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India, Japan and Beyond

Human Security, Environment, Development, Innovation and Resilience

Springer

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Preface

India and Japan's civilizational linkages have been the bedrock on which this relationship has been built. At the turn of the century, the changing world order reoriented this relationship from distantly friendly to a strategic partnership. The partnership works at various levels, including diplomacy, economics, trade, industry, science, technology, innovation, higher education, cultural issues, and people-to-people connectivity. All these have bolstered and invigorated this relationship.

India–Japan relations have a broad spectrum of cooperation. Diversity is often lost when it is discussed under umbrella themes. This book attempts to provide a snapshot of this diverse relationship and is divided into three significant parts. After the introductory chapter, which covers development partnership, the first part focuses on development and environment, particularly marine resources and its implications for QUAD partnership, human security issues in northeast India focusing on connectivity, disaster risk reduction, and critical rare earth elements. All these issues are strongly related to India–Japan bilateral collaboration and are part of the first pillar of environment and development.

The second part focuses on industry and innovation. Here, there are seven chapters on diverse issues of industry and innovation. The part starts with the MSMEs (micro, small, and medium enterprises), which emphasize on the immense potential of collaboration between the two countries. The following two chapters draw attention to the collaboration in energy sectors, the first on generic aspects of energy collaboration and the next on Hydrogen energy collaboration. Vaccine diplomacy and innovation are emerging areas of significance. The following three chapters focus on IT (information technology), social innovation, and agriculture technology.

The third part addresses yet another important pillar of this relationship, culture and people. Starting with a chapter on Yoga, the section has chapters on edu-tech, focusing on education and XR (extended reality, like virtual reality and augmented reality) as future education and learning tools and collaboration between the two countries. An analysis of youth voices is also provided for future potential collaboration. Finally, the potential of higher education, which can pave the way to people-to-people solid connectivity, is discussed.

As mentioned before, there is immense potential for India–Japan collaboration. The current book only provides a limited sample of the diverse issues under three parts. However, we believe that it would enhance the future scope of research and development in this field. We will be glad if the readers find the book useful.

Fujisawa, Japan — Rajib Shaw
New Delhi, India — Srabani Roy Choudhury

About This Book

The relationship between India and Japan had advanced at a faster speed than ever before. The Significant development of India–Japan strategic partnership, convergence of bilateral strategies, infrastructure development, human resource needs, broader economic relations and cultural dimensions signify that bilateral relations have entered into a "new era in Japan–India relations." With the global geo-political context, the relation has become more tighter, closer and strategic. While diplomatic relation is getting stronger, it is also important to strengthen the human security dimensions of the two countries, which include environment, development, disaster risk reduction, climate change issues as well as innovation and resilience building. Keeping this in mind, this book covers the broader aspects of human security dimensions of India–Japan collaboration. The book includes in-depth reviews as well as new data, based on case studies from India and Japan, involving multi and transdisciplinary research. Finally, the book suggests specific policy and action measure to enhance human security through bilateral cooperation of India and Japan, which has a global impact.

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India-Japan: Developmental Partnership for Bridging Divides

Titli Basu

Abstract While India-Japan Special Strategic and Global Partnership is positioning itself as a stabilizing force in the Indo-Pacific amid contested values, ideologies and rules- based order, this bilateral partnership has succeeded in incubating innovative ideas and translating them into strategic solutions in the post-Covid world. As India is increasingly framed in the narrative of G3 anchored on its demographic dividend, technological and economic prowess, Japan is playing a pivotal role in economic modernization of India. This chapter especially analyses the contribution of this strategic partnership on 3Ds or three verticals including (a) developmental aid (b) digitalization and (c) decarbonization not just at the bilateral level but also at the regional and global level.

Keywords India-Japan · FOIP · Developmental aid · Digitalization · Decarbonization

1 Introduction

In pursuit of a rules-based order, India-Japan "Special Strategic and Global Partnership" has positioned itself as a stabilizing force in the Free and Open Indo-Pacific (FOIP) amid fiercely contested norms and narratives, values and ideologies. Rise of China has engineered a power disequilibrium between Beijing and Washington at the global level, and Beijing and its Asian neighbours at the regional level. Amid a fragmented international system and power structures, Tokyo and Delhi alongside like-minded partners including the US, Australia and Europe especially France and the UK has succeeded in incubating innovative ideas and translating them into policy solutions in the Indo-Pacific. As Prime Minister Shinzo Abe's strategic rationale of

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the 'Confluence of the two Seas' (as argued in the Indian Parliament in 2007)[1] influenced the conceptualization of a FOIP, and further operationalization of his vision of a 'Strategic Security Diamond'[2] into today's Quad, Japan has taken the lead in advancing universal value-based constructs as an important pillar of its grand strategy. India as the biggest democracy, aligned well with Tokyo's value-based diplomacy.

Adapting and aligning with the shifting geopolitics and geo-economics of the Indo-Pacific with increasing intensification of US-China strategic competition, Russian invasion of Ukraine, Israel-Hamas conflict in Gaza in addition to recovering from the seismic shocks of a global pandemic has presented monumental challenges to policy elites across the Indo-Pacific. Delhi and Tokyo have not been bystanders and instead demonstrated political resolve, both individually and bilaterally, in not only envisaging but delivering tangible policy solutions within the frame of the India-Japan Indo-Pacific Vision 2025. The strategic maturity and mutual trust in the India-Japan relations has laid the groundwork to elevate and extend this bilateral into various trilaterals including India-Japan-US, India-Japan-Australia, India-Japan-France and so on in addition to the Quad.

