

A wireframe model of a commercial airplane, rendered in a light blue color. The model shows the fuselage, wings, tail, and engines. It is positioned diagonally across the page, from the upper left towards the lower right. The background is a dark blue gradient with white geometric shapes and a green diagonal bar.

How could the aerospace industry increase its attractiveness for the next decades?

Connecting Dreams to Value

Charting Aerospace's Future for Talent and Investment

Introduction - What Makes Aerospace Attractive?

The aerospace industry is one of the most unique fields to work in as it began with the grand dream of mankind to conquer the sky as they had conquered the sea before. Fueled by stories of pioneers who turned the dream of flight into reality, many such dreamers join the aerospace industry each year in hopes of achieving their own aspirations of contributing to the industry.

Yet, the path to realizing their ambitions are met with great amount of hurdles. The industry, a symbol of human ingenuity, now finds itself in a fierce competition for talent and investment, often perceived as less agile than the tech sector and facing public scrutiny over its environmental and ethical responsibilities.

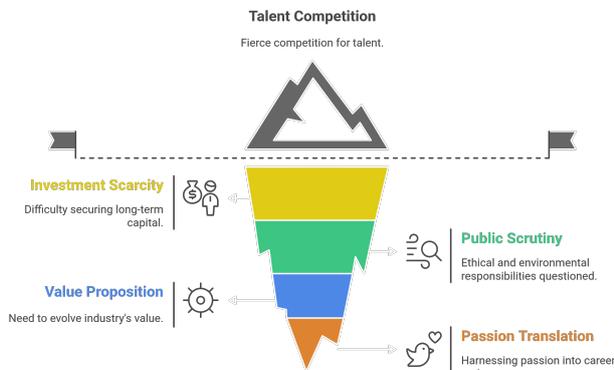


Figure 1: Hurdles for the industry

To thrive, the industry must fundamentally evolve its value proposition. This report argues for a multifaceted strategy centered on a powerful idea: **Connecting Dream with Value**. This

means inspiring the next generation with the grand, "crazy" dreams of exploration and innovation that define aerospace, while simultaneously providing reassurance that a career in this sector aligns with modern values—sustainability, diversity, inclusion, and positive societal impact. We will explore this strategy through three key lenses: attracting and retaining **Talent**, securing long-term investor **Capital**, and earning the **Public's** trust. This analysis integrates a specific focus on the expanding Indian aerospace sector, illustrating both the challenges and immense opportunities in emerging markets.

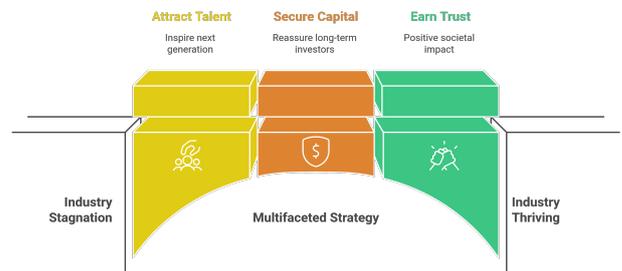


Figure 2: Strategic Bridge

The initial part of this report follows the trajectory underscoring a critical challenge for the global aerospace industry: how to harness widespread passion and translate it into tangible, attractive career paths, not just in established centers, but across the world. Then the main focus is shifted towards the perspective of how harboring new talent along with the concept of **Investible Innovations** could be the way forward.

The Reality

The industry currently is in condition of a "strained boom" where the very demand that signals long-term health is exposing deep structural flaws. The following shows how revenue growth is plateauing and the risk ratings of the companies themselves are high and varied by region.

