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Indianisation of the Defence Industry in India: Evaluating the Expanding Role of the Private Sector in Defence Manufacturing

SAMAR SINGH CHAUHAN[1], DR. PRABHU DASS BATVARI[2], DR. ARVIND NAIN[3], DR. PRIYANKA RANA[4]

[1]*Research Scholar, Faculty of Science and Humanities, SRM University, Kattankulathur Campus, Chennai, India*

[2]*Professor, Faculty of Science and Humanities, SRM University, Kattankulathur Campus, Chennai, India*

[3]*Researcher, Graphic Era (Deemed to Be University) Dehradun, Uttarakhand, India*

[4]*Associate Professor, IIMT University, Meerut, India*

Abstract- ***This chapter traces the continuing evolution of India's defence industrial base with a particular focus on the growing role of the private sector in defence production in the country in the context of indigenisation policy. The study places this analysis in the context of Atmanirbhar Bharat and Make in India and employs a qualitative and thematic analysis approach based on eight purposively selected case studies across the aerospace, armoured vehicles, ammunition, electronics, naval systems and unmanned aerial vehicles (UAV) sectors. Tata Advanced Systems, L&T Defence, Bharat Forge, Mahindra Defence, Solar Industries, the Kalyani Group, Adani Defence and the iDEX innovation ecosystem are the cases. The chapter systematically thematises the four dimensions of policy enablement, private sector capability development, export ambition and structural barriers to highlight key mechanisms that are driving India's shift from a defence economy that is largely import dependent and public sector led, to a more pluralistic and innovation-led defence industrial ecosystem. The findings show that while landmark reforms like the Defence Acquisition Procedure 2020, progressive Positive Indigenisation Lists and FDI liberalisation to 100% have paved the way, there are still a number of structural issues that are preventing the private sector from leveraging the strategic potential, such as the inefficiencies in the procurement cycle, the public-sector mentality in the PIB publication and the prototype-to-production valley of death. The chapter ends with a conceptual model for ongoing indigenisation and suggests avenues for future research for scholars and policymakers in this field.***

Keywords: Indigenisation, Defence Manufacturing, Private Sector, Make in India, Atmanirbhar Bharat, Strategic Autonomy

I. INTRODUCTION

India is one of the biggest importers of defence equipment in the world, spending around USD 13-15 billion on imports as late as 2019 (Behera, 2019; Mukherjee, 2020). In spite of having a huge armed forces establishment, a huge pool of technical manpower and a defence public sector which has been in existence for decades, the country has been structurally dependent on foreign suppliers, mainly Russia, the United States, France and Israel for sophisticated weaponry, platforms and sub-systems. This paradox of strategic vulnerability in an emerging great power and a nuclear armament has triggered a series of policy changes by successive governments leading to the comprehensive Atmanirbhar Bharat (self-reliant India) defence policy launched in 2020 (Kotha et al., 2025); Chakraborty & Roy, 2024).

Indianisation of defence manufacturing is not just an economic goal, but a strategic necessity. As (Smyrnov, 2025) states, import dependence limits flexibility of operations, endangers supply chains to geopolitical disruptions, and reduces the credibility of deterrence postures. In contrast, a strong domestic defence industrial sector has the potential to create technological spillovers, create high-skill jobs and increase diplomatic leverage. To address those imperatives, the Government of India has embarked on a total revamp of the defence procurement system, providing a hitherto unknown opportunity for the

private sector to be involved as prime contractors, technology developers and exporters.

This chapter examines the progress, promise and ongoing shortcomings of this transformation by analysing eight representative case studies from the post-2019 reform period. What the study asks is: What has been the impact of policy change on the rise of private sector actors in Indian defence manufacturing? Where have private companies proved successful, and where are there still obstacles to their complete integration? Thematic analysis is used as the methodological anchor for the analysis which is based on policy documents, academic publications, corporate reports and secondary case evidence.

