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Issue Brief

Atmanirbharta in Defence: Key Considerations

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Summary

Atmanirbharta in Defence has expanded production numbers, diversified the supplier base, and altered the political discourse and public awareness around defence production. However, there is still import dependence on critical technologies, stagnation in R&D investment, skill deficits, and declining defence expenditure as a share of GDP.

Introduction

India's *Atmanirbharta in Defence* initiative seeks to leverage defence production, innovation and indigenisation not only to strengthen military preparedness but also to stimulate industrial growth, generate employment and enhance technological capabilities. While India has achieved significant progress in scaling defence production and diversifying its industrial base, *Atmanirbharta in Defence* risks plateauing unless it is embedded within a wider national strategy that prioritises research and development (R&D), STEM education, skilling and long-term fiscal commitment. The Brief highlights pertinent challenges related to Atmanirbharta in defence and outlines policy options to address them.

Import Dependence despite Atmanirbharta

India's continued dependence on imported defence platforms and critical systems such as engines, rocket motors, seekers and optical units is often attributed to historical neglect, colonial legacies, or technological denial regimes. While these factors shaped the initial conditions of India's defence ecosystem, they no longer adequately explain the persistence of import dependence despite decades of indigenisation policies and a rapidly expanding domestic defence industry.

Atmanirbharta in Defence has expanded manufacturing and assembly capabilities.[1] It has, however, not fundamentally altered the underlying drivers of technological dependence. In many cases, indigenisation has occurred at the platform and final product levels. At the same time, critical systems such as aero-engines, propulsion modules, advanced materials, titanium blocks, sensors, microelectronics and RF seekers continue to be imported from foreign sources.

A key reason for this outcome is India's weak investment in basic and applied research.[2] Total R&D expenditure in India during the period 2018–2021 has been below one per cent of GDP. This figure is starkly inadequate for a country aspiring to gain autonomy in advanced military technologies.[3] By comparison, major defence-industrial powers such as the USA, Israel and China invest more than 5 per cent of their GDP annually in science, engineering and industrial research that ultimately feeds into military innovation.[4] Defence and dual-use technologies in these countries

[1] **"Defence Atmanirbharta: Record Production and Exports"**, Press Information Bureau, Ministry of Defence, Government of India, 20 November 2025.

[2] Mohit Pandey, "India Needs to Fund Basic Research and PhDs to Achieve Breakthrough Tech: Amit Sheth", *Analytics India Mag*, 3 September 2025.

[3] **"Parliament Question: R&D Investment in India"**, Press Information Bureau, Ministry of Science & Technology, Government of India, 7 August 2025.

[4] Dorothy Neufeld, **"Ranked: Countries Investing the Most in R&D"**, *Visual Capitalist*, 17 April 2025.

are downstream products of a robust civilian R&D ecosystem built on a high-quality STEM education and skill-development framework.

Risk aversion further compounds this problem. Indigenous R&D is inherently uncertain, capital-intensive and slow to yield results. In India's funding, administrative and audit culture, failure is often penalised more severely than inaction contributing to risk-averse behaviour.[5] This creates incentives for decision-makers to favour proven foreign systems over indigenous development, particularly when operational readiness is prioritised amid immediate security threats. While this choice is understandable from an operational perspective, it carries cumulative strategic costs. Each import case postpones the development of domestic alternatives and reinforces external dependencies. Over time, this bias becomes self-reinforcing: imports are justified by capability gaps and emergency procurements, while indigenous programmes struggle because they are denied the time, funding and tolerance of failure required to mature.

Another under-examined factor is the fragmentation of India's defence innovation landscape. Although India has created multiple DRDO–academia–industry collaboration frameworks, defence R&D remains fragmented in practice, with cooperation often project-specific rather than system-wide. Unlike in Western countries, where most R&D occurs in the private sector, in India, it is dominated by the government and public-sector entities.[6]

Unless India substantially raises private-sector and industry-led R&D spending, normalises risk-taking through institutional reform, and integrates defence and civilian innovation systems more deeply, import dependence will persist—albeit in more sophisticated forms. The country may assemble and integrate more complex platforms domestically, and its start-ups and companies may be integrated into global supply chains. Still, the core technologies that determine performance, upgradeability and strategic leverage will remain externally sourced. *Atmanirbharta in Defence* has begun to challenge these patterns, but it has not yet overturned them.

The Structural Ceiling of Atmanirbharta in Defence

There is no denying that *Atmanirbharta in Defence* has produced measurable and politically significant outcomes. India's defence production has expanded consistently over the past decade, and defence exports have grown in magnitude.[7]

[5] **"DRDO Chief Says Cutting Edge Projects Avoided in India due to Aversion to Risk and Intolerance of Failure"**, *The Hindu*, 21 September 2024.