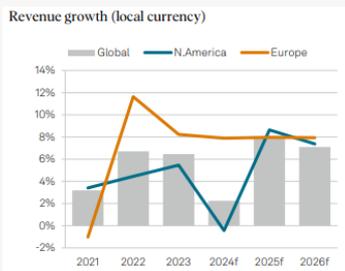


Figure 3: Revenue growth [1]

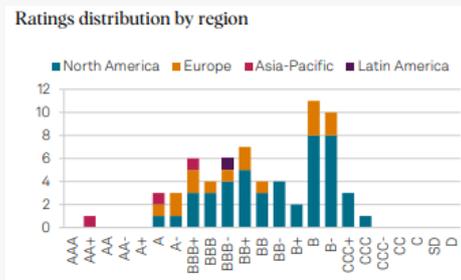


Figure 4: Risk rating [1]

The Talent - Challenge and Solutions

The aerospace and defense sector faces a critical talent shortage, projected to need hundreds of thousands of pilots, maintenance technicians, and engineers over the next two decades. Current production is constrained by these labor gaps, despite high demand for aircraft [2]. This challenge is amplified by the evolving expectations of the future workforce, particularly Gen Z. The traditional appeal of The Dream is no longer sufficient to attract the new generation. This digital native generation prioritizes purpose-driven work and seeks careers that contribute to societal and environmental good where the choice of working in the company also reflects their personal values and inaction or silence on broader topics by their company is interpreted as complicity. To tackle these challenges and to tap into the large talent pool of the newer aware generation, some approaches have been discussed in this section along with a dedicated part on retaining and re-skilling the existing workforce which requires more long-term mindset as well.

Strategy 1: Rebrand with Purpose

The industry must shift its narrative from solely technical achievements to highlighting its tangible societal benefits and must lead with a **pioneering mindset**. The following benefits are something that will be directly involved in focusing on the new narrative required:

- **Sustainability:** The aerospace industry has been working towards achieving net-zero carbon emissions by 2050 and has

contributed a significant amount of investment in the process to advancing their technologies[3]. While innovations like sustainable aviation fuel (SAF), which can reduce greenhouse gas emissions significantly, and more efficient flight paths are actively reducing the industry's environmental footprint [4], there have been currently setbacks in adoption of the technology due to several geopolitical factors including the various conflicts across the world. The company which is able to maneuver during this tough and maintain its stance will be able to effectively rebrand their image resulting in a boost of its image among the newer generation.

- **Global Connectivity and Exploration:** Aerospace careers enhance international trade, tourism, and cultural exchange. Space exploration, including missions like India's Chandrayaan program, inspires curiosity and expands human consciousness, leading to breakthroughs that improve life on Earth [5] but the essential link connecting it to the newer generation is how they are enabling global collaboration, monitor climate change, and support humanitarian aid efforts. Providing essential support for humanitarian relief and facilitating access to otherwise inaccessible areas depend very heavily on the aerospace industry so it offers a very strong brand outreach opportunity.

Target Workforce - Gen Z

The digital native generation, as observed in the study, is known to change their job at a surprisingly higher rate (even more than all the other generations combined) and as they would make up 30% of the workforce by 2030 it is absolutely essential to adapt to their requirements.

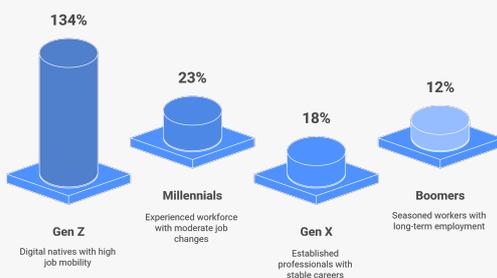


Figure 5: Job change rates [6]

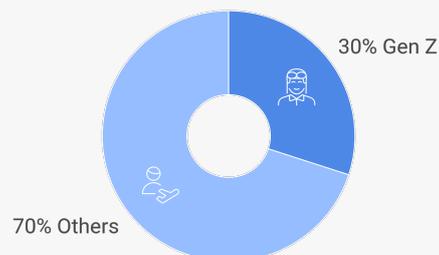


Figure 6: Workforce composition by 2030 [6]

- Diversity, Inclusion and Equality:** An existing problem for all organizations worldwide and particularly for STEM industries is that women are not only being underrepresented in the industry but even from those they are typically underrepresented in senior managerial roles (10–29%)[7] as well as minorities from racially and religiously diverse groups who are only 6.8%[8]. Apart from the diversity, workplace discrimination and safety is still a real issue with gender being cited as the most recurrent cause of discrimination by women (94%)[7]. For the next generation this is a cause of alarm but as each crisis is an opportunity, it could be used as the perfect chance to revamp the image into a completely new direction which focuses not only on inclusion and visible growth of women but also LGBTQ+ community as well in turn creating an amazing pool of talent that could be tapped extensively.