While there are diverging policy positions on a few critical issues- whether it is Tokyo and Delhi's respective strategic thinking on traditional security alliances or response to the Ukraine crisis or the geoeconomics of mega-free trade agreements including the Regional Comprehensive Economic Partnership (RCEP) or the Osaka Track on Data Free Flow with Trust (DFFT)- however, mutuality of strategic interests in the larger Indo-Pacific stratagem has outweighed these divergences between India and Japan. This is demonstrated in various frameworks beyond bilateralism including the India-Japan-Australia Resilience Supply Chain Initiatives (RSCI), Quad's Indo-Pacific Partnership for Maritime Domain Awareness (IPMDA) or Semiconductor Initiative or Quad Investors Network (QUIN), co-opting with India's Indo-Pacific Ocean's Initiative (IPOI) or the International Solar Alliance.

2 Strategic Rationale

While Japan's post-war treaty alliance with the US constitutes the core of Tokyo's grand strategy, China's ascendency, erosion of US regional primacy and complex challenges in the alliance management has led policy makers in Tokyo opt for internal and external balancing.[3] In this matrix, India is accorded space in Japan's National Security Strategies of 2013 and its recent revision in 2022. The India debate amongst

[1] Shinzo Abe, "Confluence of the Two Seas", Ministry of Foreign Affairs, August 22, 2007 https://www.mofa.go.jp/region/asia-paci/pmv0708/speech-2.html accessed on December 2, 2023.

[2] Shinzo Abe, "Asia's Democratic Security Diamond", Project Syndicate, December 27, 2012 https://www.project-syndicate.org/magazine/a-strategic-alliance-for-japan-and-india-by-shinzo-abe, accessed on December 2, 2023.

[3] Titli Basu, "Japan's Strategic Calculations: Constraints and Responses, IDSA Issue Brief, January 17, 2019 https://idsa.in/issuebrief/japan-strategic-calculations-titlibasu-18119, accessed on December 2, 2023.

Japanese strategic community and the academics often decodes the rising significance of Delhi amid shifting geopolitical dynamics. There is a school of thought which analyze India through the prism of rise of China. India is often weighed as an important leverage vis-à-vis Beijing. Moreover, there is a strand of scholarship which argued Japan's inability to comprehend the diplomatic weight of India without the "China factor".[4] Others have articulated that for Japan, "close cooperation with India is desirable against the backdrop of declining U.S. power in Asia vis-à-vis China".[5]

Beyond the institutionalisation of the annual Leaders' Summit, Foreign Minister's Strategic Dialogue, Defence Ministerial Dialogue, 2 + 2 Ministerial Meetings complemented by a series of bilateral and multilateral exercises across three services including the JIMEX, Malabar and La Perouse Exercises, Coast Guard Exercises and Dharma Guardian Exercises, India-Japan strategic partnership has invested in deepening the latitude of interoperability. Moreover, India has featured in their discussion concerning "Strategy on Defence Production and Technological Bases" alongside the US, the UK, France, Australia and Southeast Asia. As Tokyo enunciated "Three Principles on Transfer of Defence Equipment and Technology" in 2014, Delhi has explored the prospects of cooperation under its Make in India initiative and invited Japanese companies to participate in the defence corridors and ecosystem. However, interplay of complex variables like cost-competitiveness, technology transfer and domestic politics often presents colossal challenges for the policymakers. While technology collaboration in terms of robotics and Unmanned Ground Vehicle (UAVs) have paved the way for future defence technology cooperation and export of naval ship communication antennas to India is in the offing, taking the long view, stakeholders will have to invest greater energy in deepening understanding about each other's defence sector, and most importantly grasp the nuanced cultural distinctions. While dealing with Tokyo, it is important to understand that for Tokyo defence equipment and technology cooperation is beyond simple arms trade, and it features as a subset of Japan's vision and ambition to support 'Proactive Contribution to Peace'.[6]

While one school of thought argues that the variable of centuries old spiritual rapport and civilizational linkages facilitates India-Japan relation, international relations however dictate that one of the key reasons for Delhi to feature as a rational choice for Tokyo since the early 2000s is owing to Washington's shifting interest and attitude towards Delhi as a stabilising power in the Asia–Pacific. As Washington's net assessment started factoring in the vitality of India, US-Japan 2+2 Security Consultative Committee debates and discussions since the middle of 2000s has forcefully argued the case of cultivating 'India as a strong and enduring Asia–Pacific

[4] Toru Ito, "China Threat Theory in Indo-Japan Relations", in "India-Japan Relations in Emerging Asia" eds. Takenori Horimoto and Lalima Varma, Manohar 2013 pg-116.

[5] Takenori Horimoto, "Japan-India Rapprochement and Its Future Issues", JIIA Japan's Diplomacy Series, Japan Digital Library 2016 http://www2.jiia.or.jp/en/pdf/digital_library/japan_s_diplomacy/160411_Takenori_Horimoto.pdf.

