India's RDI Fund and the New Imperative of Science Diplomacy

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Abstract

India's Research, Development and Innovation (RDI) Fund represents an important development in the country's innovation financing architecture. Designed to mobilise patient capital for strategic and emerging technologies, the Fund seeks to address structural gaps in private sector research and development investment. While primarily a domestic instrument, this article argues that the RDI Fund has significant implications for India's science diplomacy. It reflects an evolving emphasis in India's science and technology policy discourse, where strengthening domestic innovation capabilities is increasingly viewed alongside sustained international scientific collaboration. In this context, domestic technological capacity becomes an important enabler of global scientific engagement and influence. By situating the RDI Fund within comparative international innovation financing models, the article highlights its hybrid design and its potential role in shaping India's position in global science and technology governance.

Introduction

Science diplomacy has become an increasingly important dimension of international relations in an era where technological capabilities are closely linked with geopolitical influence. In contemporary global governance, science and technology are no longer confined to cooperation and knowledge exchange alone; they are also embedded in questions of economic competitiveness, strategic autonomy and international positioning.

Conventionally, the concept of science diplomacy has been analysed through collaborative models: science in diplomacy, diplomacy for science, and science for diplomacy. Though this model has allowed states to join global science networks and engage in extensive scientific cooperation, it has also highlighted technological disparities, in which the agenda-setting capacity lies with nations with stronger innovation systems. Under this changing scenario, domestic innovation systems have become crucial factors in shaping a state's international scientific interactions.

India's Research, Development and Innovation (RDI) Fund has been developed to reflect this evolving context. The purpose of the Fund is to spur participation from the private sector in high-risk/high-reward areas, with an indicative budget of ₹1 lakh crore. While its immediate focus is domestic, its broader significance lies in reshaping India's capacity to engage in global science diplomacy from a position of strengthened technological capability.

* Views in the article are of the author and do not belong to the organisation they represent.

RDI Fund: Architecture and Comparative Positioning

The RDI Fund introduces a structural shift in India's innovation financing architecture.

First, it seeks to mobilise private capital into frontier technology domains such as artificial intelligence, quantum technologies, advanced manufacturing, biotechnology and clean energy. These sectors are characterised by long gestation periods, high uncertainty, and significant market failures, in which private investment is typically constrained. India's gross expenditure on R&D (GERD) remains around 0.6–0.7% of GDP, with the private sector contributing only about 36–40% of total GERD, compared to substantially higher private-sector shares in leading innovation economies such as South Korea with GERD ~ 5.0% of GDP (approximately 78%), China with GERD ~ 2.6% (around 77%), and the OECD (GERD ~ 2.7% of GDP) average of nearly 74%.[1,2] Addressing this structural gap is central to the Fund's design.

Second, the Fund focuses on patient capital tools, like equity, debt, and blended finance. This shows a move away from traditional grant-based methods toward market-aligned financial instruments that put a premium on long-term value creation and scalability.

The Fund's design also incorporates incentives to attract sustained private-sector participation in high-risk technology domains. The RDI Fund proposes long-tenure financing through both debt and equity instruments, with support available for up to 50 per cent of the total project cost. By providing unsecured patient capital, the Fund reduces financing constraints for firms operating in frontier sectors characterised by high uncertainty, long development cycles and limited access to conventional commercial finance. This risk-sharing approach is expected to improve private sector confidence while encouraging greater participation in strategically important deep-technology areas.

Third, the Fund operates through a two-tier financial mechanism, in which professional Second-Level Fund Managers (SLFMs) are responsible for capital allocation. This design aims to improve efficiency, reduce administrative bottlenecks and enhance investment discipline.

