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ISSUE BRIEF
IB/16/25

FROM CO-PRODUCTION TO CO- INNOVATION: INDIA-JAPAN COLLABORATION IN NEXT-GENERATION JET AND ARMOURED VEHICLE PROPULSION

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From Co-Production to Co-Innovation: India-Japan Collaboration in Next-Generation Jet and Armoured Vehicle Propulsion

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Abstract

India and Japan are fostering their defence partnerships by moving beyond co-production and co-development models and looking towards genuine co-innovation. The current focus is to collaborate in propulsion technology for next-generation fighter jets and armoured vehicles. A new milestone in this relationship has been marked by the visit of Japan's Minister of Defence General Nakatani on May 2025. A key takeaway from the meeting was the possibility of co-producing and co-innovating next-generation engines for fighter planes and tanks. India hopes to capitalise on Japan's nearly century-long experience developing tanks and aeroengines. India's Minister of Defence, Rajnath Singh highlighted the capabilities of India's defence industry and advocated for collaboration in these high-tech sectors. The threat perception emerging from Beijing, remains crucial to both Tokyo and New Delhi. This has prompted both the countries to pursue shared principles and strategies to foster a region based on rule of law. The Japanese Defence Minister affirmed that shared security concerns have brought the two countries closer. The ministers are focused to cooperate, with

the goal of establishing a meeting framework from a comprehensive and integrated point of view between Japan and India for coordination and task management in cooperation and collaboration, to continue increasing.

This paper explores the reasons behind this strategic shift, including shared regional security concerns, complementary technological capabilities, and the aspiration to create innovations beneficial to the military sector. It reviews current joint initiatives, addresses institutional, regulatory, and commercial barriers, and provides recommendations such as establishing joint research and development (R&D) frameworks, clear protocols for sharing intellectual property (IP), and integrated industrial centres.

Introduction

Immediately after the end of the World War II, Tokyo faced humiliation from the powers who attained victory in the war. During that period, New Delhi affirmed that Tokyo deserved to be positioned as a country with honour amongst the international community. At the Bandung Conference, India strongly supported Japan's bid for membership in the United Nations. However, during the Cold War, relations between the two democracies cooled, as Japan aligned itself more closely with the US-led capitalist bloc, while India pursued a policy of non-alignment, maintaining a foreign policy that diverged significantly from Japan's.[1]

Following the end of the Cold War, Japan and India witnessed a steady warming of relations, driven by a shared interest in promoting peace and stability in the region. Hence, they fostered a strong bilateral relationship in the beginning of 1990s. The visit of the then Prime Minister of Japan, Toshiki Kaifu in 1990 was highly symbolic.
This visit resulted in India gaining a more positive view of Japan. Japanese Prime Ministers Nakasone and Toshiki Kaifu, who visited South Asia in April 1990, emphasised the importance of peace and stability in Asia.[2] The development of this region, home to one-fifth of the world's population, is a major global interest.

Prime Minister Kaifu also delivered a keynote speech to the Indian Parliament on Japan's Asia policy, emphasising that Japan would attempt to enhance participation

on issues rather than limiting it to agenda items on bilateral or Asian issues only. Years later, Prime Minister Shinzo Abe echoed a similar thought at the Indian Parliament on the 'Confluence of the two Seas' in 2007. This highlights, Tokyo's interests in viewing New Delhi as a natural partner and that this relationship has its foundation laid long ago. India also initiated its economic reforms and commenced its 'Look East Policy' in the early 1990s. This marked another critical point which broke the economic stagnation between the two countries.

Nonetheless, Tokyo remained quite apprehensive when India conducted its nuclear tests in 1998. When the Japanese Prime Minister Mori visited India in August 2000, the diplomatic deadlock between the two nations was broke. In October 2001, Tokyo removed all economic restrictions against India relating to nuclear, and the two nations decided to form a "Global Partnership in the 21st Century".[3] In the current times, the bilateral relationship between the two leading democracies is evolving promoting peace and stability while sharing common values. In 2006, they came up with the "Joint Statement Towards India-Japan Strategic and Global Partnership"[4] and in 2014, Prime Minister Narendra Modi and the late Prime Minister Shinzo Abe, initiated the "India - Japan Strategic and Global Partnership for continuing progress and prosperity for their people and for advancing peace, stability and prosperity in Asia and the world. Elevating the relationship to a Special Strategic and Global Partnership, they called their meeting the dawn of a new era in India - Japan relations".[5] This was followed by exchange of visits by the leaders of the two countries, annual summits and fostering transfer of technology and defence cooperation.