[6] Titli Basu, "A Review of India-Japan Defence Technology Cooperation", IDSA Comment, August 31, 2018. https://idsa.in/idsacomments/india-japan-defence-technology-cooperation-tbasu-310818, accessed on December 2, 2023.

partner'[7] and supported India's increasing involvement in regional architectures. India, anchored at the heart of the Indian Ocean constitutes a key strategic and economic theatre, playing a pivotal role in hosting critical maritime chokepoints and highways transporting trillions of dollars' worth of trade and energy. The potency of Indian naval power and the geostrategic importance of the Andaman and Nicobar Joint Services Command in gaining an edge in the maritime great game is not lost on Japanese defence planner. India has a credible reputation in securing critical Sea Lanes of Communication (SLOC) as a "public good". Moreover, India has raised its trustworthiness as a reliable partner following the 1999 M/V Alondra Rainbow piracy incident despite hostile geopolitical pressures following the nuclear tests. As a traditional US security treaty ally, Japan adjusted its India policy since the early 2000s once the US Defence of Department recognised India as an trusted partner. Since 2009, Washington started analysing Delhi as a "net security provider" as articulated by Defence Secretary during the Shangri-La dialogue. As an extension of this strategic mutuality, US-Japan has urged advancing trilateral frameworks of engagement with India, which gradually matured from the director- generals level to the high-powered US-Japan-India ministerial trilateral in 2015.

As Delhi is increasingly framed in the Japanese narrative of G3[8] (US, China and India), as opposed to the Chinese narrative of G2, anchored on India's strategic maritime geography, demographic dividend, technological and economic prowess, Japan is performing a consequential role in the economic modernization of India as well as pushing UN's Sustainable Development Goals. Mapping India's economic prowess and emerging technological clout positions it at the heart of international politics. India aspires to be the third largest economy with a target of $5 trillion by 2027 and a $7 trillion by 2030. Culling out the trends in the IMF, World Bank and OECD projections, growth is estimated to remain robust, essentially driven by investment and services. IMF World Economic Outlook projects India to grow at 6.5 percent in 2024 and 2025 even as the global growth is likely to remain at 3.1 percent in 2024 and 3.2 percent in 2025. Meanwhile OECD projects India to grow at 6.2% in 2024.[9] Furthermore, World Bank's Global Economic Prospects has indicated that India is likely to maintain one of the fastest growth rate among global economies, edging up to 6.4 percent in 2024–25 and 6.5 percent in 2025–26.[10] Meanwhile,

[7] "Toward a Deeper and Broader US-Japan Alliance: Building on 50 Years of Partnership", Joint Statement of the Security Consultative Committee, by Secretary of State Clinton Secretary of Defense Gates Minister for Foreign Affairs Matsumoto Minister of Defense Itazawa, 21 June 2011, p. 5, available at http://www.mofa.go.jp/region/n-america/US/security/pdfs/ joint1106_01.pdf, accessed on 02 January 2024.

[8] Masafumi Ishii, "The lessons of the Ukraine war for the Indo-Pacific Region: a preview of, rather than a change in, what we will face in 10-15 years", JIIA, August 31, 2022, https://www.jiia.or.jp/en/ajiss_commentary/the-lessons-of-the-ukraine-war-for-the-indo-pacific-region.html accessed on December 2, 2023.

[9] "OECD Economic Outlook", Interim Report February 2024, OECD, https://www.oecd.org/economic-outlook/february-2024/ accessed on March 19, 2022.

[10] "Global Economic Prospects" World Bank, January 2024. https://openknowledge.worldbank.org/server/api/core/bitstreams/7fe97e0a-52c5-4655-9207-c176eb9fb66a/content accessed on January 21, 2024.

according to UN data, India has outpaced China in population with a huge youth demographic dividend constituting around 66 percent of the population below the age of 35. India's potential to consolidate its position as the global digital technology hub and become a skill-intensive digital talent nation is real. India has the third largest start-up ecosystem globally. It has emerged as one of the largest exporters of IT services globally. India has recently caught global attention with its successful lunar missions, quantum mission, integration of AI across various sectors and boasting one of the fastest 5G rollout programmes. In 2023, India featured 40th in the Global Innovation Index as well as the Global Competitiveness Index.

As India's rise in the global power structure is inevitable, Japan has emerged as one of the most trusted partners in the nation-building process. As India aspires to become a leading power in a multi-polar world, Japan emerged as an invaluable source for high-technology, investments and capital for infrastructure. This chapter critically analyses the intersection of policies and contribution of India-Japan Special Strategic and Global Partnership on 3Ds or three verticals including (a) developmental aid (b) digitalization and (c) decarbonization not just at the bilateral level but also at the regional and global geometries.

3 Decoding Developmental Aid

Driving India's journey through the 'Amrit Kaal' with the aim of realising an 'Atmanirbhar Bharat' is contingent on massive investments, infrastructure and developmental aid. On these three verticals Japan is proving to be an indispensable partner in the India story. India has not only emerged as the biggest beneficiary of Japan's ODA in the last decade, the aid is employed strategically, keeping it aligned with not only Japan's FOIP Vision and Development Cooperation Charter as revised in 2023 but also the 2030 Agenda for Sustainable Development. Sectoral analysis reflects that Japanese ODA towards India in 2021–2022 focussed mostly on economic infrastructure, with transportation sector accounting for 68.1 percent, water and sanitation accounting for 11.9 percent and healthcare accounting for 14.6 percent. Moreover, between 2011–2020, transport sector received around 66.2 percent of the ODA.[11] Interestingly, this aligns with the priorities of disbursements by ADB. In addition to compliance with OECD-DAC aid strategy, Japan has consistently argued the case of advancing quality growth and employing aid strategically not just in the revised Development Cooperation Charter but also in the 2022 National Security Strategy. Developmental aid, often constituting of loan, grant aid and technical assistance, serves as an important geo-economic instrument in leveraging strategic competition and expanding geopolitical influence. However, the politics of aid strategy is anchored as much on advancing trade and investment priorities of donors as on their

[11] Saito Mitsunori, "JICA's Policy In East India Development Opportunities And Challenges", JIIA, September 28, 2021. https://www.jica.go.jp/Resource/india/english/office/others/c8h0vm000009ylo4c-att/presentations_31.pdf accessed on January 21, 2024.

