# Transforming India's innovation ecosystem

### -By - Amitabh Kant\*

Economists have not debated the idea that technological progress drives economic growth. Classical growth models treated technology as an exogenous factor that drives development. However, modern growth theory suggests technology is an endogenous factor, a product of investments in education, innovation, and ideas. This has important implications for India's growth story. However, we have not yet fully leveraged our innovation potential.

Our research and development (R&D) expenditure, as a percentage of gross domestic product (GDP), remains around 0.7% of GDP, which is significantly lower than countries such as South Korea (5.2%), China (2.6%), and the United States (3.6%). To bridge this gap, the Rs. 1 lakh crore R&D fund announced in July 2024 and the Fund of Funds for DeepTech, announced in Feb 2025 must be operationalised at the earliest.

While we are granting more patents than ever, with over 100,000 granted in FY24, most of them remain uncommercialised. A study by the Fraunhofer Institute reveals that, over the last decade, payments for intellectual property rights (IPR) have increased, from USD 4.8 billion to USD 14 billion. In contrast, IPR receipts have doubled from 0.7 to 1.5 billion, a wide gap between payments and receipts.

At the same time, global dynamics are shifting. Advanced economies are cutting funding for research departments and universities. In the United States, tensions are escalating between Harvard and the Trump Administration. Norms on student visas are also becoming stricter in developed countries. This is an opportune time for India to make a strategic leap forward in building our innovation ecosystem. We need attract and retain talent, and we need the infrastructure.

## Attracting the Best Minds

We must attract the best minds to India. Existing schemes, such as the Visiting Advanced Joint Research Faculty (VAJRA) and the Global Initiative for Academic Networks (GIAN), are extremely limited in scope. We need to think big and bring the best Indian minds back to India. A dedicated national programme with two tracks can help attract the best minds to India. Under Track 1, we should aim to invite 500 top academics from the world's top 100 universities. These researchers should be required to spend 6 months of the year in India for the next five years. A startup grant of USD 1 million can be provided to set up research labs or projects. The goal should be to build local capacity. Track 2 can focus on offering sabbaticals to faculty from the world's top 200 universities.

These 1,000 sabbaticals can be supported by grants of USD 100,000, with annual topups. These researchers should be required to engage and mentor students, ensuring knowledge transfer and ecosystem development.

## Building Infrastructure for Innovation

At the same time, we need to build the requisite infrastructure for an innovation ecosystem. We need world-class innovation infrastructure, not just for design, but also for prototyping and testing, which are crucial for product development. Common prototyping labs and design studios in our academic institutes are one avenue. Advanced testing facilities and labs across sectors should be established, in and around clusters, in partnership with educational institutes. Our experience with digital public infrastructure (DPI) and open-access data provides a solid foundation. Take, for instance, the compute clusters being provided under the IndiaAl Mission. Similar models can be explored in DeepTech areas.

# Forging Industry-Academia Partnerships

A missing link in our innovation ecosystem is the partnership between industry and academia to conduct applied research, creating commercial innovations. If we are to become a product nation, then this gap between academic and industrial research needs to be bridged. There are several successful models worldwide. The Warwick Manufacturing Group (WMG) is a pioneering example. Based at the University of Warwick, it brings together researchers and industry, innovating across sectors such as auto, healthcare, and batteries, among others. Not just industrial research, but the centre offers academic degrees at all levels, degree internships, and hosts a skills centre. This can serve as a potential model for India to emulate in leading institutes or Institutes of Eminence (IoE). Industry must take the lead in this aspect.

# Inviting Global Universities to Set Up Campuses

Each year, lakhs of our students go abroad to study in countries such as the US, the UK, Australia, and Canada. Increasingly, we are seeing countries tighten norms on student visas. Immigration routes are also becoming stricter post-education. While we spend hundreds of thousands of dollars on education, an alternative could be to invite these global universities to set up campuses in India. Monash University in Australia and the University of Nottingham in the UK, for instance, have set up campuses in Malaysia. New York University (NYU) set up campuses in Abu Dhabi and Shanghai. These universities collaborated with the government, industry, and existing academic institutes to establish and scale up operations. This would allow India to retain talent first, but also attract students from the Global South, making India a regional educational hub.

### Emerge as a Buyer of Technology

Apart from playing an enabling role, governments worldwide have also given a boost to the innovation ecosystem by becoming key buyers of technology. The United States' Defence Advanced Research Projects Agency (DARPA) is a pertinent example. DARPA catalysed breakthroughs like the internet and GPS, for instance. The Central Government can play a similar role, catalysing innovations into real-world solutions, especially in the socio-economic sphere. Our socio-economic challenges require innovative solutions with a public purpose. India can take the lead in the technologies that will define the future—artificial intelligence, quantum computing, green hydrogen, and semiconductors through this approach. Grand challenges can play a catalytic role in this aspect. With outcome-based tenders and phased grants with buy-back commitments, the government can send strong market signals and reduce technology adoption risk.

To emerge as a true innovation leader, India must act with urgency and ambition. The building blocks are clear: world-class talent, robust infrastructure, strong industryacademia linkages, and catalytic public procurement. These steps will help India transition from being a consumer of global technologies to a developer of frontier solutions. India is not short of ideas, but we must scale our innovations globally. India's innovation ecosystem will not transform solely based on government policy. Private enterprise must play a leading role. The government has created several platforms. The industry must now move forward with bold investments. They must move beyond assembly and take risks in deep tech, clean tech, semiconductors, and mobility. This is not a time for incrementalism. We need to act boldly, and private enterprise must be at the heart of this transformation.

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