By emphasizing these impacts, aerospace can inspire the next generation to view its careers as purpose-driven. The most important aspect, while integrating these values into the organisation, will be the ability to adapt to the evolving values of the newer generation with time and a great method of preparing and gauging will be to have early and deep engagement programs like NASA

University Student Design Challenge and Airbus Fly Your Ideas Challenge but focused more on diverse socio-economic implication along with the technical aspect of the competition itself. These challenges will not only provide invaluable hands-on experience in areas like structural design, mission planning, and systems engineering, giving students a meaningful connection to the industry's culture of innovation and problem-solving long before they enter the job market but also a connection beyond, mainly of the nurturing work culture offered by the organisation and the proactive culture of respecting future values.

Strategy 2: Modernize the Employee Value Proposition (EVP)

A modern EVP must offer continuous growth, knowledge management, cross-fertilisation and flexibility with the possibility of discovering unique skillsets for the existing workforce (or as they call in video games; to unlock new skills and upgrade the current ones). This must be an integral part

of the strategy as it would essentially transform the outlook and expectations of the employees.

Especially with the rapid integration of advanced technologies like AI and digital twins which necessitate robust reskilling and upskilling programs, investing in career-long training is crucial for retaining valuable expertise [9].

Unsatisfaction with Current Role and Attrition Rate

The dissatisfaction in the aerospace and defense industry stems from the skill gap, will gap, and time gap these factors are substantial and are costing the median companies approximately \$300 million to \$330 million per year in lost productivity[10]

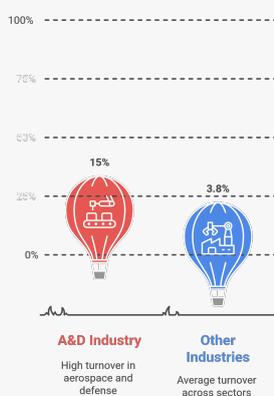


Figure 7: Attr. rate comparison industries[11]

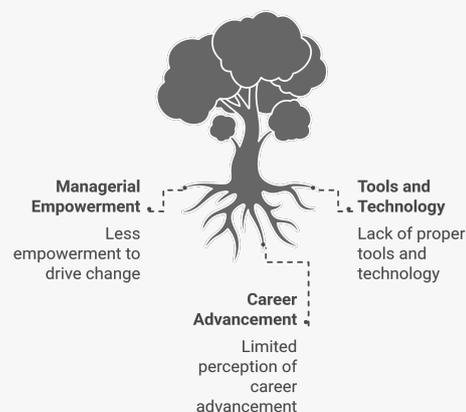


Figure 8: Attrition causes [11]

For offering a modern value proposition there is a need to urgently adopt digital transformation as the backbone. The following few suggested solutions provide The Dream and The Value for the employees and new talent in the industry.

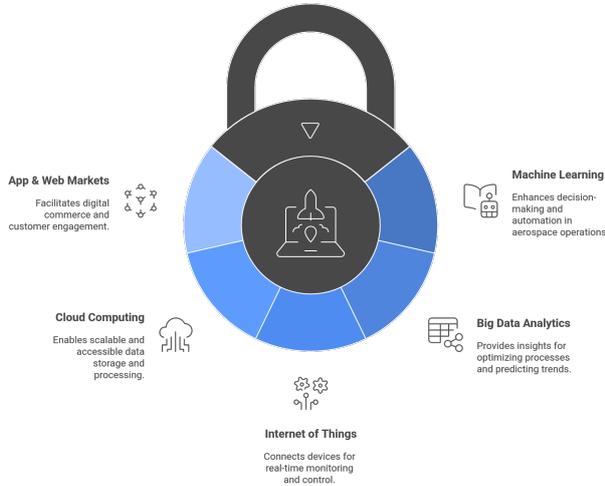


Figure 9: Digital Transformation Focus [12]

