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100 Days of TRUST and Trump: Policy Recommendations for the India-U.S. TRUST Initiative

Rudra Chaudhuri | Amlan Mohanty | Shruti Sharma | Tejas Bharadwaj | Konark Bhandari

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Carnegie Endowment for International Peace
Publications Department
1779 Massachusetts Avenue NW
Washington, D.C. 20036
P: + 1 202 483 7600
F: + 1 202 483 1840
CarnegieEndowment.org

Carnegie India
Unit C-4, C-5 & C-6, Edenpark,
Shaheed Jeet Singh Marg
New Delhi – 110016, India
P: +011 4008687
CarnegieIndia.org

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Introduction

In February 2025, India and the United States announced the Transforming the Relationship Utilizing Strategic Technology (TRUST) initiative in a joint statement, signaling a continued ambition to advance their partnership in tech cooperation under U.S. President Donald Trump's second term. As this administration completes a hundred days, the contours of this initiative are beginning to take shape.

This compendium analyzes the scope and strategic significance of the TRUST initiative and offers policy pathways that could define its trajectory. It consists of five chapters, drawing from discussions that took place at Carnegie India's Global Technology Summit 2025, co-hosted with the Ministry of External Affairs, Government of India.

The first chapter explains what the TRUST initiative is and provides context based on limited media coverage around the joint statement and, more importantly, conversations with officials, industry leaders, academics, and experts from February and April 2025.

The four chapters that follow each present a focused policy agenda for areas of cooperation highlighted under TRUST: artificial intelligence, pharmaceuticals, space cooperation, and semiconductors. Authored by Carnegie India's scholars, these chapters assess existing efforts, identify strategic opportunities, and outline concrete steps that policymakers in India and the United States can take to advance shared goals.

Built on strategic alignment, trusted supply chains, and co-developed innovation, TRUST holds promise as a lasting framework for coordination between India and the United States. This compendium is a contribution to that effort.

CHAPTER 1

What is the India–United States TRUST Initiative?

Rudra Chaudhuri

On February 13, 2025, Indian Prime Minister Narendra Modi and United States President Donald Trump met at the White House. Prime Minister Modi was on an official working visit to the United States.[1] A seven-page-long joint statement followed.[2] It covered a range of issue areas for cooperation: defense, trade and investment, energy security, technology and innovation, multilateral cooperation, and people-to-people cooperation. Importantly, the "leaders announced the launch of the U.S.-India TRUST (Transforming the Relationship Utilizing Strategic Technology) initiative."[3]

This essay explains what the TRUST initiative is, breaking down some of its key parts. It begins by providing a context for the TRUST initiative, which will need to be kept squarely in mind as officials and others in both countries work toward delivering on the initiative. This essay is based on the limited publications and news reports on and around the joint statement. Importantly, it is also based on conversations with officials, industry leaders, academics, and other experts from both countries between February and April 2025. Clearly, it's early days for the TRUST initiative, and the initiative is likely to expand in different ways as discussions get deeper and wider in the following months.

Context for the TRUST Initiative

"Nothing in the joint statement was easy, there were several lines that needed intense dialogue," argued one of the negotiators. "The part that was relatively easier was the section on technology," said another. What became clear was that the joint statement was designed to serve as the roadmap for cooperation and delivery. Time stamps were also embedded into the statement. The need for delivery in "this year"—in 2025—was mentioned five times across the different sections of the statement.[4]

To be clear, almost every discussion on the TRUST initiative is pegged to the commitments made in the joint statements. These are "to do's" that officials will need to justify to each other at regular intervals.

Both sides had committed to a "results-driven agenda with initial outcomes *this year* to demonstrate the level of trust for a mutually beneficial partnership."[5] It is abundantly clear that "delivery" is the operative moving term.[6] Subsequently, what has become clearer, especially to Indian officials and political leaders, is that the 3,054-word statement hinged in large part on a U.S-India Bilateral Trade Agreement (BTA).