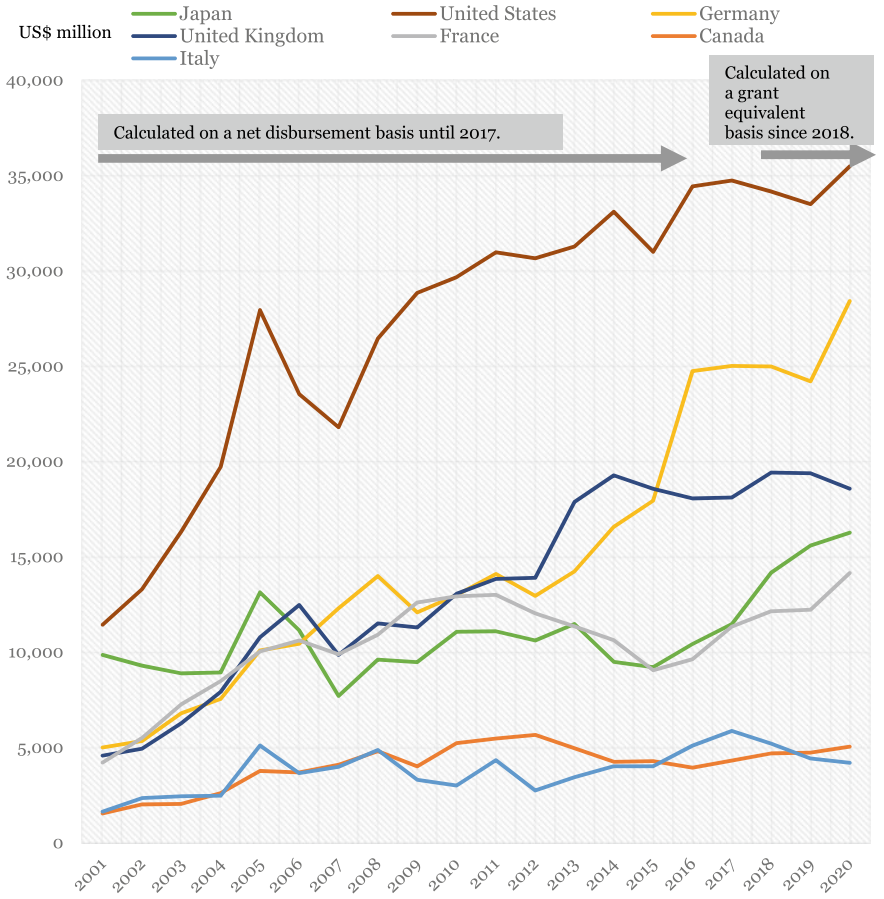


Fig. 1 ODA of DAC countries. White Paper on Development Cooperation 2022, Ministry of Foreign Affairs Japan

strategic ambitions. While Japanese ODA to Asia went southward over the decades, Asia still received 59.1 percent of the ODA in 2021 (Figs. 1 and 2).

Japan's development aid has performed a substantive role in advancing Prime Minister Modi's flagship programmes including the 'Make in India' initiative, 'Skill India', 'Digital India', 'Start-up India' and 'Smart Cities'. In this regard, Japan, being an international norm-setter in high quality infrastructure, has accorded priority to it in its development aid. Asian Development Bank (ADB) has projected that developing Asia requires US $26 trillion from 2016–2030.[12] This estimate has is

[12] "Meeting Asia's Infrastructure Needs", ADB, February 2017. https://www.adb.org/publications/asia-infrastructure-needs#:~:text=investment%20and%20development.-,Developing%20Asia%20will%20need%20to%20invest%20%241.7%20trillion%20per%20year,to%20%24250%20billion%20by%202020 accessed on March 19, 2022.

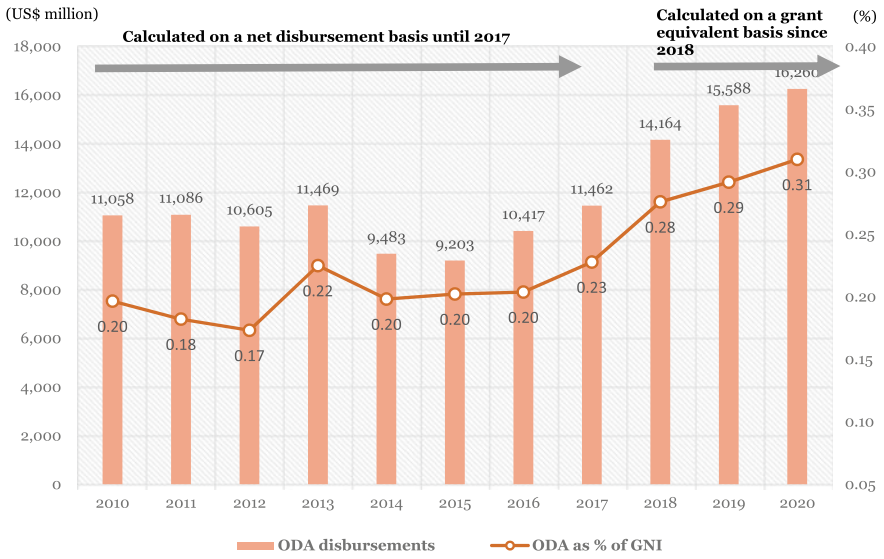


Fig. 2 Japanese ODA and percentage of GNI. *Source* White Paper on Development Cooperation 2022, Ministry of Foreign Affairs Japan

