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EDITORIAL ANALYSIS

India's Innovation Ecosystem — Bridging Scale with Depth

 **HINDUSTAN TIMES**

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SUBJECTS COVERED**SCIENCE & TECH****ECONOMY****GS PAPERS****GS3****CURATED & WRITTEN BY****Bharat Choudhary**

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India's Innovation Ecosystem — Bridging Scale with Depth

Hindustan Times 24 March 2026 **GS3**

HT Hindustan Times | MAINS RELEVANCE: **GS Paper 3**



INTERVIEW ANGLE

"India has 200,000+ startups but spends only 0.64% of GDP on R&D. Can scale compensate for depth in building a sovereign innovation ecosystem?"

India's Innovation Ecosystem — Bridging Scale with Depth

Hindustan Times editorial examines India's strategic shift toward building a sovereign innovation ecosystem, highlighting strengths like digital infrastructure (Aadhaar, UPI) and 200,000+ recognised startups, while identifying critical gaps including R&D spending stagnant at 0.64% of GDP, patent pendency of 58+ months, and the persistent "valley of death" in lab-to-market translation.

INDIA'S INNOVATION STRENGTHS

India has built impressive innovation scale:

INDICATOR	VALUE
Recognised startups	200,000+ (3rd largest ecosystem globally)
Unicorns	110+
Global Innovation Index rank	40th (WIPO, 2024) — up from 81st in 2015
Aadhaar enrolments	140 crore+
UPI transactions (2025)	16+ billion/month
Digital public infrastructure	Aadhaar, UPI, DigiLocker, CoWIN, ONDC
IT services exports	\$200+ billion annually

India's digital public infrastructure (DPI) model — Aadhaar for identity, UPI for payments, DigiLocker for documents — has become a global template, adopted or studied by 40+ countries.

THE DEPTH DEFICIT

Despite scale, the editorial identifies structural weaknesses:

R&D Spending — Stubbornly Low

COUNTRY	R&D AS % OF GDP
Israel	5.4%
South Korea	4.9%
USA	3.5%
China	2.4%
India	0.64%
Brazil	1.2%

India's R&D spending has been stagnant at 0.6-0.7% of GDP for over a decade. The government contributes ~55% of R&D funding (vs 20-30% in innovation leaders where the private sector dominates).

Patent Pendency

- Average time to grant a patent in India: **58+ months** (nearly 5 years)
- USA: 22-24 months
- China: 20 months
- Impact: Innovators lose competitive advantage by the time patents are granted
- Patent applications filed (2024-25): ~90,000+ (but only ~30,000 grants)

The Valley of Death

The gap between laboratory innovation and commercial product is where most Indian innovations fail:

- Universities produce research papers but few patents
- Research institutions lack industry linkages
- Angel/seed funding is available but Series A-B financing is scarce for deep-tech
- Manufacturing scale-up is expensive and India lacks prototyping infrastructure

DEEP-TECH MISSIONS — PROMISE AND REALITY

India has launched ambitious deep-tech programmes:

MISSION	OUTLAY	STATUS
India Semiconductor Mission	Rs 76,000 crore	Fab plants approved (Tata-PSMC Dholera, Tata Jagiroad)
National Quantum Mission	Rs 6,003 crore	Launched 2023, building quantum computing labs
National Deep Tech Startup Policy	Under formulation	Draft stage
IndiaAI Mission	Rs 10,372 crore	AI compute infrastructure, skill development
National Research Foundation (NRF)	Rs 50,000 crore (5 years)	Operationalised 2024

The editorial cautions that announcements are not outcomes — India’s semiconductor mission was first proposed in 2007, and no fabrication plant is yet operational.

THE QUADRUPLE HELIX MODEL

The editorial proposes a **Quadruple Helix** framework:

- ① **Academia:** Universities as research hubs with mandatory industry collaboration
- ② **Industry:** Private sector must increase R&D spending from 36% to 60%+ of total
- ③ **Government:** Policy, funding (NRF), and regulatory sandboxes
- ④ **Civil Society:** Open innovation, citizen science, grassroots innovation (Honey Bee Network model)

DECENTRALISING INNOVATION

India’s innovation is concentrated in **Bengaluru, Hyderabad, Pune, Delhi-NCR, and Mumbai**. The editorial calls for:

- **Tier 2/3 innovation clusters:** Atal Incubation Centres in 50+ cities
- **Patent facilitation centres:** Reduce filing complexity for MSMEs
- **Sovereign patent pools:** Pool Indian patents in strategic sectors (pharma, semiconductors) for collective licensing
- **Regulatory sandboxes:** Safe spaces for testing innovations (fintech sandbox by RBI already exists)

VC VOLATILITY — A STRUCTURAL RISK

Indian startups raised **\$10-12 billion** in 2024-25 (down from \$36 billion in 2021). The editorial warns:

- Over-dependence on foreign VC creates boom-bust cycles
- Domestic institutional capital (pension funds, insurance) barely participates in venture
- Need for a dedicated **Innovation Finance Corporation** (on the lines of SIDBI for MSMEs)

UPSC RELEVANCE

Global Innovation Index, NRF, India Semiconductor Mission, National Quantum Mission, IndiaAI, Atal Innovation Mission

MAINS GS-III:

Science & Technology policy, R&D ecosystem, startups, industrial policy, intellectual property

INTERVIEW:

India ranks well on innovation index but poorly on R&D spending. Is Indian innovation width-driven or depth-driven?

★ FACTS CORNER — KNOWLEDGEPEDIA

INDIA'S INNOVATION METRICS:

- Global Innovation Index: 40th (WIPO, 2024)
- R&D spending: 0.64% of GDP
- Recognised startups: 200,000+
- Unicorns: 110+
- Patent applications: ~90,000/year (grants: ~30,000)
- Patent pendency: 58+ months

KEY MISSIONS:

- India Semiconductor Mission: Rs 76,000 crore
- National Quantum Mission: Rs 6,003 crore (2023)
- IndiaAI Mission: Rs 10,372 crore
- NRF: Rs 50,000 crore over 5 years
- Atal Innovation Mission: 10,000+ Tinkering Labs

DIGITAL PUBLIC INFRASTRUCTURE:

- Aadhaar: 140 crore+ enrolments
- UPI: 16+ billion transactions/month
- India Stack: Aadhaar + UPI + DigiLocker + ONDC
- Adopted/studied by: 40+ countries

OTHER RELEVANT FACTS:

- WIPO: World Intellectual Property Organization (Geneva)
- IPO: Indian Patent Office (under DPIIT)
- CSIR: Council of Scientific and Industrial Research (38 labs)
- DRDO: Defence Research and Development Organisation (52 labs)
- DST: Department of Science and Technology
- Honey Bee Network: Grassroots innovation documentation (Prof Anil Gupta)
- SIDBI: Small Industries Development Bank of India

Sources: [Hindustan Times](#), [Drishti IAS](#), [WIPO](#)

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