What is also apparent is that amending the Indian Civil Liability for Nuclear Damage Act (CLNDA) and the Atomic Energy Act is of paramount importance to the White House as well as the Indian leaders.[7] If both sets of amendments can be made in this calendar year, it will open the pathway for genuine private sector participation in India's civil nuclear energy future. Several companies are lining up with well-calibrated pitches to sell reactors to India and embed new industry alliances. Trade and the CLNDA have been set up by the White House as a litmus test for the roadmap more broadly. The refrain amongst insiders is that "some things can move in parallel, and will need to, but these key issues will ultimately shade all else."[8] This context is critical.

One of the key pillars of the statement that is being negotiated in parallel is on and around the new India-U.S. TRUST initiative: transforming the relationship utilizing strategic technologies. The first India-U.S. Track 1.5 meeting on the TRUST initiative was hosted by Carnegie India in New Delhi in March 2025. A set of four other closed-door meetings on the initiative with Indian and U.S. officials, industry leaders, experts, and interlocutors took place in New Delhi and also at Carnegie India's Global Technology Summit in April 2025. Industry bodies have hosted several meetings too.[9] For most participants, India-U.S. strategic technology cooperation is hardly new.

This ecosystem, if it can be called that, has been part of forceful discussions over the last three years. They were designed to support the India-U.S. initiative on Critical and Emerging Technology (iCET), which was officially launched in January 2023 by National Security Advisors (NSAs) Ajit Doval and Jake Sullivan.[10] This was one of the hallmarks of the Biden administration. It was an initiative anchored by the respective NSAs. It committed officials on both sides to coordinate to deliver on a range of deals and outcomes, more successfully in semiconductors, defense, space, and in creating a formal dialogue process to discuss export controls.[11] It was less successful in seeding lines of cooperation in areas such as artificial intelligence, biotechnology, and quantum technology.[12]

In one sense, the baton for technology cooperation was not only picked up but also reimagined by the Trump administration, and Indian officials are ambitious about the TRUST initiative. As one official stated soon after the joint statement was published, "the Trump team went much further than we expected."[13] This sentiment for ambition is more than clear in interactions with American officials as well. "We want things done," is the chorus that echoes between Pennsylvania Avenue and Foggy Bottom.

The TRUST Initiative: Transforming the Relationship Utilizing Strategic Technology

The TRUST initiative is designed to "catalyze government-to-government, academia and private sector collaboration" with the intent to "promote application of critical and emerging technologies."[14] These include mutually inclusive verticals such as defense, AI, semiconductors, biotechnology, energy, and space. With the view to develop long-standing partnerships in these technology areas, there is equal attention given to "encouraging the use of verified technology vendors and ensuring sensitive technologies are protected."[15] This is key to U.S. officials.

One of the easier parts to negotiate in the joint statement was the segment on AI, officials from both sides claim.[16] There is a clear realization on both sides that the AI dialogue was one that was largely absent in the Biden years. The "Framework for Artificial Intelligence Diffusion" announced by the Biden administration just before it left office placed India in a second tier.[17] Restrictions were placed in this category of countries "on the total computing power they can import, unless that computing power is hosted in trusted and secure environments."[18]

For those in India, the analogy was simple. The idea of the iCET was to create a business class corridor for cooperation, but the diffusion rules placed India on the back of coach.[19] To be clear, this was a global framework. Those batting for India in the Biden White House lost this battle to a larger set of imperatives driving controls that were focused on China.

"As a central pillar of the TRUST initiative," President Trump and Prime Minister Modi have "put forward a U.S.-India Roadmap on Accelerating AI Infrastructure." This is to be created in the current calendar year. The aim is to mitigate frictions and create pathways "to enable industry partnerships and investments in next generation data centers … access to compute and processors for AI" without losing sight of "protection and controls necessary to protect these technologies." The work on the roadmap has already started, in advance of Vice President J. D. Vance's visit to India in April 2025.