Economically, Japan remains a key source of Official Development Assistance (ODA) and Foreign Direct Investment (FDI) for India, evident in significant infrastructure projects like the Delhi-Mumbai Industrial Corridor and the Mumbai-Ahmedabad High-Speed Rail project.[6] Yet, despite this strong economic relationship, defence cooperation lagged for many years. It has only recently begun to align with their robust economic ties.

Japan's pacifist constitution historically restricted defence exports and collaborative defence initiatives. However, escalating threats from North Korea and China's assertive actions in East and South China Seas have led Japan to revise its defence stance. The "Three Principles on Transfer of Defence Equipment and Technology" in

2014 significantly shifted Japan’s previous stance, enabling collaborative defence projects.[7] India, pursuing its "Atmanirbhar Bharat" (Self-reliant India) policy to build domestic defence capabilities and reduce foreign dependence, sees Japan as an ideal partner due to Japan's advanced technology, R&D infrastructure, and shared strategic concerns.

Several key agreements underpin this cooperation, including the ‘2015 Defence Equipment Transfer Agreement’ and the ‘2020 Acquisition and Cross-Servicing Agreement’. Projects such as the Visual SLAM-based GNSS augmentation highlight the operational viability of joint efforts in emerging technologies.[8]

From Co-Production to Co-Innovation: Strategic Relevance

Historically, India's defence acquisitions have centred around co-production involving licensed manufacturing and local assembly. Although beneficial initially, this model limited technological absorption and the development of sovereign capabilities. Projects like ‘Advanced Medium Combat Aircraft’ (AMCA) illustrate India's ambition to progress beyond co-production towards genuine co-innovation, entailing shared R&D, intellectual property rights, and mutual technological integration. For example, New Delhi has successfully produced Su-30 MKIs and T-90 tanks in collaboration with Moscow but these efforts have done little to the development of indigenous design capabilities.

It is evident that the aviation industry benefits the most from indigenisation in defence, as India rightfully advocates for Atmanirbharta (self-reliance). The most advanced technologies are needed for aircraft. However, it is a reality that high-end technologies are not shared by any nation and tend to become obsolescent very quickly. Any nation must conduct research and development (R&D) and create its own intellectual property in order to be able to sit at the global table. The leadership of the Indian Air Force (IAF) strongly supports all domestic aviation initiatives. The AMCA is expected to be commissioned by 2035, according to Defence Research and Development Organisation (DRDO) Chairman Samir V Kamat.[9] Nonetheless, this project demonstrates enthusiasm and its challenges in achieving indigenisation in the defence sector.

According to Kamat, the DRDO has started the development process and the design of the AMCA fighter is already finished, making it a stealth aircraft.[10] He also stated that DRDO hopes to complete AMCA's development trials by 2034.

Members of India's defence establishment and other media outlets have previously referred to the AMCA as a 5.5-generation fighter aircraft. This implies that it will have some of the characteristics of the next generation of jets, which are being built by China and the US, which currently use platforms from the fifth generation.
There are four essential characteristics of a fifth-generation fighter plane. First, because of its tiny radar cross section, it is stealthy, making it almost invisible to hostile radars.[11] Second, it can 'supercruise', which means it can fly faster than sound without using afterburners that burn a lot of fuel. Third, it has sensors and sophisticated avionics for network-centric operations. To improve the pilot-aircraft interface, artificial intelligence is also being included more and more.[12] Finally, by using active electronically scanned array (AESA) radars to detect and engage targets from a great distance, it should be able to outrange its foes.[13]

A pivotal moment occurred in May 2025 during a high-level meeting between Defence Ministers of the two countries, Rajnath Singh and Gen Nakatani, reinforcing commitments towards co-developing advanced propulsion systems for future jets and tanks.[14]

New Delhi seems to be interested in Japan's XF9-1 prototype engines which has a capacity of 15 metric tons of thrust.[15] These engines were delivered to the Acquisition, Technology and Logistics of Japan (ATLA) by the Japanese Engineering Company IHI Corporation. The initiative highlights the significance of an advanced propulsion technology for a fifth-generation stealth fighter. Nonetheless, New Delhi has not clarified so far about the kind of engine program it will acquire for the AMCA project.
This partnership is critical as it addresses India's long-standing gaps, such as the delayed Kaveri engine project, and leverages Japan's established expertise in propulsion technology. To attain such advanced technologies, New Delhi might need to attain considerable structural adjustments. India must refine its Defence Acquisition Procedure to accommodate R&D-intensive partnerships, while Japan must further liberalise its defence export policies and clarify IP-sharing frameworks. A bilateral

propulsion innovation charter, specifically tailored for the AMCA programme, could form the foundation for these collaborative efforts.