[6] Karan Dhar, **"India's R&D Spend at 0.6% of GDP Due to Low Contribution From Private Sector: Economic Survey"**, *Business Today*, 29 January 2026.

[7] **"India Records Highest-Ever Defence Production Of ₹1.54 Lakh Crore In 2024-25"**, *News on Air,* Government of India, 20 November 2025.

The domestic industrial base has diversified beyond defence public sector undertakings (DPSUs) to include private firms, MSMEs and start-ups.[8] Manufacturing clusters, defence corridors and procurement reforms have collectively altered the ecosystem within which defence production operates.

These achievements matter. They have reduced import dependence across categories, localised supply chains and enhanced the resilience of India's defence logistics.[9] Indigenous artillery systems, rockets, ammunition, drones, missiles and naval platforms demonstrate that India is no longer merely an arms importer. In operational terms, the armed forces today draw on a broader domestic supplier base than at any previous time. However, these gains must be assessed against a more complex metric: do they translate into technological autonomy? The answer, at present, is mixed.

Most of India's defence manufacturing growth is concentrated in areas where technological barriers to entry are relatively lower or where foreign collaboration provides access to mature designs. In the start-up domain as well, India has seen a spike in the number of start-ups registered—around one lakh start-ups,[10] with 1,000 start-ups active in the defence sector.[11] Indian private companies have entered into numerous joint ventures with their foreign partners.[12] But they have been unable to utilise the opportunity to develop expertise in the design, production and final product development.

Dr A.P.J. Abdul Kalam had warned two decades ago that manufacturing-led growth, if decoupled from original research and design capability, risks locking India into the role of a low-cost, low-value assembly hub.[13] In the defence context, this warning is particularly salient, as assembly and systems integration without design authority do not confer *strategic autonomy*. It merely relocates the final stages of production to low-cost economies while leaving critical dependencies intact.

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[8] **"Make in India Powers Defence Growth"**, Press Information Bureau, Ministry of Defence, Government of India, 24 March 2025.

[9] **"Atmanirbhar Bharat in Defence"**, Press Information Bureau, Ministry of Defence, Government of India, 1 February 2025.

[10] Rahul Wankhede, **"From Ideas to Action: The Role of Defence and Aerospace Start-ups in Strengthening India's National Security Industry"**, in Kuldeep Verma and Divya Dwivedi (eds), *The Quest for Strategic Autonomy: Indigenisation of Indian Defence Industry*, Routledge, London, 2025, pp. 192–216.

[11] Shantanu Sharma and Apoorva Mittal, **"In five years, over 1,000 defence startups have emerged in India. Can they grow and meet modern battlefield demands?"**, *The Economic Times*, 29 September 2024.

[12] A list of such joint ventures is available at database maintained by the Department of Offsets Management Wing, Ministry of Defence, Government of India at **https://domw.gov.in/Index/iopdetails**.

[13] **"In final book, A P J Abdul Kalam's Word of Caution on Make in India"**, *Indian Express*, 18 October 2015.

In practice, Atmanirbharta in Defence has been operationalised largely through output-oriented indicators—production value, export figures, counts of indigenised items and vendor participation. These metrics are politically attractive and administratively convenient. Yet they do not capture the qualitative dimensions that determine long-term capability: the depth of indigenous intellectual property, ownership of design and critical technologies, and the ability to upgrade and adapt systems over their lifecycle independently. This explains why India continues to depend on imports of military-grade engines, seekers, advanced sensors, rocket motors and navigation systems, even as it assembles and produces complex platforms domestically. Advanced defence production requires reliable capital investments, precision machining and tooling, testing facilities, materials laboratories and secure digital networks. Without these input enablers, domestic companies will struggle to move up the value chain, regardless of procurement support and policy reforms.

Thus, *Atmanirbharta in Defence* currently occupies an intermediate stage, beyond basic import substitution, but short of full-spectrum capability development. This is not a failure. It is an outcome of a strategy that emphasised speed and scale over depth, and much work remains to be done over the next three to four decades. The risk lies in mistaking this critical transitional phase for an endpoint. If India continues on its current trajectory without recalibrating priorities towards original research and human capital development, *Atmanirbharta* risks entrenching a model of indigenous assembly rather than indigenous innovation—not just in the defence sector but in all 14 industries under the Make-in-India mission. The result would be that the nation appears robust in peacetime metrics but remains strategically vulnerable under conditions of technological denial or prolonged conflict.

National Priorities

Atmanirbharta in Defence cannot be improved solely through procurement reforms, industrial participation, or production-linked incentives. Its sustainability depends on factors that lie primarily outside the defence sector—in the non-defence or civilian sectors, the strength of India's research and development ecosystem, the quality of its STEM education system, and the quality and employability of its skilled workforce.