There is a firm belief that a roadmap will need to be clearly articulated by the time President Trump is expected to come to India for a Quad Leaders' Summit in the last quarter of 2025. As mentioned above, the timelines for delivery are paramount in the TRUST initiative. There is an expectation that to enable such cooperation, the Framework for AI Diffusion will need to be reconsidered. There is also considerable domestic push within the United States to simplify the diffusion rule.[20]

As the loss of momentum on AI during the Biden years is being renegotiated under the TRUST initiative, so is the verve to do more on biopharma. There is a laser-sharp focus in the White House to "build trusted and resilient supply chains," a vision shared by Indian officials.[21] On pharmaceuticals, and as far as U.S. officials are concerned, the aim is twofold: to derisk the access to top active pharmaceutical ingredients (APIs) from China and encourage investments from Indian pharmaceutical companies into the United States. Discussions on where these land have started. The outcomes might need to be adjusted depending on how the discussions on creating a business case for both these propositions go.

Officials on both sides have clearly spent time to plug the gaps in the iCET and chart a course to go further in areas where early investments were made during the Biden years. The one area of continuation is clearly reflected in the launch of INDUS Innovation, "a new innovation bridge modelled after the successful INDUS-X platform."[22] The aim is to create an innovation ecosystem that will "advance U.S.-India industry and academic partnerships and foster investments in space, energy, and other emerging technologies."[23] To realize this potential, both sides have committed themselves to "review their respective arms transfer regulations."[24] This will be key from the Indian perspective.

Both sides have also bet on the INDUS-X initiative, which started during the Biden years.[25] There will be a summit sometime in 2025, possibly when the U.S. NSA is able to visit India. A trip scheduled for April 2025 was cancelled.[26] Expectedly, this is also when the TRUST initiative will be formally launched.

Conclusion

The motivation behind the TRUST initiative is to continue to grow the ecosystem for innovation and investments within secure supply chains between the United States and India. There is a much stronger drive to deliver on very specific outcomes on an elaborate and well-designed infrastructure roadmap for AI, pharma, nuclear cooperation, and other technology areas. The business-like approach, as seen thus far, is focused on making investments happen and clearing the pathway for the same in both countries. What's missing, to those on the outside, is the strategic articulation of where India stands in the imagination of the White House and in other government offices in Washington D.C. That both leaders share a unique connect is without doubt, as is the fact that both sides have moved at lightning speed to move the TRUST initiative and other parts of the roadmap.

Yet, for those in India, there was some comfort during the Biden years that while the India-U.S. ties were in themselves strategically beneficial, China played an important role in motivating officials to work overtime in clearing the path for the delivery of jet engines, semiconductor plants, and armed drones. The China argument, at least for the moment, is muted in the transactions highlighted above. Apart from the verve to derisk pharmaceutical supply chains from China, U.S. officials have gone out of their way to make clear that the TRUST initiative is about the bilateral relationship only.

The grammatical construct is to keep China out of this equation. In the end, whether the implicit or explicit articulation of the China factor, as it were, is important or not in the delivery of the initiative is yet to be seen.

Lastly, the iCET was clearly placed under the stewardship of the respective NSAs and their secretariats with the active support of the Ministry of External Affairs in India and the State Department in the United States. As yet, and at least in the public domain, there is nothing to suggest that this structure will remain. There is some discussion about the deputy NSAs leading this effort.[27] This would be a mistake. It would be safe to say that the TRUST initiative will require the trust of the fragmented bureaucracies in both countries. The NSAs leading this effort sends the much-needed signal that this unique initiative is backed directly by the principals who have given expression to their intent in the February joint statement. To this end, and with the view to galvanize the momentum for deliverables in this calendar year, the NSAs should meet soon and launch the TRUST initiative with partners across industry, academia, and think tanks.

CHAPTER 2

The U.S.-India Policy Roadmap on Accelerating AI Infrastructure

Rudra Chaudhuri and Amlan Mohanty

On February 13, 2025, Indian Prime Minister Narendra Modi and United States President Donald Trump met at the White House. Prime Minister Modi was on an official working visit to the United States. A seven-page-long joint statement followed. It covered a range of issue areas for cooperation: defense, trade and investment, energy security, technology and innovation, multilateral cooperation, and people-to-people cooperation. Importantly, the "leaders announced the launch of the U.S.-India TRUST (Transforming the Relationship Utilizing Strategic Technology) initiative."