The AMCA programme is more than an aircraft development initiative. It represents India's new strategic approach towards defence partnerships, with Japan serving as an ideal partner. Together, their collaboration on the AMCA propulsion system could establish a benchmark for future co-innovation initiatives across the Indo-Pacific region.

Commences Strategic Autonomy

The strategic motivations driving the partnership between India and Japan in propulsion technology are diverse, encompassing security imperatives and deeper layers of economic, technological, and geopolitical alignment. Strategic autonomy remains at the core to commence the partnership between the two countries in the field of advanced technology. In the changing global geopolitical landscape, New Delhi and Tokyo remain uncertain about their reliance on the US, Russia or Europe. At the same time Japan is aspiring to become a 'Normal Country'[1] and shifting from a defensive defence system to an offensive one. It is investing in its domestic defence industries to develop advanced technologies meanwhile, looking for opportunities to tap into export markets.

In December 2022, Japan released an updated National Security Strategy (NSS) that outlines its commitment to strengthening defence and security cooperation with like-minded nations. This includes joint research, development, and production of defence equipment and technology. The NSS underscores the importance of such collaborations in enhancing Japan's defence capabilities and contributing to regional and global peace and stability. [16]

Joint initiatives in developing propulsion technology in a way would enable India to modernise its defence sector. New Delhi and Tokyo would have a control over design,

[1] '*Japan wants to become a normal country'* refers to Tokyo's aspiration to move beyond its post-WWII pacifist constraints, especially Article 9 of its Constitution, and exercise full sovereign rights, including the use of military force for self-defense and collective security. It implies Tokyo's enthusiasm to expand its military role also to match with its global economic stature, asserting itself as both a strategic and economic power with greater autonomy in international affairs. Source: The Diplomat, URL: https://thediplomat.com/2013/12/is-japan-now-finally-a-normal-country/

testing, upgrading to replacement enabling them to acquire strategic autonomy in the defence technology sector.

Additionally, jointly developed propulsion systems, competitively priced and region-specific, could appeal significantly to friendly nations across Southeast Asia and Africa, effectively enhancing India and Japan's status as influential regional security providers. Promoting these co-developed propulsion solutions under a unified ‘Make in Asia for the World’ brand could substantially enhance both countries’ industrial credibility and soft power on the global stage.

Challenges to Deeper Collaboration

Despite the considerable mutual interests shared by India and Japan, several significant obstacles persist, complicating deeper collaboration. They have been discussed in the following paragraphs:

• **Divergent Regulatory Frameworks:** One major barrier lies in the distinctly different regulatory systems governing defence procurement and technology transfers in the two countries. India's Defence Acquisition Procedure (DAP) emphasizes indigenous development and includes multiple procurement categories, such as Buy Indian, Buy and Make, and Strategic Partnership, which can sometimes slow down decision-making processes and create uncertainty for international partners. Japan, meanwhile, continues to be cautious in its export policies despite substantial reforms in 2014. Each proposal for technology transfer undergoes meticulous evaluation by Japan’s Ministry of Economy, Trade, and Industry (METI) and frequently requires legislative oversight. These differences in export control and procurement policies complicate alignment, particularly for high-tech, dual-use propulsion systems.

• **IP and Technology Transfer Barriers:** Japanese firms strongly prioritize intellectual property (IP) protection and typically show reluctance in sharing proprietary information on sensitive technologies, especially turbine blades, heat-resistant alloys, and stealth-compatible engine architectures. In contrast, India seeks full design participation and the rights to adapt technology locally rather than merely assembling foreign components. Without a clearly defined, government-to-government backed

mechanism for IP sharing, achieving meaningful collaboration in propulsion technology research and development remains challenging.

• **Limited Industrial Integration:** Unlike India's established partnerships with countries like France and Russia, which feature well-developed production lines, joint ventures, and established training programs, the India-Japan defence industry relationship is relatively new and underdeveloped. The absence of joint centres of excellence, collaborative research laboratories, or coordinated industrial initiatives hampers the emergence of a cohesive innovation culture. Additionally, Japanese private sector firms remain largely unfamiliar with India's defence procurement procedures, further hindering proactive engagement and effective collaboration.

• **Strategic Trust Deficit:** Japan has deeply embedded and institutionalized defence partnerships with the United States and more recently, with the United Kingdom and Italy through initiatives like the Global Combat Air Programme (GCAP). However, its collaboration with India remains at an exploratory stage. India's efforts to maintain strategic autonomy while balancing a historically significant reliance on Russian defence equipment can appear unpredictable or inconsistent from Tokyo's viewpoint. Moreover, the absence of a clearly articulated five- or ten-year strategic collaboration roadmap, coupled with the lack of established trilateral frameworks involving India's other strategic partners, exacerbates the trust gap between the two countries.