II. LITERATURE REVIEW

Since 2019, when the indigenisation policy was accelerated, there has been a tremendous growth in the scholarship on the transformation of India's defence industry. (Behera, 2019) gave a basic background of the structural challenges in India's defence industry, where defence public sector undertakings (DPSUs) and ordnance factories have historically dominated the market over the competitive private sector. This analysis was further developed by (Weiss, 2019), who highlighted the slow progress of the private sector integration despite the early liberalisation measures, which was due to the bureaucracy inertia and unequal access to institutions.

Defence Acquisition Procedure 2020 (DAP-2020) has been a subject of much scrutiny. (Behera, 2021) provides an in-depth analysis of the DAP-2020 and notes that the most important structural change is the introduction of Buy Indian – Indigenously Designed, Developed and Manufactured (IDDM) which for the first time puts the domestic private firms on par with the foreign OEMs. (Sharma & Gupta, 2024) placed this reform in the context of the overall Make-in-India defence policy, which they called a paradigm shift, but warned that there was a need to be wary of the hype since no complementary reforms were being undertaken in the ecosystem.

The contribution of certain private companies has been a subject of much research. (Dey & Gawande, 2026) explored the C-295 programme, which marked the first entry of Tata Advanced Systems into the aerospace manufacturing sector and was a "watershed moment for private-sector-led platform integration". (Verma, 2024) discussed L&T Defence's contribution to the K9 Vajra self-propelled howitzer programme and showed how the integration of complex systems by private primes is possible. (Gupta, 2021) took a look at Bharat Forge's ATAGS artillery programme and how R&D leadership of a purely private entity is found in a strategically sensitive domain.

(Vatsa, 2025) have studied the iDEX (Innovations for Defence Excellence) programme as a tool to link deep-tech startups with defence needs. (Yawson, 2021) evaluated the overall innovation system architecture, in the context of the national and sectoral innovation system theory. The issue of FDI liberalisation has been explored by (Gupta, 2022; Shukla, 2023) who has provided a detailed case study of the AK-203 joint venture between the Adani Group and Russian arms company Kalashnikov as an example of indigenisation through FDI.

(Rajiv, 2022; BHARAT & ZERO, 2026) have analysed the export dimensions, which highlights India's aim of reaching USD 5 billion in annual defence export by 2025, especially the role of private companies like Kalyani Group and Solar Industries as the first of the new breed of defence exporters. (Yoganandham, 2025) analysed the Defence Industrial Corridors in Uttar Pradesh and Tamil Nadu as a spatial policy tool for facilitating the private sector's cluster formation. However, despite this level of work, there is still a lack of cross-case thematic synthesis of multiple private sector actors together, common mechanisms and barriers, and theoretically grounded conclusions for the overall trend of indigenisation. This paper aims to fill this gap.

III. THEORETICAL FRAMEWORK

This study is based on three complementary theoretical traditions which are used to develop an integrated analytical framework to understand Indianisation of defence manufacturing.

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3.1 Resource Dependency Theory (RDT): Developed by Pfeffer and Salancik and further explored by (Kumari & Tiwari, 2025) in the Indian defence context where it states that organisations and states aim to reduce their dependence on critical external resources. This dependence on imports for defence is a textbook example of a resource dependency issue and indigenisation reforms can be viewed as strategic moves to internalise capabilities, minimize external leverage and increase autonomy. RDT provides an explanation as to the government's aggressive import substitution policies, which are based on Positive Indigenisation Lists.

3.2 Institutional Theory: (Schulte et al., 2019; Bodnieks, 2020) use institutional theory to explain the uptake of defence industrial reform in the formal rules, informal norms and organisational fields. This is because the culture, procurement systems and risk aversion of DPSU, understood as institutional legacies, remain strong despite the apparent policy support for private participation in the MoD.

3.3 Innovation Systems Framework: (Mehta, 2018; Murti, 2019) use the Sectoral Innovation System (SIS) framework to analyse Indian defence, looking at the interactions between actors, institutions, knowledge flows and markets in creating (or blocking) technological innovation. In this context, the iDEX and DRDO – private sector collaboration ecosystem are evaluated.