A "central pillar" of the TRUST initiative, as highlighted in the joint statement, is a commitment by leaders on both sides to "work with U.S. and Indian private industry to put forward a U.S.-India Roadmap on Accelerating AI Infrastructure.[28] Three primary goals have been mentioned in relation to AI: (1) accelerating the build out of U.S.-origin AI infrastructure in India by enabling market access, industry partnerships and investments; (2) unlocking constraints in financing, building, powering, and connecting such infrastructure; (3) supporting the development of innovative AI models and applications.

On April 10, 2025, Carnegie India held a U.S.-India track 1.5 meeting with officials from both countries, industry representatives, lawyers, civil society, and experts to brainstorm a policy agenda to realize these goals. This was organized during Carnegie India's Global Technology Summit, co-hosted with the Indian Ministry of External Affairs. The takeaways are as follows.

Review of the AI Diffusion Rules

The predominant view in India is that the AI Diffusion Rules will constrain the ability of U.S. technology firms to build out their AI infrastructure in India and hamper their ability to develop AI models in the country—two key goals of the TRUST initiative.[29]

The Framework for Artificial Intelligence Diffusion, introduced towards the end of the Biden administration, placed India in "tier two" of the rules, limiting its ability to source computing power from the United States.[30]

According to an executive from a U.S.-based semiconductor firm, the cap of 50,000 graphics processing units (GPU) placed on the import of chips to India under the Diffusion Rules will soon be breached for two main reasons: (1) there is increasing demand for next-generation chips to run large-scale inferencing and agentic AI systems.[31] For these chips, export controls will kick in at a much lower threshold (roughly 17,000 GPUs); (2) the 7 percent cap on data centre deployments in a single country could impact the India investment plans of U.S. hyperscalers, particularly those with a significant in-country presence already.

Although the policy rationale for the Diffusion Rules remains sound—to address the trafficking of chips and offshoring of AI training infrastructure to adversarial countries—there was general agreement that the rules should be revised in light of the TRUST initiative.

Accordingly, the key recommendations to the Trump administration are as follows:

1. Rationalize the caps and classification system based on the target country's overall population, scale of AI adoption, and "friendliness" to the United States.

2. Simplify the regulatory requirements, since most relevant firms have implemented safeguards to prevent the trafficking of GPUs and offshoring of training infrastructure.

Reliable Power Supply for Data Centres

There is strong demand for cheap, reliable, and renewable energy to operate data centres in India. However, poor distribution channels, lack of diversity in power supply, and caps on green energy usage have created bottlenecks for U.S. firms.

Some participants suggested that India should develop its nuclear energy capacity using small modular reactors (SMRs) to complement other sources. However, the high cost and long gestation period of six to seven years render this strategy unfeasible for India in the near term.

Another issue raised was the risk to such critical infrastructure, given increasing cases of cyberattacks and physical damage to undersea cables in the Indo-Pacific.

Therefore, key recommendations on this issue under the TRUST framework are as follows:

1. Explore alternative energy sources (for example, geothermal) and develop dedicated zones with stable transmission to help augment data centre capacity in India.

2. Create new diplomatic channels for regulatory reform to increase the supply of reliable power and to encourage the use of green energy.

3. Connect U.S. natural gas suppliers with Indian customers and incentivise Bharat Heavy Electricals Limited (BHEL) to build transformers, which are in short supply.

4. Identify trusted vendors for the power sector to address security concerns, similar to the process followed in the telecom sector, which is currently under review.[32]

Open-Source Models for AI Adoption

Participants highlighted the importance of U.S.-origin open-weight AI models for India. The Indian government aims to increase AI adoption for socio-economic development, and open-source models play an important role in that respect. To be sure, a large number of developers in India are fine-tuning and building on top of open weight models using unique data collection layers. A growing number of India-built AI applications are being developed on top of such models.

It was therefore suggested that a joint statement be issued under the TRUST initiative, supporting the development and use of open-source models to increase AI adoption in India and maintain U.S. leadership in the development and diffusion of advanced AI models. There was also a strong view that export controls should not apply to open weight models. This could be formally articulated during the launch of the TRUST initiative, to reassure developers in India, encouraging them to build on top of trusted open-weight models, rather than relying on untrusted but accessible open-source models.

