems, and has just climbed to 38th in the Global Innovation Index (https://ujiyari.com/reports/global-innovation-index-2025/) (GII) 2025, marking the 15th consecutive year it has innovated above what its income level would predict. The harder, and as yet unsolved, question is what happens *after* invention. Why do so few Indian inventions become globally competitive, scaled-up enterprises that the world buys from, instead of ideas that are licensed, acquired or simply left to wither at the prototype stage?

The Hindu's lead opinion frames this as India's next challenge: the journey "from invention to global scale." The thesis is that the binding constraint is no longer creativity or talent. It is the *ecosystem* that should convert a laboratory breakthrough into a factory, a product line, a global brand and an export. That ecosystem in India is shallow in three specific places: research funding, manufacturing depth, and patient capital.

THE LIFT LINE

> *India has learned to invent. It has not yet learned to scale. The distance between a working prototype and a globally competitive product is where Indian innovation keeps stalling, and closing that distance is now a strategic, not merely an economic, priority.*

THE CORE ARGUMENT

The editorial's spine is a distinction between **innovation output efficiency** and **innovation scale**. GII 2025 captures this precisely: India ranks 32nd on innovation *outputs* but only 52nd on innovation *inputs*. In plain terms, India squeezes a lot of output from comparatively little input. That is a compliment and a warning at once. It tells us the system is efficient but starved, and that efficiency cannot substitute forever for sustained investment when the goal shifts from clever invention to globally scaled production.

Scale is where India underperforms its own ambition. A handful of unicorns and a strong consumer-internet sector are not the same as deep-tech industrial champions in semiconductors, advanced materials, clean energy hardware, biotech or precision manufacturing. The editorial's worry is that India risks becoming a permanent supplier of *ideas and talent* to the world's value chains rather than an owner of the high-margin, scaled ends of those chains.

HOW TO THINK ABOUT IT

When an examiner asks why India invents but does not scale, resist the single-cause answer. The honest diagnosis is a *system* failure with three reinforcing weak links. Think of it as a relay race where the baton keeps getting dropped at the handover.

Weak Link 1: Research Is Underfunded, and Wrongly Composed

India's Gross Expenditure on R&D (GERD) sits at roughly **0.64% of GDP**, where it has hovered for years. Compare this with China and the United States, both above 2% (the US closer to 3.5%, China around 2.4%), and South Korea near 4.8%. Low absolute spend is only half the story. The *composition* is the deeper problem: in advanced economies the private sector funds the bulk of R&D, often two-thirds or more. In India the government still carries a disproportionate (https://ujiyari.com/vocab/disproportionate/) share, and private corporate R&D remains thin. This matters because commercial scale-up is overwhelmingly a private-sector act. If firms do not invest in research, they will not own the technologies they need to scale.

Weak Link 2: The Missing Middle In Manufacturing

An invention becomes a global product only if it can be manufactured at competitive cost and volume. Here India confronts the **"missing middle"**: a manufacturing base dominated by very large firms at one end and tiny informal units at the other, with too few mid-sized, technology-intensive firms in between. Add a thin domestic base in components, capital goods, precision tooling and advanced materials, and the result is that even a brilliant Indian prototype often has to be scaled abroad, where the supply chain already exists. The breakthrough is Indian; the factory, the jobs and the margin are not.

Weak Link 3: The Valley of Death and the Absence of Patient Capital

Between a working proof-of-concept and a commercially viable product lies the **"valley of death (https://ujiyari.com/terms/valley-of-death-innovation/)"**, the stretch where funding dries up because the technology is too unproven for buyers and too long-gestation for typical investors. Indian venture capital has matured impressively, but it has clustered around consumer-internet and fintech bets that promise quick exits. **Deep-tech**, by contrast, needs *patient capital*: money willing to wait five, eight, ten years for a hardware or frontier-science payoff. That capital is scarce, and so the valley of death claims inventions that a different financing structure would have carried to scale.

THE INNOVATION ECOSYSTEM: WHAT ALREADY EXISTS

To be fair to the policy record, India has begun building institutions aimed squarely at these gaps:

INITIATIVE	PURPOSE	STATUS / DETAIL
Anusandhan National Research Foundation (https://ujiyari.com/schemes/anrf/) (ANRF)	Strategic direction and competitive funding for research, with a mandate (https://ujiyari.com/vocab/mandate/) to crowd in private money	Set up under the ANRF Act, 2023; corpus of about Rs 50,000 crore over five years, of which roughly Rs 14,000 crore is the government share
Production Linked Incentive (PLI)	Deepen domestic manufacturing across electronics, pharma, solar and more	Output-linked subsidies to build scale and the missing middle
IN-SPACe	Open the space sector to private players	Enables private launch, satellite and downstream industry
India Semiconductor Mission	Build domestic chip fabrication and design	Mission-mode fiscal support for fabs and ATMP units

The ANRF is the most important of these for the editorial's argument, because its explicit design goal is to *leverage (https://ujiyari.com/vocab/leverage/)* private funding rather than simply spend public money. Whether it can move the needle on the private-R&D share is the test that matters.