<table>
<tr><td colspan="4">DRIVING FORCES: Make in India | Atmanirbhar Bharat | Strategic Autonomy Policy</td></tr>
<tr><td>Institutional Framework (MoD / DRDO / DPP)</td><td>Market Mechanisms (iDEX / DIC / SIDM)</td><td>Technology Transfer & Joint Ventures</td><td>FDI Liberalisation (74% → 100%)</td></tr>
<tr><td colspan="4">PRIVATE SECTOR ACTORS: Tata Advanced Systems | L&T Defence | HAL-Private JVs | MSMEs | Startups</td></tr>
<tr><td colspan="2">OUTCOMES: Import Substitution | Export Growth | Indigenous Capability</td><td colspan="2">THEORETICAL LENS: Resource Dependency | Institutional Theory | Innovation Systems</td></tr>
</table>

Figure 1: Theoretical Framework – Indigenisation of India's Defence Industry

These three theories offer a multi-layered lens of analysis: RDT gives an explanation of strategic motivation, institutional theory gives an explanation of implementation friction and innovation systems theory gives an explanation of capability development dynamics. The three need to converge to explain the speed and trajectory of the Indian defence indigenisation.

IV. METHODOLOGY

The study adopts a qualitative research design with the thematic analysis as the primary method of analysis, in line with the approach set by Braun and Clarke (2006) and modified for defence research with a policy focus. The study takes an interpretivist epistemological approach which assumes that indigenisation and private sector capability is socially and institutionally constructed.

4.1 Case Study Selection

A total of 8 cases were selected based on the maximum variation in the key dimensions: Industrial domain (Aerospace, Land systems, Naval, Ammunition, Electronics, UAVs), Firm size (Large conglomerate to MSME), Reform mechanism engaged (FDI, DAP-2020, iDEX, Defence Corridors). This maximum variation approach improves the range of analysis and transferability of the results (Verma, 2026).

4.2 Data Sources

The primary data sources are the policy documents of the PIB Publication, Defence Acquisition Council (DAC) approvals, Parliamentary Standing Committee on Defence reports and the annual reports of the Defence Research and Development Organisation (DRDO) (2019-25). Peer-reviewed journal articles, think tank publications (IDSA, ORF and CLAWS) and corporate sustainability/annual reports are considered secondary sources. To ensure policy-contemporaneous relevance, academic sources are only cited from the time-frame 2019-2026.

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4.3 Thematic Analysis Procedure

Thematic analysis was a six-phase process of familiarisation with data, initial code generation, theme development, theme review, theme naming and synthesis and write-up. Coding was done deductively (theoretically guided) and inductively (emergent themes). Triangulation was done across at least three data sources for each case, and member checking was achieved by cross checking with peer reviewed assessments, enhancing credibility.

Phase 1 Research Design	Phase 2 Lit. Review & Framework	Phase 3 Case Selection (8 Cases)	Phase 4 Thematic Coding	Phase 5 Synthesis & Validation
Data Sources: Policy Documents | Annual Reports | Interviews (Secondary) | Academic Journals (2019–2026) | MoD Reports				

Figure 2: Research Methodology – Five-Phase Qualitative Design

A sub-sample of coded material (25%) was second coded to validate inter-coder reliability (Cohen's kappa = 0.81) which was good. The drawbacks are that there were no primary interviews (a conscious decision due to the sensitive nature of defence procurement data) and there could be selection bias towards high-profile cases.

V. ANALYSIS

5.1 Case Study Overview

The eight cases cover all the key sectors of the Indian defence industry. The case selection matrix is summarised in Table 1, which shows the domain, key initiative and strategic importance of each case.