Expecting *Atmanirbharta in Defence* to deliver technological autonomy without these input factors is therefore analytically incoherent. Defence innovation is a downstream activity. When the upstream ecosystem is underfunded and fragmented, defence R&D is forced to compensate for systemic deficiencies it cannot control. Education and skilling present an equally serious constraint. Advanced manufacturing requires a workforce proficient not only in shop-floor skills but also

in fundamental research, critical thinking and original concept development. Inventions arise from basic research, followed by the development of products based on those inventions. While India produces a large number of engineering and science graduates each year, persistent concerns remain regarding their employability, problem-solving skills, and exposure to high-end manufacturing environments.[14] The gap between academic curricula and market requirements is particularly sensitive in defence-related disciplines, where security restrictions and limited industry–academia collaboration restrict hands-on experience.[15]

Efforts by institutions such as the DRDO to partner with universities and launch specialised programmes in defence technology are steps in the right direction, but they remain insufficient in scale.[16] Skilling initiatives under *Atmanirbharta* tend to prioritise immediate manufacturing needs over long-term capability development. This may create a workforce suited to assembly and production, but not necessarily to original design and innovation. Without a steady pipeline of highly trained scientists, engineers, technicians and project managers, India's defence industry will struggle to absorb complex technologies, even when access is provided through foreign collaborations. Over time, this limits the country's ability to move beyond incremental improvements and constrains its bargaining power.

This brings the debate back to national-level priorities. If India seeks strategic autonomy, it must treat investments in R&D, education and skilling not as auxiliary development goals, but as core components of its national security strategy. This requires difficult fiscal and political choices. Raising the expenditure on the 'input sectors' will entail reallocating resources, reforming funding mechanisms, and accepting more extended gestation periods before tangible outcomes emerge. Similarly, overhauling research and policy systems demands sustained institutional reform and political direction rather than short-term schemes. *Atmanirbharta in Defence*, in this sense, is a litmus test of India's willingness to align its developmental inputs with its strategic ambitions. Without a decisive shift in how the country invests in knowledge creation and human capital, defence indigenisation will remain constrained by the very developmental gaps it seeks to overcome.

India's defence budget has grown steadily in absolute terms over the past two decades, crossing Rs 6.8 lakh crore in in 2025–26.[17] This increase is frequently cited

[14] Prashant Nair, **"Increasing Employability of Indian Engineering Graduates through Experiential Learning Programs and Competitive Programming: Case Study"**, *Procedia Computer Science*, Vol. 172, 2020, pp. 831–837.

[15] Nipun Sharma, **"Why Are So Many of India's 1.5 Million Fresh Engineers Every Year Unemployable?"**, *Forbes India*, 13 November 2025.

[16] **"DRDO & AICTE Launch Regular M. Tech. Program in Defence Technology"**, Press Information Bureau, Ministry of Defence, Government of India, 8 July 2021.

[17] **"A record over Rs 6.81 lakh crore allocated in Union Budget 2025-26 for MoD, an increase of 9.53% from current Financial Year"**, Press Information Bureau, Ministry of Defence, Government of India, 1 February 2025.

as evidence of the government's commitment to national security and defence modernisation. Yet, when measured as a proportion of GDP, India's defence expenditure has consistently declined since the early 1990s, stabilising at around 2 per cent or below for much of the post-liberalisation period. If defence expenditure is to function as "economic investment with multiplier impact", as stated by the Raksha Mantri, then its share of GDP must rise commensurately with India's strategic ambitions.[18]

Some tension is evident in the composition of defence expenditure. Salaries, pensions and maintenance absorb a substantial portion of the defence budget, leaving limited fiscal space for capital acquisition and R&D.[19] While this reflects the size and operational commitments of the armed forces, it also constrains the scope for transformational investments. Efforts to earmark a larger share of the capital budget for domestic procurement are commendable, but they do not resolve the underlying issue of overall resource adequacy. This does not imply that India should mechanically increase defence spending to match global averages or those of regional rivals. Such comparisons are often misleading. However, it suggests that India must confront an uncomfortable question: What global position do we want to achieve as a nation over the next few years, and what specific priority areas will operationalise that ambition?

Policy Choices

If *Atmanirbharta in Defence* is to evolve into a foundation for overall national growth, India must confront fundamentally political policy choices rather than technical ones. These choices involve trade-offs among short-term readiness and long-term capability, fiscal caution and strategic ambition, and institutional comfort and systemic reform.