• **Economic Risk Factors**: Japanese defence companies typically approach international ventures from a commercial perspective, carefully evaluating risks and potential returns. India's defence contracts are often subject to procedural delays and bureaucratic bottlenecks, posing commercial risks for potential Japanese investors. Compared to countries that offer streamlined procurement processes and clearer profit projections, India's complex processes and heightened political scrutiny can discourage sustained private sector engagement, thereby reducing momentum in scaling propulsion-specific collaborative ventures.

Recommendations for a Co-Innovative Defence Future

To effectively navigate these barriers and realize the full potential of joint propulsion, focused innovation, several strategic actions are recommended:

• **Bilateral Defence Innovation Framework:** India and Japan should formalize a dedicated bilateral "India-Japan Defence Innovation Framework," similar to existing international models like the iCET initiative or the US-Japan UPWARDS programme. This framework should clearly outline collaborative timelines, co-funding mechanisms, and thematic working groups explicitly targeting propulsion and mobility technologies. Implementation should be overseen by a Joint Steering Committee co-chaired by representatives from Japan's METI and India's MeitY or DRDO.

• **Joint Propulsion Technology Lab:** Establishing an Indo-Japan Jet and Tank Propulsion Technology Lab (IJPTTL) within India's designated defence industrial corridors would be highly beneficial. This joint research facility could focus on critical technology areas such as high-bypass turbofan engines, miniaturized UAV engines, electric propulsion systems for tanks, and heat-resistant ceramics. Leading Japanese corporations such as IHI, along with Indian organizations like GTRE and BHEL, could jointly manage research, contributing expertise, infrastructure, personnel, and initial funding.

• **Public-Private Sector Integration**: Initiating a biannual India-Japan Defence Industry Forum would foster direct collaboration between Japanese SMEs and OEMs and Indian DRDO laboratories, defence startups, and public sector undertakings. Moreover, extending tailored "Make in India" incentives combined with Technology Transfer benefits under India's Production Linked Incentive (PLI) scheme to Japanese engine manufacturers could significantly enhance production capabilities and adherence to standardized quality norms.

• **Skill Exchange and Residency Programs:** Creating structured, long-term academic and technical residency programs between prestigious Indian institutions such as IIT Madras, recognized for propulsion research, and leading Japanese universities like the University of Tokyo and Tohoku University would be highly

beneficial. Joint degree programs and internships within corporations and labs like Mitsubishi, IHI, HAL, and DRDO would promote cultural and technical exchange, ensuring a deeper mutual understanding of project objectives and requirements.

• **IPR and Export Agreements:** A Supplementary Protocol to the existing 2015 Defence Equipment and Technology Transfer Agreement should be drafted. This protocol would establish clear, secure guidelines for intellectual property co-ownership, proper handling of dual-use technologies, and define export control categories explicitly for propulsion-related components. Such clarity would provide robust legal safeguards and promote mutual trust and confidence between both parties.

• **Strategic Forums for Dialogue:** Instituting an annual "India-Japan Propulsion Innovation Dialogue," alternating between Tokyo and New Delhi, would facilitate ongoing strategic discussions involving representatives from government agencies, academia, and industry stakeholders. Additionally, a track-1.5 roundtable under the existing 2+2 dialogue format, dedicated exclusively to propulsion systems, could clarify strategic directions, establish transparent development roadmaps, and regularly issue joint communiqués, enhancing investor confidence and transparency.

Conclusion

India and Japan stand at the threshold of a new chapter in their bilateral defence relationship, moving beyond transactional hardware exchanges towards genuine, shared technological innovation. The two countries are looking to develop a relationship, which is beyond a buyer and seller dynamic. Considering the global security environment, New Delhi and Tokyo believe the significance of co-innovation which starts from joint R&D, co-ownership of IP including shared innovation ecosystems. The aim should no longer be limited to co-production and co-development rather create a long-term roadmap moving from a cooperation which has mostly been transactional in nature.

India sees a stronger Japan as a valuable and helpful strategic partner in relation to China and the Indo-Pacific. Under the leadership of Prime Minister Shigeru Ishiba, fostering defence cooperation with India could remain a top priority for Japan.

DISCLAIMER

The paper is author's individual scholastic articulation and does not necessarily reflect the views of CENJOWS. The author certifies that the article is original in content, unpublished and it has not been submitted for publication/ web upload elsewhere and that the facts and figures quoted are duly referenced, as needed and are believed to be correct.

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