- Personalized Career Paths:** Biggest benefit of digital transformation is the ability to take advantage of AI tech and offer personalize career paths for the professionals in the company at large scale. An AI-driven platform for your career in the company taking into account your personal values and outlook towards future while also providing insight into your realistic impact on the working of the company (which is currently vague or lost in the vertical downstream along with the associated appreciation for contribution) could be game-changing.
- Aerospace Innovation Labs and Open-Sourcing Tech:** Create dedicated internal labs where experimentation is explicitly encouraged, and launching public-facing challenges on platforms like Kaggle, offering significant rewards and potential recruitment pathways for solving real industry problems related to sustainability, autonomy, or deep space exploration. Open-source contribution culture to non-critical research areas of domains outside as well to attract global talent and foster collaboration.
- Incubating Diverse Groups:** Prioritizing diverse backgrounds when forming teams fosters innovation and broadens the talent pool, as diverse teams are linked to improved problem-solving and creativity. Even sponsored scholarship or spot reservations in

the industry for all roles could greatly contribute as it will not only increase the performance of the teams but even inspire more talent to consider joining and associating the idea of recognition with staying long-term in the company. Introducing members across generations having a different management styles and Way of Working (WoW) could lead to interesting outcomes as well.

- Impact Bonuses:** With the advantage of a personalized career path we can move beyond standard compensation practices to introduce performance bonuses explicitly tied to achieving measurable milestones on projects with significant societal or technological impact (e.g., demonstrable reductions in emissions, successful deployment of space-based climate monitoring tech). It can be further tied to equity or stock options linked to long-term project success, fostering an ownership mindset even among non-executive roles.

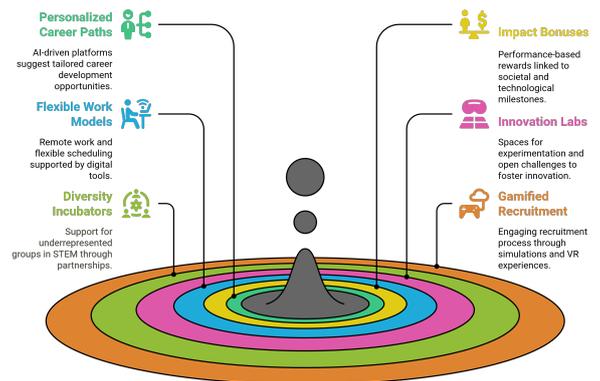


Figure 10: Talent Capture Techniques

- Mentorship and Knowledge Management Programs:** Establishing structured mentorship and knowledge management programs can foster knowledge transfer and career development. Programs for underrepresented groups and regions of the industry require specific focus and will be vital for promoting growth across the spectrum.
- Leverage Immersive Training Technologies (AR/VR):** AR and VR are transformative tools for workforce development, providing hands-on, interactive simulations for design, manufacturing, and maintenance in a safe environment while being very accessible to each section of the workforce regardless of region and background.

The Capital - Evolution and Spillover Economy

Capital is the lifeblood of an industry defined by long development cycles and high capital intensity, and to acquire this constant stream of life there is a constant need on finding and securing newer investors as well as preserving the existing ones. The only way to keep an investor and get new ones is to prove confidence in the business constantly and capture newer value propositions.

As discussed before the current situation of the "strained boom", the aerospace sector must evolve as well as present an even more compelling case built on stability, safety, and a clear vision for sustainable growth.

Building Existing Investor Confidence

Investors prioritize safety, security, and stability. The industry must commit to rigorous safety standards and highlight its inherent stability, such as long-term backlogs for commercial aircraft and counter-cyclical defense spending. While not only including