The RDI Fund is a natural extension of India's ongoing efforts to strengthen its research and innovation ecosystem. Consecutive efforts over the past decades have contributed to a measurable strengthening of India's innovation ecosystem. These include mission-mode programs geared toward developing startups, strengthening institutional capacities, and supporting innovation-led entrepreneurship. India has improved significantly in the Global Innovation Index, rising from 81 in 2015 to 38 in 2025, reflecting steady progress in innovation inputs and outputs. India is among the top five countries in terms of scientific publication outcomes, indicating a strong and expanding research base. In addition, India has developed one of the world's largest startup ecosystems, with more than 110 unicorns as of recent estimates. The RDI Fund marks another milestone in this trajectory.

Innovation financing models differ greatly when viewed globally. The Small Business Innovation Research (SBIR) Program in the United States connects funding for early-stage innovations with government purchases.[3] This makes sure that technological development meets government needs. Israel's Yozma Program is an example of a catalytic venture capital model in which the government helped private investment ecosystems grow by sharing risks and making investments together. This enabled these ecosystems to join global innovation networks.[4]

Co-investment is also central to Korea's venture investment strategies and to Singapore's early-stage public–private financing frameworks. Similarly, the United Kingdom's innovation investment models integrate market discipline with public support.[5] The SIDBI Fund of Funds for Startups (FFS) is an important example of a tool used by India to indirectly mobilise venture capital through fund-of-funds mechanisms.

In light of these innovations, the RDI Fund has been developed to integrate catalytic capital and indirect financing models, thereby emphasising strategic technology domains and the development of long-term capabilities.

Science Diplomacy: From Collaboration to Capability

Science diplomacy is increasingly shifting from an emphasis on collaboration to one of capability. While India's historical engagement has emphasised the collaborative/cooperative aspects of science

diplomacy[6], it has also created opportunities for participation in multisectoral scientific initiatives and large-scale research frameworks worldwide. The collaborative nature of these science diplomacy activities has facilitated the integration of countries into the global science system and exposed asymmetries in technological capabilities, with countries with more developed innovation ecosystems often exercising greater influence over the setting of research priorities, governance structures, and global standards.

The launch of the RDI Fund represents a gradual shift toward a capability-based framework for science diplomacy, where domestic technological strength is used as the basis for international interaction rather than merely an outcome of it. This transition redefines how scientific influence is created and exercised in the global system.

Technological Capability as Diplomatic Capital

Technology is a key form of diplomatic capital in today's global governance landscape. Consequently, sectors such as semiconductors, space, AI, and clean energy all exhibit strong correlations among their innovation capabilities, production capacities, and standard-setting abilities. Countries with robust and supportive innovation ecosystems will have greater opportunities to participate in the creation of global rules and norms, to shape regulation, and to negotiate technology partnerships on more equitable terms.[7] Conversely, countries without robust technology bases will create dependencies and fewer equal opportunities for partnerships.

The RDI Fund will provide India with the tools necessary to improve its overall positioning as the global landscape shifts. By strengthening domestic innovation capability, the RDI Fund will enable India to establish itself as an equitable and effective participant in global technology governance, as well as in strategic partnerships in emerging technology sectors.

From Domestic Innovation to Global Integration

While the RDI Fund has a predominantly domestic focus, all innovation outputs are inherently global. Technologies developed in these emerging sectors will be incorporated into global supply chains and licensing agreements.

India Stack, particularly the Unified Payments Interface (UPI), illustrates how domestically developed digital public infrastructure can achieve global relevance at scale. India Stack demonstrates that foundational digital technologies, when designed for interoperability, openness, and scalability, can extend beyond national boundaries and influence global digital ecosystems and emerging financial technology standards. Building on this model, the RDI Fund can enable similar pathways in deep technology domains such as artificial intelligence, quantum technologies, and advanced manufacturing. This creates an opportunity for India to increasingly participate in global innovation systems not only as a consumer of technology but also as a contributor to global standards, interoperable platforms, and technology governance frameworks.

Implications for Science Diplomacy

The RDI Fund has three primary implications for India's science diplomacy strategy: (1) Moving to influence through capabilities instead of participation and using India's domestic capability as a source of strength in external relationships; (2) Increasing India's ability to define its own research priorities and negotiate international partnerships and technology agreements from a position of technological capability and strategic autonomy; (3) Creating pathways for greater cooperation with the Global South through technology sharing, co-development and context-appropriate innovation diffusion.