more than double since the 2009 assessment projecting US$ 750 billion annual investment.[13] India's NITI Aayog projects India to be a US$ 7 trillion economy by the next decade and in order to propel this economic story, there is imperative to build world class infrastructure that can foster manufacturing hubs and plug India into the global value chains (GVC). India's participation in the GVC, according to the Asian Infrastructure Investment Bank statistics, remains 7.4 percent below the average rate for emerging economies.[14] India's effective participation in regional and global value chains will be determined by improved infrastructure, connectivity, productivity and competitiveness (Figs. 3 and 4).

India's Economic Survey estimates that in infrastructure, we need to expend approximately US$ 1.4 trillion. Even though governments in their national budgets accord importance to infrastructure, for instance, India allocates 3.3 percent of GDP to infrastructure sector in 2024[15] especially focussing on transport and logistics, there remains a considerable gulf between the actual and the desired investment.

[13] "Meeting Asia's Infrastructure Needs", Asia Development Bank, February 2017 at https://www.adb.org/publications/asia-infrastructure-needs accessed on March 19, 2022.

[14] "Asian Infrastructure Finance 2021: Sustaining Global Value Chains", Asian Infrastructure Investment Bank, 2021, https://www.aiib.org/en/news-events/asian-infrastructure-finance/2021/introduction/index.html accessed on March 19, 2022.

[15] "Interim Union Budget 2024: What are expectations of players in infrastructure sector?" Economic Times, January 11, 2024. https://government.economictimes.indiatimes.com/news/smart-infra/interim-union-budget-2024-what-are-the-expectations-of-the-players-in-infrastructure-sector/106729939# accessed on March 19, 2022.

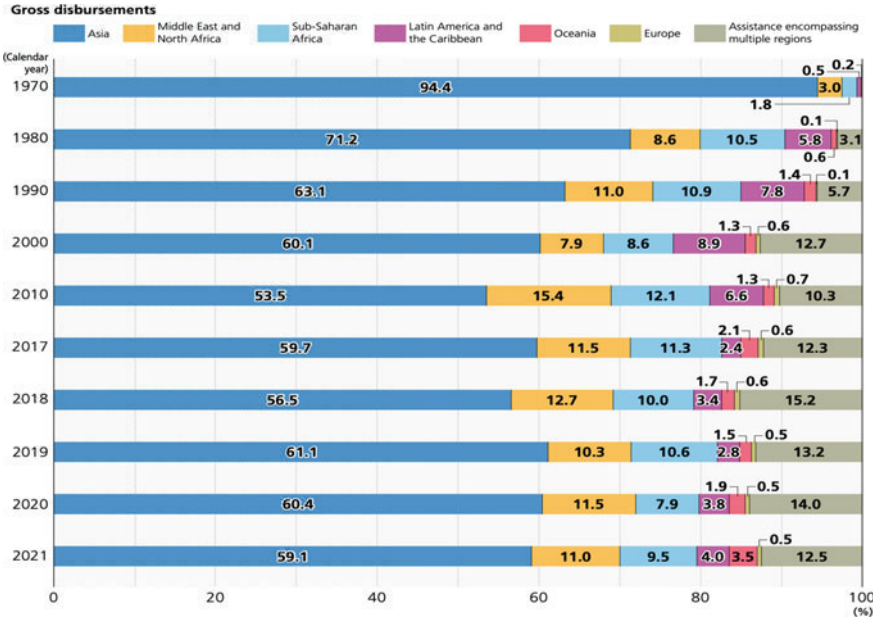


Fig. 3 Japan's ODA by region. *Source* OECD database, December 2022; White Paper on Development Cooperation 2022, Ministry of Foreign Affairs Japan

Fig. 4 ODA loan commitment towards India in the last decade. (2009/10–2021/22). *Source*: Japan International Cooperation Agency[16]

[16] "JICA Operations and Activities in India", JICA, 2020–2021. https://www.jica.go.jp/Resource/india/english/office/others/c8h0vm00004cesxi-att/brochure_24.pdf accessed on March 19, 2022.

Here, multilateral development banks and bilateral aid doners remain as an important source to bridge the infrastructure financing gap. India features as the front runner in borrowing from multilateral development banks. With regard to bilateral development aid, Tokyo is positioned as the leading donor.

As Ministry of foreign Affairs underscores, Tokyo's branding of quality infrastructure is anchored on five principles including: mobilising resources via public–private partnerships; synergising with development priorities of developing economies; advancing global standards of environmental principles; supporting quality infrastructure through low life-cycle cost, resilience and inclusiveness; and complimenting and supporting the local economy.[17] Japan's "Infrastructure System Overseas Promotion Strategy (2021–2025)" is also aligned with the policy objectives of FOIP, SDGs and advances carbon neutrality and digital transformation.