Case No.	Organisation	Domain	Key Initiative	Strategic Significance
CS-1	Tata Advanced Systems	Aerospace	C-295 Transport Aircraft	First private-sector aircraft MRO & assembly in India
CS-2	L&T Defence	Naval / Land	K9 Vajra SPH & P-75I	Artillery indigenisation; submarine integration
CS-3	Bharat Forge	Ammunition & Artillery	Advanced Towed Artillery Gun System (ATAGS)	Private R&D leadership in complex weapon systems
CS-4	Mahindra Defence	Vehicles	Light Specialist Vehicles (LSV)	SME-driven modular defence platforms
CS-5	DRDO–Private JV Ecosystem	Electronics / Missiles	iDEX Sprint Challenges	Startup-to-delivery pipeline acceleration
CS-6	Kalyani Group	Ammunition	155mm Artillery Shell Export	First private-sector defence export at scale
CS-7	Solar Industries	Explosives & Ammunition	Pinaka Rocket Warheads	PPP in strategic munitions; import replacement
CS-8	Adani Defence & Aerospace	Drones / Small Arms	AK-203 Rifle JV & Drones	FDI-driven JV and UAV indigenisation

Table 1: Case Study Selection Matrix (n = 8)

In all eight, a common structural narrative can be discerned: each case is that of a private sector actor that has transitioned from margin to mainstream due to the policy change since 2019. Yet, the speed and extent of this change is highly uneven, depending on

the technological strength of the firm, the extent of its government business and the type of reform mechanisms it has used.

5.2 Thematic Coding Results

Table 2 is the consolidated thematic coding matrix which is based on the analysis of all eight cases. Four main themes emerged: Policy Enablement, Private Sector Capability, Export Promotion and Structural Barriers.

Theme	Sub-Theme	Cases Evidenced	Key Policy/Mechanism
Policy Enablement	Positive Lists & DPP Reform	CS-1, CS-3, CS-5, CS-6	Defence Acquisition Procedure 2020; Positive Indigenisation Lists I–VI
Policy Enablement	FDI Liberalisation	CS-7, CS-8	100% FDI via automatic route (2020); DPIIT guidelines
Private Sector Capability	R&D Investment	CS-2, CS-3, CS-4	DRDO tech-transfer; iDEX DISC grants up to ₹1.5 Cr
Private Sector Capability	Manufacturing Scale-up	CS-1, CS-6, CS-7	PLI Scheme for Defence; two dedicated Defence Industrial Corridors
Export Promotion	International Partnerships	CS-6, CS-8	Defence Export Strategy 2020; ₹35,000 Cr target by 2025
Structural Barriers	Public Sector Competition	CS-2, CS-4, CS-5	Ordnance Factory corporatisation tensions; DPSUs preference
Structural Barriers	Procurement Delays	CS-1, CS-3, CS-7	Long A-to-P timelines; DAC approval lags
Innovation Ecosystem	Startup Integration	CS-5, CS-8	iDEX, TDF, Innovations for Defence Excellence

Table 2: Thematic Analysis – Coding Matrix Across Eight Case Studies

5.3 Policy Milestones and Reform Architecture

Table 3 outlines key policy events between 2019 and 2025 and the provisions that have affected the operating environment for private defence manufacturers, and the level of impact on the private sector.

Year	Policy / Initiative	Provision	Private Sector Impact
2019	Draft Defence Production Policy	Indigenisation target 70% by 2024	Incentivised private R&D expenditure
2020	Defence Acquisition Procedure (DAP-2020)	Category 'Make-I' & 'Buy Indian–IDDM'	Private primes eligible for major platforms
2020	FDI Reform	100% under automatic route	Enabled Adani, Kalyani global JVs
2021	Positive Indigenisation Lists I & II	101 then 108 items banned for import	Forced import substitution by private OEMs
2022	Defence Industrial Corridors	UP & Tamil Nadu corridors operationalised	Private cluster investments exceeding ₹20,000 Cr
2023	Positive Lists III–V	Expanded to sub-systems & ammunition	MSMEs and Tier-2 supply chains activated
202	iDEX	35+	Deep-tech

4	Expansion (DISC VII–IX)	technology challenges	startups contracted for prototypes
2025	Defence Export Target ₹50,000 Cr	Long-term export roadmap	Private sector contributes ~40% of defence exports

Table 3: Key Policy Milestones in India's Defence Indigenisation (2019–2025)

5.4 Cross-Case Comparative Analysis

Table 4 is a cross-case comparison of key performance and structural dimensions, which allows for systematic identification of patterns across the 8 cases.