Data Governance for AI Development

Data governance emerged as another important issue across dimensions of data sharing and sovereignty. The lack of transparency from model developers in explaining their training datasets was identified as a lapse in AI governance. However, this must be balanced against the need to protect intellectual property and trade secrets to promote innovation. Rather than asking developers to disclose their training datasets, it was suggested that a certification system be created to evaluate the fairness or fitness of an AI system for a particular use case.

Industry representatives also highlighted concerns around proposed data localization norms in the Draft Digital Personal Data Protection Rules released by the Indian Ministry of Electronics and Information Technology (MeitY).[33] Rather than these data localization norms, the Indian government should increase access to federal datasets, as it proposes to do under the IndiaAI mission.[34]

Regulatory Roadblocks to AI Buildouts

Besides the AI Diffusion Rules, other regulatory obstacles to AI infrastructure development include taxation issues, approval delays, and telecom licensing rules. Further, as explained above, restrictions on cross-border data flows and a fragmented cybersecurity regulatory regime (for example, multiple incident reporting requirements) create friction for AI companies.

Key recommendations on this issue under the TRUST framework are as follows:

1. Set up a single-window clearance system for data centers and energy investments

2. Simplify the financial requirements to set up data centers in India and facilitate financing from public banks for high-end GPUs.

3. Encourage the U.S. Development Finance Corporation (DFC) and the National Telecommunications and Information Administration (NTIA) to finance such projects.

4. Create a venture capital network with the U.S. in India to finance data centres.

Conclusion

Overall, there remains a strong commitment on both sides to accelerate AI infrastructure development, adoption, and access. The key to doing so will be to unlock the constraints in relation to power, financing, and regulation. In particular, the AI Diffusion Rules will need to be simplified and rationalized, while retaining core security objectives. Strong support for open-source technologies will also help increase AI adoption.

The TRUST initiative provides a strong platform to discuss, review, and resolve these issues and encourages greater partnership between the two sides on AI policy.

CHAPTER 3

A Resilient Pharma Supply Chain

Shruti Sharma

> *On February 13, 2025, Indian Prime Minister Narendra Modi and United States President Donald Trump met at the White House. Prime Minister Modi was on an official working visit to the United States. A seven-page-long joint statement followed. It covered a range of issue areas for cooperation: defense, trade and investment, energy security, technology and innovation, multilateral cooperation, and people-to-people cooperation. Importantly, the "leaders announced the launch of the U.S.-India TRUST (Transforming the Relationship Utilizing Strategic Technology) initiative."*

This essay takes stock of the early momentum generated by the joint leaders' commitment to catalyze public and private investments in building Indian manufacturing capacity—both domestically and in the United States—for active pharmaceutical ingredients (APIs) for critical medicines.[35]

Given the strategic importance of pharmaceutical supply chains to the national security of both India and the United States, and their shared reliance on China for APIs and key starting materials, there is a compelling reason to deepen bilateral cooperation in the pharmaceutical sector. With India as the world's third-largest producer of medicines by volume and the United States as its largest healthcare market, aligning interests to build a resilient, diversified API ecosystem is both urgent and mutually beneficial.[36]

To discuss this, Carnegie India held a U.S.-India Track 1.5 dialogue during the 9th Global Technology Summit, co-hosted with the Ministry of External Affairs. The discussion brought together stakeholders from government, industry, philanthropic institutions, and the policy community to explore actionable pathways for long-term collaboration on building API supply chain resilience between the two nations.

Leverage Existing Infrastructure

Rather than duplicating manufacturing infrastructure in the United States, both countries should build on existing facilities and prioritize commercially viable strategies. Relocating API production to the United States would be time-intensive, drive up costs, and require government support through incentives such as subsidized land and talent development. In contrast, India offers a more cost-effective alternative, with established GMP (good manufacturing practices)- and FDA (U.S. Food and Drug Administration)-compliant manufacturing plants, affordable land, and a skilled workforce. In cases where manufacturing needs to relocate to the United States, the two countries should evaluate their complementary strengths and jointly select two or three priority products to begin production at existing pharmaceutical facilities in the United States. This pilot approach would help both governments identify the types of support needed for scaling future collaborations. Indian investments in U.S. manufacturing facilities should be strategically aimed at catering not just to the American market, but also to global demand.