DIAGRAM IN WORDS: THE INNOVATION PIPELINE

Picture a funnel with four stages. **Stage 1, Idea and Research:** plentiful in India, but underfunded. **Stage 2, Prototype and Proof-of-Concept:** still reasonably served by labs, incubators and early grants. **Stage 3, the Valley of Death:** the funnel narrows sharply here, as patient capital and translational support thin out. **Stage 4, Global Scale-Up:** the narrowest point, where weak manufacturing depth and a shallow component

base choke throughput (https://ujiyari.com/vocab/throughput/). The Indian funnel is wide at the top and pinched at the bottom. The policy task is to widen the bottom two stages so that what enters as invention exits as a globally scaled enterprise.

THE COUNTER-VIEW, TAKEN SERIOUSLY

A strong rebuttal deserves a hearing. India *is* scaling, the optimist argues, just not in the hardware-centric way the editorial frames. Digital public infrastructure (UPI, Aadhaar-linked rails) is a globally exported innovation. The unicorn count is among the world's highest. Missions in space and semiconductors are real and accelerating. On this view, output efficiency is a feature, not a bug: a capital-scarce economy *should* innovate frugally, and the state should not crowd into commercial technology bets it is poorly placed to pick.

The reply is that digital-platform scale and deep-tech industrial scale are different games. Software scales cheaply and globally without a heavy supply chain; semiconductors, advanced materials and precision hardware do not. India's success in the former does not resolve its weakness in the latter, and it is precisely the latter that determines strategic autonomy (https://ujiyari.com/terms/strategic-autonomy/) in a world of technology export controls and supply-chain weaponisation. Frugality is a virtue until it becomes an excuse for chronic underinvestment.

WAY FORWARD

1. **Raise and recompose R&D spending.** Move GERD decisively above 1% of GDP in the near term, but with the explicit goal of *crowding in* private R&D so that the corporate share rises toward peer levels. ANRF's leverage target is the right instrument; it must be funded and measured against that target.
2. **Build the missing middle.** Use PLI and cluster policy to grow mid-sized, technology-intensive manufacturers and to deepen the domestic base in components, capital goods and advanced materials, so that scale-up can happen at home.
3. **Bridge the valley of death.** Create dedicated deep-tech, patient-capital pools (blended public-private funds, sovereign and pension allocations) and translational research bridges that take technologies from lab readiness to manufacturing readiness.
4. **Fix commercialisation links.** Strengthen IP-to-market pathways: technology-transfer offices, university-industry consortia, and procurement that gives first-buyer demand to Indian deep-tech, so that inventions have a guaranteed early market.
5. **Treat scale as strategy.** Frame globally scaled deep-tech as a national-security and strategic-autonomy objective, not merely an economic one, given technology controls and supply-chain risks.

UPSC RELEVANCE AND PYQ LINKAGE

This editorial maps directly to **GS Paper 3** (science and technology; indigenisation (https://ujiyari.com/vocab/indigenisation/) of technology and developing new technology; growth and development; effects of liberalisation on the economy). It is also a ready-made source of examples for essays on innovation, self-reliance and the knowledge economy.

Prelims angles: GII 2025 rank (38th of 139 economies); ANRF and the ANRF Act, 2023; the agencies behind IN-SPACe and the India Semiconductor Mission; PLI sectors.

Previous Year Question linkage:

- *"Technology as the panacea (https://ujiyari.com/vocab/panacea/) for the growing crime threatens to be a double-edged sword. Discuss."* and broader S&T questions reward the input-output, scale-versus-invention framing used here.
- *"Launched on 25th June 2015, the housing-for-all scheme…"* style data-anchored questions show why the examiner values *exact* figures; carry the 0.64% GERD, 38th GII rank and ANRF corpus numbers into the hall.
- Mains questions on indigenisation of technology and India's manufacturing competitiveness draw directly on the "missing middle" and "valley of death" concepts.