- Industry-Wide ESG Data Standardization & "Green Bonds"**: Develop and adopt standardized, aerospace-specific Environmental, Social, and Governance (ESG) reporting metrics, audited by credible third parties. Launch "Green Aerospace Bonds," specifically ring-fenced to finance projects with independently verified sustainability benefits, offering investors a clear impact investment vehicle.
- Real-Time Talent & Skills Dashboard**: Create a dynamic, aggregated, and anonymized industry-wide dashboard showcasing key talent metrics: available skill sets (e.g., certified AI/ML engineers, composite materials specialists), projected pipeline from partner universities/training programs, regional talent concentrations, and retention rates. This provides tangible proof of workforce capacity and adaptability.
- Collaborative Risk Mitigation Platforms**: Establish industry-backed consortia to address systemic risks. Examples include shared cybersecurity threat intelligence centers specific to aerospace operational technology (OT) and potentially co-funded insurance pools for nascent technologies like commercial space stations or large-scale AAM networks, reducing individual company risk exposure.
- Transparent Supply Chain & Geopolitical Risk Mapping**: Provide investors with sophisticated, data-driven mapping of critical supply chains, identifying potential bottlenecks and outlining proactive diversification and resilience strategies (e.g., multi-sourcing critical components, investing in domestic production capabilities). Clearly articulate strategies for navigating geopolitical instability impacting markets or resources.

Pillars for Gaining Investor Confidence



Innovation Showcase

Showcasing validated prototypes and pilot projects to attract investment.



ESG Standardization

Developing standardized ESG metrics and green investment vehicles.



Talent Dashboard

Creating a real-time dashboard to showcase workforce capacity and skills.



Risk Mitigation

Establishing platforms to address systemic risks in the aerospace industry.



Supply Chain Mapping

Providing data-driven insights into supply chain and geopolitical risks.

Figure 11: 5 Pillars

- **Blockchain for Supply Chain Resilience:** Blockchain technology enhances transparency and traceability across the aerospace supply chain [13][14]. It can create immutable digital "birth certificates" for aircraft components, optimizing MRO processes. This boosts operational efficiency and strengthens security. However, challenges to adoption include high costs and regulatory clarity [15].
- **Innovation Showcases:** Host curated events (physical and virtual) focused solely on demonstrating validated prototypes and pilot project results from high-growth areas (e.g., certified SAF production units, operational AAM vertiports, successful orbital debris removal tests). Include live data streams and transparent performance metrics.

Spillover Economy

Aerospace R&D consistently yields significant spillover technologies that benefit other industries. This innovation multiplier effect creates value beyond core aerospace operations. A core, and often under-communicated, aspect of the Aerospace and Defense (A&D) investment case is the industry's role as a powerful engine of innovation for the entire global economy. [16]

- **70%:** The social return on investment in aerospace R&D over a ten-year period.
- **4-5x:** The social return is approximately four to five times greater than the private return for the innovating company.
- **90%:** of the total spillover benefits are concentrated in five key sectors: Automotive, Transport, Plastics, Machinery, and Scientific R&D.

Source: Aerospace Technology Institute [17]

Investment in aerospace R&D generates value that extends far beyond the sector itself through a phenomenon known as technology spillover. These spillovers occur through several mechanisms:

- **Knowledge Spillovers:** When knowledge created by one organization, often to solve a unique aerospace challenge, is transferred to others without full payment, creating new value.
- **Market Spillovers:** Where the benefits of a new technology are not fully captured in the price paid by the buyer, creating surplus value for other industries.
- **Network Spillovers:** When new A&D goods or services create demand for complementary products in other sectors, acting as a platform effect.