In case of Japan, exporting infrastructure enables the dual goals of generating new growth engines geared towards revitalising the domestic economy as well as reinforcing strategic relations with the Indo-Pacific stakeholders and advancing regional influence. Tokyo aligns it with their pitch for "Partnership for Quality Infrastructure" (PQI) whose latitude subsequently expanded to become the "Expanded Partnership for Quality Infrastructure" (EPQI). The larger aim is to complement the bilateral support through Japan International Cooperation Agency (JICA) and Japan Bank for International Cooperation (JBIC) with multilateral pledges through the ADB, as a smart policy for building high-quality infrastructure. The "ADB Strategy 2030" also underlines that "ADB will play an important role in supporting the global agenda of infrastructure development as a source of global growth … ADB will promote quality infrastructure investments that are green, sustainable, resilient, and inclusive."[18]

Role of Japanese developmental assistance in India's mega-infrastructure projects, for instance the Mumbai–Ahmedabad High-Speed Rail, Industrial Corridors between Delhi and Mumbai, and Chennai and Bengaluru, Dedicated Freight Corridor and urban mass rapid transport systems, especially Delhi Metro has proved to be a force multiplier in India's growth story. But what has made Japan different from other doners is its commitment to prioritise the strategic peripheries of India including the Northeast and Andaman and Nicobar Islands in its development assistance matrix. Additionally, Japan has co-opted in Delhi's regional and global infrastructure and connectivity endeavours, including the Indo-Pacific Oceans Initiative (IPOI) and the Coalition for Disaster-Resilient Infrastructure (CDRI).

In the Northeast, which is often considered as a strategic connect between India and Southeast Asian economies over Bay of Bengal, Tokyo's development assistance is productively contributing in reimagining connectivity by pursuing a "triple

[17] "'Quality Infrastructure Investment' Casebook", Ministry of Foreign Affairs, https://www.mofa.go.jp/files/000095681.pdf accessed on March 19, 2022.

[18] "ADB Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific", Asia Development Bank, July 2018 at https://www.adb.org/sites/default/files/institutional-document/435391/strategy-2030-main-document.pdf, accessed on March 19, 2022.

I" strategy advancing infrastructure, investment, and industrial value chains.[19] The primary objective is to build economic corridors, drive competitiveness, increase productivity and achieve inclusive growth. As India is imbibing global best practices, Tokyo remains a trusted ally as is demonstrated by the fact that the existing ODA projects in the Northeast stands at ¥ 246 billion. In this context, the role of the Act East Forum as an institutional anchor remains effective. Japanese ODA's contribution in the Northeast is not just confined to infrastructure projects but equal attention is accorded to strengthening people-to-people connect, promoting skill development, capacity building and bio-diversity projects.

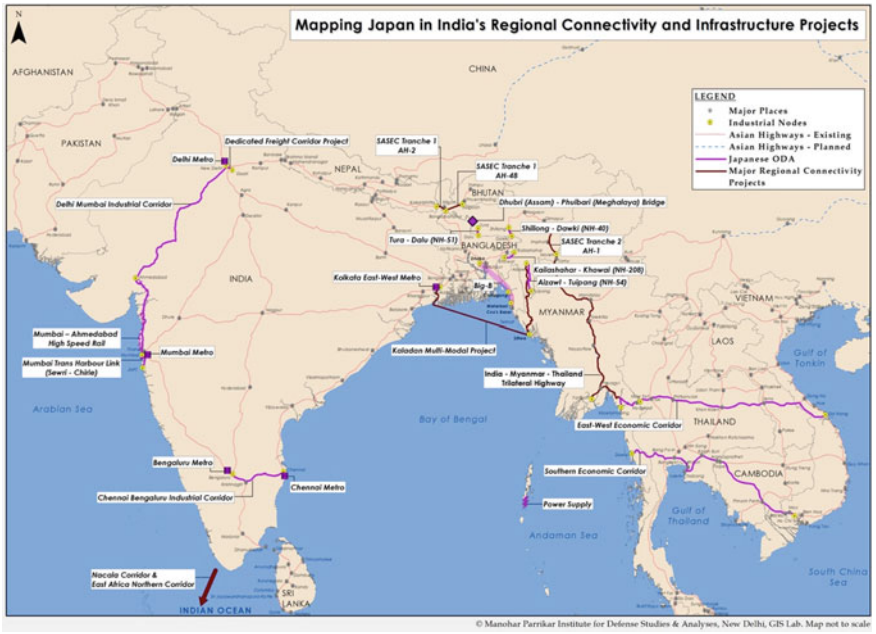
As India envisions new economic corridors and aspires to develop robust economic integration between its Northeast region and Southeast and East Asia, "connecting the connectivities", that is leveraging the existing and ongoing cross-border infrastructure corridors is vitally important. For example, connecting Japan's "Big-B project" in Bangladesh with India's "Northeast Road Connectivity Improvement" projects has led to the conception of the latest "Bay of Bengal-Northeast India industrial value chain" project, making full use of the Matarbari deep sea port. Moreover, creating further synergy with existing regional connectivity initiatives such as the BBIN, SASEC, Asian Highways, Trilateral Highway, ASEAN Connectivity, and Japan's own Economic Corridors in Southeast Asia will prove to be a force-multiplier.[20] Japan's ODA has played a pivotal role in driving Indian's productivity, competitiveness, economic growth and employment (Map 1).