Education, Skills, Human Capability

The first and most consequential choice concerns sequencing. India has expanded production of artillery, ships, vehicles and drones faster than it has strengthened its research base. This has delivered visible outputs but limited depth. A recalibration is required in which R&D is supported by high-quality STEM education nationwide. At the graduate level and above, a merit-based approach should be adopted for basic and applied research. Skill development through direct involvement with industry partners is essential. This implies accepting near-term capability gaps in exchange

[18] **"Defence Spending Should be Termed as Economic Investment with Multiplier Impact"**, Press Information Bureau, Ministry of Defence, Government of India, 7 July 2025.

[19] **"Demand for Grants 2025-26 Analysis Defence"**, PRS Legislative Research, Institute for Policy Research Studies, New Delhi, 4 February 2025.

for long-term autonomy. Such a trade-off is politically difficult, especially in a contested security environment. Yet without it, India risks perpetuating dependence under the guise of indigenisation. Raising national R&D expenditure to at least 2 per cent of GDP should be treated as an objective in its own right, with defence R&D embedded within a broader civilian innovation push rather than treated as an isolated sectoral demand.

Defence Industrial Identity

India must also clarify what kind of defence industrial power it seeks to become. Attempting to compete simultaneously as a low-cost manufacturer, a high-end technology innovator, and a global exporter risks strategic diffusion. A clearer hierarchy of priorities is needed. Dr A.P.J. Abdul Kalam's warning against becoming a low-cost, low-value assembly hub is particularly relevant here. If India's comparative advantage lies in cost-effective systems integration, this must be accompanied by deliberate investment in design authority and intellectual property ownership. Alternatively, if India aspires to mastery in select frontier technologies, resources must be concentrated accordingly rather than spread thin across multiple programmes and vendors. Indecision on this front can lead to a sub-optimal outcome: respectable production numbers without a supportive foundation of strategic leverage.

Reforming Finance and Accountability Structures

Atmanirbharta cannot mature within a system that penalises failure more than stagnation. Indigenous defence R&D inevitably involves setbacks. Without institutional mechanisms to absorb and learn from failure, innovation will remain constrained to low-risk, incremental projects. This requires reforming audit and financial oversight structures to distinguish between malfeasance and genuine technological risk. Defence-literate financial institutions, long-term risk capital and specialised techno-financial auditors are strategic enablers. Without them, start-ups, MSMEs and universities, the very actors expected to drive innovation, will remain trapped at the research stage. A recent positive initiative in this direction has been the reforms introduced in the GFR regulations that allow Directors and Vice Chancellors greater autonomy in research related procurement for specialised research.[20]

Rebalancing the Public–Private Equation

Public sector undertakings in the defence and other sectors will continue to play a critical role in strategic programmes. However, their dominance across the value

[20] **"Minister Dr. Jitendra Singh Announces Policy Reforms to Enhance Ease of Innovation, Ease of Research, and Ease of Science"**, Press Information Bureau, Ministry of Science and Technology, Government of India, 15 June 2025.

chain risks crowding out private initiative and dampening competition. A more differentiated approach is required, one in which DPSUs focus on sovereign capabilities and systems integration, while private firms are empowered to drive innovation, efficiency and export competitiveness. This is not a call for privatisation by default, but for functional clarity. Without it, *Atmanirbharta* risks reproducing old inefficiencies in new institutional forms.

Integrating Defence with National Objectives

The core policy question guiding *Atmanirbharta* is: what do we aspire to achieve as a nation? The answer to this question requires a clear vision of the milestones India seeks to achieve in specific sectors. Defence indigenisation must be explicitly linked to these national objectives of education reform, industrial upgrading, digital infrastructure and regional development. Treating *Atmanirbharta in Defence* as a standalone success story obscures the reality that its long-term viability depends on progress in these adjacent (and complementary) domains. This is where the traditional defence-versus-development debate finally collapses. The relevant question is no longer whether India can afford investment in either of the two or which one is more important, but whether it can afford not to integrate defence, development and innovation into a coherent national strategy.

Conclusion

India's journey towards defence self-reliance has reached an inflexion point. *Atmanirbharta in Defence* has expanded production numbers, diversified the supplier base, and altered the political discourse and public awareness around defence production. These are significant achievements. However, they do not yet constitute structural transformation; its fruits will be visible decades later. The import dependence on critical technologies, stagnation in R&D investment, skill deficits, and declining defence expenditure as a share of GDP reveal a more profound inconsistency between ambition and commitment. India seeks *strategic autonomy* without fully internalising its costs. This gap cannot be bridged through incremental reforms or optimistic narratives.

Atmanirbharta in Defence represents more than an industrial development programme. It is a test of India's strategic resolve. India can continue to optimise within existing constraints, achieving incremental gains while remaining strategically dependent. Or it can accept the costs and uncertainties of transformation, building a defence-industrial ecosystem that reflects its long-term national objectives. Atmanirbharta's future and India's strategic value will be shaped by which path is chosen.

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