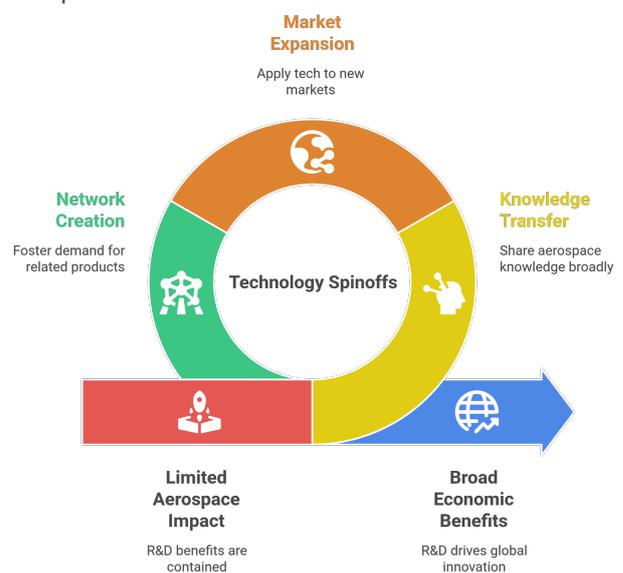


Figure 12: Spillover Economy

This data demonstrates a compelling case for government and private investment in the sector, as the benefits extend far beyond the innovating companies themselves. The strategic imperative for the A&D industry is to systematically track, quantify, and communicate these spillovers.

This reframes R&D spending from a simple cost center into a powerful investment that generates a broad economic domino effect. It makes a compelling case that investing in aerospace is not just a bet on a single industry but an investment in the foundational technological progress of a diversified modern economy. This creates a uniquely attractive and systemically important asset class, mitigating risk for investors by demonstrating that A&D innovation lifts the technological capabilities of many other sectors within their portfolios.

The Public Mandate - Transparency and Collaboration

The Public here comprises of the society (humans, governance bodies) and few aspects of the public sector of the aerospace industry as well. The aerospace industry's progress in the 21st century hinges on **public trust**, earned through transparent engagement on societal issues and robust governance. This trust directly influences the industry's appeal to talent, investors, and global partners.

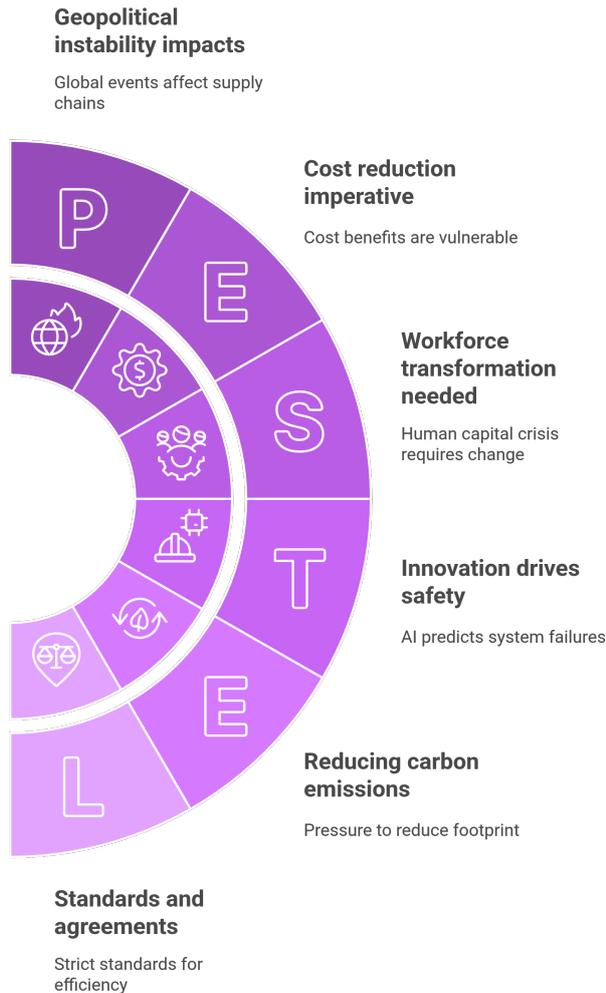


Figure 13: PESTEL Analysis

Safety, Security, and Ethical Practices

The industry's highly regulated nature demands traceability and ethical sourcing of parts throughout an aircraft's lifecycle to ensure safety and reliability. AI-driven analytics enhance predictive maintenance, reducing risks and costs, while cybersecurity-by-design principles protect critical systems. Standardized frameworks like NIST SP 800-171 bolster confidence and resilience across the ecosystem.

Ethical practices and sustainability are central to public perception. **De-centralisation** provides a tamper-proof records, reducing risks of data manipulation and counterfeiting. Smart contracts further enhance transparency, though human factors remain a cybersecurity vulnerability. The industry must also address ethical concerns such as space debris and the societal impact of high-cost exploration, clearly communicating its broader value beyond economics [18].