The ability to lead in critical technologies is based upon both technologically capable designs and the scale of production. By investing in frontier technologies, the RDI Fund would enable India to take a greater role in many existing international forums, such as the G20, BRICS (Brazil, Russia, India, China, and South Africa), and the Quadrilateral Security Dialogue (QUAD). Additionally, through these activities,

the RDI Fund can build new avenues of South-South collaboration.[7]

The effectiveness of the RDI Fund will also depend on its coordination with India's existing bilateral and multilateral science and technology partnerships. India already maintains extensive S&T cooperation frameworks with countries such as the United States, France, Japan, Germany, and Australia, alongside participation in multilateral forums and partnerships, including the G20, BRICS, SCO and Quad. Alignment between the Fund's priority technology sectors and these international cooperation mechanisms could facilitate joint research, co-development initiatives, researcher mobility and technology partnerships. Such coordination would strengthen the integration of domestic innovation financing with India's broader science diplomacy objectives and international technology engagement.

Many developing countries seek affordable and contextual technological solutions. Therefore, India's innovation ecosystem makes it an important partner for those countries. In this context, science diplomacy can serve as a mechanism for equitable knowledge exchange, capacity building, and collaboration on development-oriented issues. It will act not only as a tool for cooperation but also as an instrument for projecting domestic innovation capacity into global governance structures.

Limitations and Risks

Although the RDI Fund has enormous potential for impact, it faces challenges in several areas. A strong domestic focus, while strategically justified, could risk insularity if not complemented by deliberate international engagement. There is also the question of whether supported innovations will achieve global competitiveness or remain confined to domestic markets.

The success of the RDI Fund will depend on factors such as the extent to which it is integrated with industrial and trade policy, the coordination of funding with existing science and technology initiatives, and its ability to continue attracting long-term private-sector investment. Without these attributes, there is a high risk that the RDI Fund will fail to achieve the desired outcomes.

The RDI Fund could benefit from an enhanced scientific diplomacy strategy that fully captures its potential, leveraging various elements. These elements should include co-investment structures with trusted international partners; stronger linkages with bilateral and multilateral S&T agreements, and support for global deployment of Indian technologies; and integrating the RDI Fund with development diplomacy initiatives, particularly in the Global South, where technology sharing/building will provide the basis for developing long-term and mutually beneficial strategic partnerships. By using these approaches, India can maintain its domestic focus on self-reliance while simultaneously strengthening its global technology footprint.

Conclusion

The success of the RDI Fund may be assessed through both domestic innovation outcomes and international technological positioning. Domestic indicators could include increased private-sector participation in R&D, the commercialisation of deep-technology innovations, growth in patents and technology-intensive startups, and the scaling of frontier-technology enterprises. In the international context, an important indicator would be the extent to which technologies supported through the Fund achieve global competitiveness, participate in international value chains and contribute to emerging global standards and interoperable technology systems. Additional measures may include international co-development partnerships, technology exports and the adoption of Indian-origin technological platforms in partner countries.

The RDI Fund is a significant advancement in India's innovation finance system and its diplomacy regarding scientific matters. While primarily designed as a domestic instrument, it has broader implications for India's participation in international governance of science and technology. In this regard, the RDI Fund marks a shift from a focus on collaborative science diplomacy to one that is based on developing indigenous capacities for innovation and development. In an increasingly technology-driven world, these capacities will become increasingly important as sources of diplomatic power and leverage.

As India develops new capabilities by providing access to funding for innovation development and expanding existing networks of science, the RDI Fund will help India become an influential member of many of the world's major science networks. Thus, the RDI Fund not only provides a vehicle for financial support but also points to an emerging model of science diplomacy, one in which national capability underpins global engagement and in which India is positioned not only as a participant in global science but also as a shaper of its future direction.

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