4 Digitalisation as a Transformative Force

In the age of fourth industrial revolution and digital economy, it is vitally important to be at the fore front of high-technology which has the transformative power in empowering knowledge-based economies. Since high-technology today is as much a part of geopolitics as it is about geo-economics and determines national power, countries are doubling down on fostering secure supply chains bilaterally and also within trilateral and Quad frames. Japan as a global leader in innovation has conceptualised Society 5.0 as a policy goal prioritising digital technologies, AI, Block Chain and Internet of Things. In this regard, India is leveraging its relation with Japan in fostering high-tech cooperation prioritising ICT products, AI, and cyber. In 2018, the bilateral Digital Partnership was launched prioritising digital information and communication technologies. The Digital Partnership is further buttressed by the Start-Up ecosystem, and NASSCOM and JETRO are deepening cooperation and connecting the start-ups and technology firms with venture capitalists in Japan.

[19] Titli Basu, "India and Japan: Connecting the Connectivities in the Bay of Bengal", The Diplomat, August 16, 2023. https://thediplomat.com/2023/08/india-and-japan-connecting-the-connectivities-in-the-bay-of-bengal/ accessed on March 19, 2022.

[20] Ibid.



Map 1 Japan in India's Northeast: The Indo-Pacific Connect, IDSA Comment, April 19, 2022 *Source* Titli Basu[21]

The "Memorandum of Understanding in ICT" has buttressed partnership particularly in 5G, telecom security, and building submarine optical fibre cable. Tokyo's international competitiveness in submarine cable infrastructure gives Japanese companies an edge in supporting the "Digital India" initiative. Japanese company NEC has played a pivotal part in linking the Andaman and Nicobar with Chennai as well as Kochi and the Lakshadweep Islands. Japan is also in the lead in advancing communication networks across Asia especially in Southeast Asia. 5G has emerged as a fierce battleground amongst great powers. For instance, Japanese Guidelines on IT products and services procurement has underscored the importance of remaining vigilant on cyber-security and supply-chain risks without alluding to threats coming from China. Tokyo has created tax-incentives to stimulate investment in building safe 5G supply-chain. NTT and NEC are taking the lead in building 5G alliance. There is an urgent need to cooperate, tapping into the strengths and weaknesses in various facets of innovation and designing robust telecom supply chain. Here, India and Japan have opportunities to join forces in Open Radio Access Network (O-RAN) technology. For instance, Japanese company Rakuten's 5G network has cooperated with Sterlite Technologies and HCL, Wipro, and Tech Mahindra for hardware and software respectively.

[21] "Japan in India's Northeast: The Indo-Pacific Connect", IDSA Comment, April 19, 2022. https://idsa.in/idsacomments/japan-in-indias-northeast-the-indo-pacific-tbasu-190422, accessed on March 10, 2024.

The 2023 Memorandum of Cooperation (MoC) on the Semiconductor Supply Chain Partnership[22] is yet another pillar on which India-Japan strategic partnership will hinge since digital economies rely on semiconductors. The MoC is geared towards deepening G2G and B2B cooperation on the verticals of design, R&D, and building secure supply chain. Anchored on the bilateral Digital Partnership, complemented by the India-Japan Industrial Competitiveness Partnership (IJICP) formed in 2019, the recent Semiconductor Supply Chain Partnership will expand the strategic latitude of cooperation in the electronics ecosystem.

5 Driving Decarbonisation

Responsible economies, aligned with the targets of Paris Agreement, are employing policies towards realising the goal of net zero emissions. India and Japan being amongst the top five emitters of carbon dioxide, aims to realise net-zero status by 2070 and 2050 respectively. IEA estimates that in order to realise the net zero target by 2070, annually $160 billion is required till 2030 and thus accessing low cost long term capital is vital. To steer innovation geared towards uplifting millions of people out of poverty, India has launched 'National Hydrogen Mission', 'Green Hydrogen' and 'Green Ammonia Policy'. As India pushed for LIFE (Lifestyle for Environment) vision at G20, 2023–2024 budget has prioritised Green Growth. As decarbonisation is contingent on steady energy transition, India can be a beneficiary of Japan's Asia Energy Transition Initiative (AETI) which aims to realise sustainable development and carbon neutrality.

India's economic rise implies that energy demand will soar and low-carbon technologies have a market potential of $80 billion in by 2030.[23] Moving ahead, prioritising renewable batteries and green hydrogen will be important. Japan's low carbon technologies will be a force multiplier in India journey to develop and industrialize. Since hydrogen will define the future and has the potential to decarbonize both the power and non-power sectors, India-Japan cooperation on green hydrogen value chain from production to supply holds enormous potential. For instance, India's ACME Group dealing with renewable energy and Japan's IHI Corporation have signed an offtake term sheet enabling import of green hydrogen-based ammonia annually from Orissa to Japan from 2028. Private sector's participation in hydrogen production and hydrogen transport is the key. Japanese have a wealth of R&D experience over the last four decades on hydrogen, especially hydrogen stations and fuel cells and it has been one of the early movers into commercializing fuel cell co-generation system and fuel cell vehicles. Another sector where India-Japan

[22] "Cabinet approves Memorandum of Cooperation between India and Japan on Japan-India Semiconductor Supply Chain Partnership", Ministry of Electronics & IT, 25 Octoboer 2023, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1970784 accessed on March 19, 2022.