Political Landscape and Global Governance

Geopolitical instability—such as conflicts in Ukraine and Israel—disrupts supply chains and drives protectionist policies of countries shielding themselves and closing up, reshaping defense spending and industry dynamics. Global collaboration is essential for resilience and innovation:

- **International Standards:** Organizations like ICAO (e.g., CORSIA) and IMO set safety and sustainability benchmarks, while public-private partnerships (e.g., NASA-SpaceX) accelerate technological advancements.
- **Strategic Alliances:** Countries like India and Israel are forming new partnerships in drones, cybersecurity, and precision technologies to address shared challenges.[19]
- **Standardization:** Initiatives like SESAR (EU) and NextGen (FAA) harmonize air traffic management, while ISO frameworks ensure compatibility for AI and IoT.
- **Cybersecurity:** Unified standards and platforms like the Aviation ISAC protect against cyber threats, ensuring data integrity in digital systems.
- **Employment and Workforce Development:** Global cooperation is critical for creating widespread exchange programs, and fostering mobility in the aerospace workforce, ensuring a sustainable talent pipeline across all regions and not concentrated in a particular region.

The Indian TCP (Talent, Capital & Public) - Analysis and Application

The evolution of the Indian aerospace and defense market serves as a powerful case study to apply the TCP approach. The Indian government's 'Atmanirbhar Bharat' (Self-Reliant India) initiative is fostering a vibrant domestic manufacturing and R&D ecosystem.

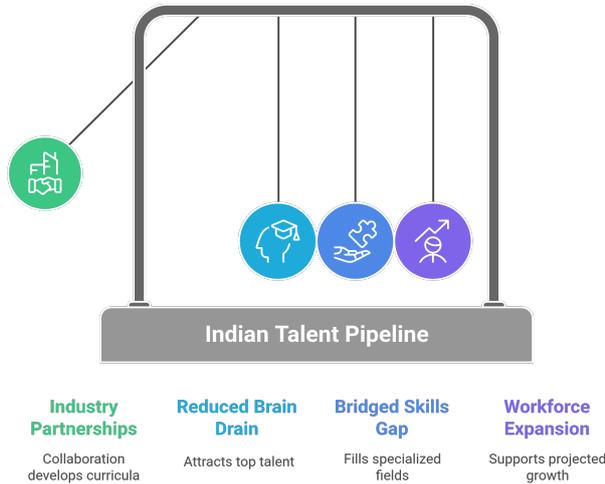


Figure 14: Indian Talent Pipeline[20]

Talent

- Problem** India faces a significant human capital crisis marked by a "brain drain" of top talent and a skills gap in specialized fields like avionics and composites manufacturing. Employees often express dissatisfaction with organizational policies, fairness, support from superiors, and career advancement opportunities.
- Action** To counter this, India must forge deep, project-based partnerships between industry leaders, premier research institutions, and universities. These collaborations should co-develop curricula and sponsor hands-on student projects and national design challenges.
- Opportunity** A unique opportunity lies in leveraging India's world-class software and digital talent by creating career paths that fuse digital skills with aerospace applications, such as AI for avionics, digital twins for Maintenance, Repair, and Overhaul (MRO), and data analytics for supply chain management. The goal is to build a self-sustaining domestic talent pipeline that views the Indian A&D sector as globally competitive,

supporting a projected workforce expansion from 150,000 to 450,000 within a decade.

Capital

- Problem:** Despite rapid growth projections – with the market valued at \$26.8 billion in 2023 and projected to reach \$48.4 billion by 2032 – India's aerospace sector faces inertia for investors due to a "trust deficit" between public and private sectors.[20]
- Action:** Private companies encounter complex and slow-moving regulations, limited access to expensive testing facilities, and challenges in securing funding for projects with long gestation periods. Historically, foreign investment has been constrained by bureaucracy and complicated tax laws. To de-risk investment, the government must create single-window, fast-track systems for regulatory approvals, invest in shared, open-access national testing and certification infrastructure for private players, and implement Production Linked Incentive (PLI) schemes.