Case	Ownership	Export Activity	Tech Level	Barrier Encountered	Outcome / Status
CS-1: Tata-ATS / C-295	Private	Yes	High	Initial DPSU resistance	MRO hub; 56 aircraft ordered
CS-2: L&T Defence	Private	Limited	High	Long procurement cycles	K9 delivered; P75-I shortlisted
CS-3: Bharat Forge ATAGS	Private	Pending	High	Prototype-to-order gap	Army trials complete; order pending
CS-4: Mahindra LSV	Private	Limited	Medium	Cost competitiveness vs import	In service with Army
CS-5: iDEX Ecosystem	Mixed / PPP	No	Emerging	Scale-up post-prototype	35+ startups contracted
CS-6: Kalyani Artillery Shells	Private	Yes	Medium	Export clearance delays	First large-scale private export
CS-7: Solar Industries	Private	Yes	Medium	MoU to production lag	Pinaka warheads in production
CS-8: Adani AK-203 / Drones	JV/Private	Nascent	Medium–High	Technology transfer timeline	50,000 rifles; drone production live

Table 4: Cross-Case Comparative Analysis of Private Sector Defence Firms

VI. DISCUSSION

The analysis of the theme shows that the indigenisation of defence in India has been a multi-speed and multi-actor process, and policy changes have been essential but not sufficient to transform the private sector. The cases in the report show that private sector in cases where policy enablement has coincided with existing firm capabilities and market incentives such as Tata C-295 and L&T K9 Vajra has delivered creditable outcomes. But the overall trend of the case set is towards a situation of partial integration: private companies have important roles, but they remain subordinate in a system that remains structurally tilted towards public sector incumbents.

The Positive Indigenisation Lists have been acknowledged as a demand side forcing mechanism (Shukla, 2023). The government has banned the import of certain products, thus ensuring that the armed forces have to buy locally, which has ensured market opportunities for private manufacturers. The

increasing size of the list from 101 items (2020) to more than 300 sub-systems and components (2023) is a growing effort that follows the logic of resource dependency: the more the state can do without external resources, the more it will be able to do so (Yadav, 2024).

The liberalisation of FDI to 100% on automatic route has brought about some significant foreign investment in the form of joint ventures, most prominently the AK-203 programme (Roy-Chaudhury & Solanki, 2020) and the drone manufacturing projects of Adani. However, the facts indicate that FDI has been a differential catalyst and not a transformative one: the amount of FDI in the defence sector is not significant when compared with the overall capital needs of the sector, and the technology transfer commitments have not always been met to the desired degree by the policy makers (Srinath, 2020).

The iDEX programme is qualitatively different kind of private sector integration – it is based on innovation-led disruption and not incremental import substitution. (Bhojraj, 2024) conclude that iDEX has successfully established a pipeline for defence start-ups in the form of a venture, but there is a gap between prototype development and series production contracts, which is termed the ‘valley of death'. Such a gap exists between civilian innovation ecosystems which are filled with venture capital and scaling infrastructure in the Indian defence context.

The cross-cutting theme is structural barriers. (Garg et al., 2026) points at systemic constraint, which is the time taken by the government to reach the stage of signing the contract from the Acceptance of Necessity (AoN) in India is often more than 5 years, creating significant cash-flow and planning uncertainty for private companies that cannot match the balance-sheet strength of DPSUs. The Bharat Forge ATAGS case is illustrative: the system was tested and tried by the Army and was ready by 2022, but a production order was still pending at the time of writing in 2024 (Harutyunyan, 2025), indicating the institutional inertia and mindset that (Choudhary, 2025) theorises as a result of the DPSU-centric procurement culture.

VII. FINDINGS

Thematic analysis results in six main findings:

7.1 Policy-Capability Convergence is Conditional: Private sector success in defence manufacturing is most likely when policy enablement is in conjunction with already existing technological capability. Industrial conglomerate legacy firms (Tata, L&T, Bharat Forge) have turned policy opportunity to delivery; newer firms have higher capability acquisition curves.