[23] Fatih Birol and Amitabh Kant, "India's clean energy transition is rapidly underway, benefiting the entire world", IEA, January 2022. https://www.iea.org/commentaries/india-s-clean-energy-transition-is-rapidly-underway-benefiting-the-entire-world accessed on March 19, 2022.

low-carbon cooperation is taking shape is in steel. As the 2nd and 3rd largest steel producers, India and Japan is reportedly considering employing specific technologies, possibly through Japanese project. In this context, exploring the possibility of mutual cooperation under "COURSE 50" will be useful.

"India-Japan Energy Dialogue" has culminated into "India-Japan Clean Energy Partnership" with the goal of fostering innovation and building resilient and trustworthy supply chains, especially focusing on EVs, batteries, charging infrastructure; carbon capture, utilization and storage; solar PV cells; clean coal technology, biofuels and strategic petroleum reserves. However, tapping into these opportunities and moving innovative technologies from research labs to factories to consumers will be contingent on the private sectors participation. The priority should be in R&D, tech-transfer, training, capacity building and low-cost financing.[24]

6 Road Ahead

As India-Japan further consolidates their strategic partnership in navigating the fluid balance of power and interests in the Indo-Pacific, Tokyo will continue to be an important stakeholder in building a strong India. As Prime Minister Modi aims to secure capital and technology to fuel the 'Atmanirbhar Bharat' vision, partnership with Japan, anchored on 3Ds of developmental aid, digitalisation, and decarbonisation, will be indispensable to making India a developed economy. While Japan has been a substantive contributor to key initiatives such as 'Make in India', 'Skill India', 'Digital India', 'Start-up India' and 'Smart cities', one issue area which needs greater focus in making this strategic arc most effective is deepening the people-to-people connect. Despite bipartisan support and the time tested political stability between these two Asian democracies as well as the 2nd and 3rd biggest economies, there is a huge deficit in the people-to-people connect when compared to Japan's relations with China.

Despite no historical baggage in the India-Japan relations, unlike the rocky China-Japan relations, the comparative figures, as reflected in Table 1, leaves a lot to be desired. Japan's people-to-people connect with India and China, both having comparable scale in demographics as well as market size, shows a contrasting frame. Japanese outreach in China, despite having major historical rifts and sovereignty issues often echoing intense nationalism within the domestic landscape of both countries and shaping the regional power balance, succeeded in fostering a very robust people-to-people relation. While successive annual JBIC survey features both India and China as top "promising countries for overseas business", but the above data reflects a huge gap between projection and reality. For instance, there has been a southward movement in the number of Japanese companies registered in India both

[24] "India-Japan Clean Energy Partnership", MEA, March 19, 2022. https://www.mea.gov.in/bilateral-documents.htm?dtl/34992/IndiaJapan_Clean_Energy_Partnership accessed on March 10, 2024.

Table 1 Japan's people-to-people connect with China and India

	Number of residents in Japan	Number of Japanese companies	Number of tourists visiting Japan	Bilateral trade with Japan
China	745,411 as in June 2021	31,324 as in October 2022	2,425,000 in 2023	$335.4 billion in 2022
India	43,886 as of December 2022	1400 in 2022	54,314 in 2022	$21.96 billion in 2022–23

Source Ministry of Foreign Affairs Japan and Indian Embassy in Japan[26]

in 2021 and 2022.[25] Going ahead, bridging this divide by employing enabling policies will be crucial in adding substantive depth and making India-Japan relation an enduring partnership.

[25] Japanese Business Establishments in India—2022, Embassy of Japan in India, https://www.in.emb-japan.go.jp/files/100353089.pdf accessed on March 10, 2024.

[26] "Japan–China Economic Relationship and China's Economy", MOFA, January 24, 2024. https://www.mofa.go.jp/files/100540401.pdf; "Japan–China Relations (Basic Data)", MOFA, July 6, 2023 https://www.mofa.go.jp/region/asia-paci/china/data.html; "Japan-India Relations (Basic Data)", MOFA, March 14, 2024 https://www.mofa.go.jp/region/asia-paci/india/data.html#:~:text=Japan%20and%20India%20signed%20a,countries%20have%20enjoyed%20cordial%20relations; Japanese Business Establishments in India—2022, Embassy of Japan in India, https://www.in.emb-japan.go.jp/files/100353089.pdf, accessed on March 10, 2024.

Development and Environment

Sustainable and Equitable Use of Mineral Resources: A QUAD Implication

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Abstract In the Indo-Pacific region, around two-thirds of the ocean lies in Areas Beyond National Jurisdiction (ABNJs), home to unique species and habitats critical to marine biodiversity. The biodiversity in ABNJ is in peril due to a patchwork of legislative frameworks. The loss of biodiversity in ABNJ impacts the ocean's ability to withstand climate change and offer resources vital for human life. It is hence essential to negotiate a secure mechanism to protect and further ABNJ governance and safeguard the marine environment and species while analyzing the impacts of human activities, creating capacity, transferring technology, and sharing the benefits of marine genetic resources equitably. This chapter will focus on sustainable and equitable use of mineral resources in QUAD region.

Keywords Indo Pacific · Resilience · Seabed mining · Mineral resources · QUAD countries

1 Introduction

The deep seabed is among one of the most unexplored regions on this planet, and is home to many species, and is the largest habitat on Earth (FAO Fisheries & Aquaculture 2021). With the discovery of deep-sea minerals, major countries have focused on promoting research and acquiring significant stakes in deep sea beds. The Indo-Pacific is one of the crucial zones that have been discussed internationally as the

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