- **\$74.8 Billion:** Defense budget for FY 2024-25.
- **75%:** of capital procurement reserved for domestic sources.
- **\$2.5 Billion:** Record defense exports in FY 2023-24, a 32.5% increase YoY.
- **150,000 to 450,000:** Projected expansion of the aerospace sector workforce within a decade
- **\$26.8 Billion:** Market value in 2023, projected to reach \$48.4 Billion by 2032
- **6.8%:** Compound Annual Growth Rate (CAGR) of the industry
- **95%:** Approximate share of India's defense manufacturing that currently occurs in the public sector

Source: Invest India, 2024 [3][20]

- **Opportunity:** Designating defense aerospace as an "infrastructure sector" could also provide crucial tax breaks and benefits.

The "Make in India" initiative, which has increased indigenous procurement and eased Foreign Direct Investment (FDI) norms up to 74% (100% in satellite components), marks a significant policy shift to attract capital.[3]

Public

- **Problem:** The Indian government has historically driven the aerospace industry through public sector undertakings like Hindustan Aeronautics Limited (HAL).

However, the "Make in India" initiative aims to foster a hybrid ecosystem by encouraging private sector participation and reducing import reliance.

- **Action:** Public-private partnerships (PPPs) are essential to enhance the industry's appeal by stimulating innovation, reducing

costs and risks, and expanding market opportunities.

These collaborations allow the government to leverage private sector expertise and resources for capital-intensive projects and critical capabilities like satellite communications and Earth monitoring.

- **Opportunity:** PPPs are crucial for workforce development initiatives, such as "Space Workforce 2030," which aims to build a more diverse community of aerospace engineers.[21] Policymakers need to create a frictionless operating environment for the private sector by simplifying regulations and streamlining procurement.

The industry can also showcase its societal impact by addressing global challenges like climate change (e.g., Sustainable Aviation Fuel), global security, and digital connectivity, aligning with Gen Z's purpose-driven values.

Nurturing Plan for building Public-Private-Partnerships



Figure 15: PPP Nurturing Plan

Strategic Recommendations & Conclusion

Investible Innovations: A Unified Strategy

To transform its global appeal, the aerospace industry must align its visionary aspirations with tangible value creation. This requires a unified strategy that connects technological innovation with societal impact, creating a virtuous cycle of trust, investment, and talent attraction. The following recommendations focus on investible frontiers that address current market, forthcoming talent and technological trends:



Figure 16: Virtuous Cycle

Key Recommendations

1. Global Talent Cooperative

Establish an industry-funded cooperative program offering rotational assignments across countries and companies. This initiative should include a "Return to Home" track, enabling professionals to bring international experience back to emerging aerospace hubs. Such exposure will cultivate a globally competitive workforce while addressing local skill gaps.

2. Aerospace Innovation Fund

Create a collective venture capital fund focused on commercializing non-core aerospace innovations. This fund would provide investors with

clear mechanisms to capitalize on the innovation multiplier effect, unlocking new revenue streams from spin-off technologies and fostering entrepreneurial growth within the sector.

3. Independent Sustainability Council

Form an autonomous council of scientists and policymakers to audit and publicly report on the industry's progress toward sustainability goals. Third-party validation enhances credibility and builds public trust more effectively than internal reporting.

Conclusion - A Vision of Global Aerospace

The aerospace journey—from childhood dreams in India to professional studies in France—has revealed a fundamental truth: while the power of flight is universal, opportunity is not. The industry's future attractiveness will be determined by its ability to create a global ecosystem that is as innovative and inclusive as the technologies it produces.

By embracing the **Connecting Dream with Value** strategy, aerospace can:

- Become a talent magnet by offering purpose-driven careers
- Attract investment through sustainable, society-enriching growth
- Earn public trust via transparent leadership on critical issues

The vision for the industry where the brightest minds worldwide can realize their grandest aspirations while building a future of flight that is safer, more sustainable, and more connected than ever before.

As we move forward, my aspiration is to contribute to a thriving global aerospace sector that stands to become a fully integrated ecosystem, turning today's challenges into tomorrow's opportunities.

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