7.2 The Indigenisation Mandate is Working at the Sub-System Level: Positive Indigenisation Lists have been successful in steering procurement at the component and sub-system level towards domestic private companies. Indigenisation at the platform level is still at a nascent stage, and is limited to a few big primes.

7.3 Defence Exports are an Emerging but Fragile Opportunity: Private sector-led exports (Kalyani, Solar Industries) are a true break-through but volumes are small, clearance times long and diversification of markets is limited. Besides the headline announcements, there is a need for institutional support to meet India's defence export target.

7.4 The Innovation Ecosystem is Nascent but Promising: iDEX has been able to catalyse the defence startup activity but there is a need for more robust mechanisms to bridge the gap between challenge winners and production contractors, dedicated scaling capital, and technology readiness level (TRL) assessment frameworks.

7.5 Institutional Reform Lags Policy Reform: Institutional implementation is the biggest challenge for private sector integration, not policy design. As predicted by institutional theory, deeper institutional legacies such as procurement timelines, DPSU preferencing and risk-averse acquisition bureaucracies are all resistant to formal policy change.

7.6 FDI and Joint Ventures Enable Technology Access but not Technology Transfer: FDI liberalisation has brought in joint ventures but deep technology transfer – as opposed to assembly and integration – has been elusive. Authentic indigenisation is not just licensed manufacturing; it needs domestic R&D investment.

VIII. CONCLUSION

This chapter has explored the Indianisation of the defence industry of India using a qualitative thematic analysis approach of eight case studies that have been covered during the 2019-2025 reform era. The study reveals that while India has made substantive but uneven progress in expanding the role of private sector in the defence industry, it is now in a position to take a leap forward. The DAP-2020, Positive Indigenisation Lists, Defence Industrial Corridors, FDI liberalisation and the iDEX innovation framework are all landmark policy changes that have established an enabling environment that did not exist 10 years ago.

Private industry from conglomerates to fledgling startups has shown commendable skills in aerospace assembly, artillery manufacturing, ammunition manufacturing and unmanned systems (Nair, 2023). This modest but significant step by India towards becoming a defence exporter, spearheaded by private companies, is a strategic achievement that would have seemed unimaginable before 2019. Even though strategic autonomy is a generational challenge, the resource dependency imperative is being addressed.

But structural challenges – especially the inefficiencies in the procurement cycle, institutional resistance to change in the MoD ecosystem, and the limits the scope for optimism. The cases highlight that policy reform has been a necessary but inadequate measure; it will take complementary institutional reform for the policy intent to be translated into defence industrial capability to be partial. The Indian defence industry is at a strategic inflection point and the coming decade will decide whether the structural or episodic transition to the private sector will happen (Rossiter & Cannon, 2019).

IX. FUTURE RESEARCH DIRECTIONS

Based on the findings of this study, four main areas for future research are suggested:

9.1 Longitudinal Tracking: Conducting a longitudinal study over a 5–10-year period of the same eight cases would allow for a more thorough evaluation of the durability of the impact of the reforms and the extent to which institutional counter-pressures may impact the reforms.

9.2 Comparative Defence Industrialisation: Learning from the systematic comparison of the indigenisation journey of India with similar cases in South Korea, Israel, Turkey and Brazil, all of which have successfully developed private-sector-led defence sectors, would provide actionable learning for the Indian policymakers.

9.3 MSME and Startup Ecosystem Analysis: Defence MSME and startup tier is under researched. A detailed ethnographic study of the iDEX participants and a survey of Defence Industrial Corridor based SMEs would give a detailed picture of the grassroots innovation ecosystem.

9.4 Gender and Workforce Dimensions: The gender dimension of defence industrial employment, including women in STEM pipelines feeding into defence R&D and manufacturing is an altogether new dimension of the defence industrialisation in India that is in need of focused research.

9.5 Future research should also delve deeper into subnational variation: the differential development trajectories of the Uttar Pradesh and Tamil Nadu Defence Industrial Corridors, for instance, can be considered a natural comparative experiment in regional industrial policy, which has not been systematically explored in the academic literature.

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