FACTS CORNER

- **Global Innovation Index 2025:** India ranked **38th** of 139 economies (up from 39th), top in Central and Southern Asia; 32nd on outputs, 52nd on inputs; an over-performer for income level for the 15th consecutive year.
- **R&D spending (GERD):** about **0.64% of GDP**, versus China (~2.4%) and the United States (~3.5%); private-sector share well below that of advanced economies.
- **ANRF:** Anusandhan National Research Foundation (https://ujiyari.com/terms/national-research-foundation/), established under the **ANRF Act, 2023**; government share around **Rs 14,000 crore** within a larger five-year corpus designed to mobilise non-governmental funds.
- **Key concepts:** "valley of death" (lab-to-market funding gap); "missing middle" (manufacturing structure); patient capital (long-horizon deep-tech finance).
- **Ecosystem instruments:** PLI schemes, IN-SPACe (space), India Semiconductor Mission.

Source: From Invention to Global Scale: India's Next Innovation Challenge — Ujiyari.com | Free UPSC & State PCS Editorial Analysis

KEY ARGUMENTS AT A GLANCE

India has demonstrated strong innovation-output efficiency, climbing to 38th in the Global Innovation Index 2025, but its inability to commercialise and scale inventions into globally competitive enterprises is the binding constraint on its technological rise. The gap is structural, rooted in chronic R&D underfunding, shallow manufacturing depth and a shortage of patient capital.

✓ SUPPORTING

- Gross R&D spending stuck near 0.64% of GDP, against 2%-plus in China and the United States, with the private sector contributing a far smaller share than in peer economies, starves the deep-tech pipeline of sustained funding.
- A “missing middle” in manufacturing and a thin component and capital-goods base mean inventions cannot be turned into cost-competitive products at global volumes, so scale-up migrates abroad.
- The “valley of death” between proof-of-concept and commercial production persists because venture capital favours quick consumer-internet exits over long-gestation deep-tech, leaving hardware and frontier science underfunded.

⚠ COUNTER

Critics argue India is already scaling through digital public infrastructure, a record unicorn count and missions in space (IN-SPACe) and semiconductors, and that output efficiency matters more than raw R&D spend; the state should not crowd into commercial bets it cannot pick.

→ WAY FORWARD

Front-load ANRF funding with a deliberate private-sector leverage target, use PLI and mission-mode programmes to deepen component manufacturing, create deep-tech patient-capital pools and translational research bridges, and strengthen IP commercialisation links between labs, industry and startups.

MAINS ANSWER FRAMEWORK

QUESTION

India ranks among the world's top innovators on output efficiency yet converts few inventions into globally competitive, scaled enterprises. Critically examine the structural and ecosystem barriers that trap Indian innovation in the "valley of death" between the laboratory and the global market, and suggest measures to build deep-tech champions of global scale. (250 words)

INTRODUCTION

India is now a recognised innovation over-performer, ranking 38th in the Global Innovation Index 2025 and out-performing its income peers for a 15th straight year. Yet the next challenge is sterner: turning invention into enterprises of global scale.

BODY

Three structural barriers explain the gap. First, financing: gross R&D expenditure is only about 0.64% of GDP, far below China and the United States at over 2%, and the private sector funds a smaller share than in advanced economies, so frontier research lacks sustained capital.

Second, manufacturing depth: a “missing middle” of mid-sized firms and a thin component, materials and capital-goods base prevent inventions from being produced at competitive cost and volume, pushing scale-up offshore. Third, the “valley of death”: venture capital concentrates on quick consumer-internet exits, while deep-tech and hardware, with long gestation, struggle for patient capital and translational support.

Institutional reforms are under way, including the Anusandhan National Research Foundation under the 2023 Act with a Rs 14,000 crore corpus designed to leverage private funds, Production Linked Incentive schemes, and missions such as IN-SPACe and the semiconductor programme. These address the symptoms, but commercialisation links between laboratory, industry and market remain weak.

CONCLUSION

Scaling invention into global champions demands deeper and more private R&D funding, a denser manufacturing base, and patient capital that bridges the valley of death, so that Indian ideas are built, owned and scaled at home.

RELATED DAILY ARTICLES

24 Jun NAFEX.in: NAFED's Digital Auction Portal for...

24 Jun RBI's 2026 Master Direction on TReDS for MSME Financing

24 Jun CPCL Becomes India's 28th Navratna CPSE

23 Jun **Current Affairs Today, June 23, 2026**

CURATED & WRITTEN BY

Bharat Choudhary

UPSC Educator & Content Creator

linkedin.com/in/epicbharat

📖 Read Full Article on Ujiyari →

https://ujiyari.com/editorials/2026/06/the-hindu-invention-to-global-scale-innovation-2026/