Establish Clarity on Demand and Create Market Certainty

A demand estimation exercise led by governments, trusted third parties, or consultants is critical to guide Indian production toward the needs of the United States. To de-risk industry investments, both countries should explore advanced market commitments to provide a guaranteed market for manufactured products. This can either be done through government procurement, stockpile arrangements, offtake agreements where a U.S. firm agrees to purchase select APIs from an Indian manufacturer to assure companies, or a pharma-sector equivalent of the U.S.-India Security of Supply Arrangement (SOSA) to ensure supply continuity amid global disruptions.[37]

Build Enabling Infrastructure for API Collaboration

For meaningful India-U.S. research collaboration, it is essential to develop integrated industrial clusters with complete infrastructure—from raw material sourcing to utilities and logistics—to enable large-scale production. Parallelly, a robust research and policy ecosystem must be built by facilitating the presence of U.S. universities in India, promoting student mobility, and strengthening partnerships between academia and industry. Government support will play a vital role—subsidized access to land, utilities, and streamlined policies will ensure the timely market entry of products. Additionally, simplifying the environmental approval processes in both countries is critical. Together, these measures can serve as foundational infrastructure for a resilient India-U.S. pharmaceutical partnership, positioning them as a credible and competitive alternative to China.

Mobilize Funding to Compete With Predatory Pricing

As India and the U.S. work toward building robust, secure, and high-quality pharmaceutical supply chains, one of the biggest challenges remains the artificially low pricing from China. To address this, both nations should consider trade safeguards, minimum price mechanisms, or joint subsidy models to level the playing field. Innovative funding approaches, such as encouraging large equity funds to invest in India's pharmaceutical sector, can help offset the initial cost disadvantages incurred while setting up alternative supply chains. Additionally, public-private partnerships should be explored to enhance the co-development of technology and the collaborative manufacturing of products.

Harmonize Regulatory Frameworks

Regulatory misalignment remains one of the key barriers to deeper India-U.S. collaboration in API manufacturing. To enable smoother cooperation, both countries must work toward aligning their regulatory systems, policies, and approval processes. India can take steps to encourage more clinical trials through ethical review boards that offer expedited approvals. Additionally, the current three-tiered drug approval process—covering marketing, authorization, and import registration—should be restructured to run in parallel, rather than sequentially, to reduce delays. India should also seek permanent membership in the International Council for Harmonisation (ICH) to promote regulatory convergence and ensure the seamless movement of pharmaceuticals between the two nations.

Conclusion

As the TRUST initiative progresses and as India and the United States seek to secure pharmaceutical supply chains, efforts must focus on leveraging existing capabilities, aligning regulatory systems, and creating investment-friendly ecosystems. Instead of duplicating manufacturing infrastructure in the U.S., both countries should either build on India's cost-effective, FDA-compliant API manufacturing strengths or identify strategic points along the API supply chain where U.S. capabilities can enhance resilience and efficiency. A coordinated approach to demand forecasting and market assurance—through off-take agreements or advanced market commitments—will incentivize sustained supply. Robust academic and industrial R&D collaboration, aided by university partnerships and streamlined regulatory frameworks, will drive innovation. India's regulatory architecture must be modernized for global alignment, including faster clearances and streamlined processes. Finally, collaboration must move beyond APIs to strategically important therapeutic areas like oncology, peptides, diabetes, medical devices such as inhalers, and complex generics.

CHAPTER 4

In Space We TRUST: New Horizons

Tejas Bharadwaj

> *On February 13, 2025, Indian Prime Minister Narendra Modi and United States President Donald Trump met at the White House. Prime Minister Modi was on an official working visit to the United States. A seven-page-long joint statement followed. It covered a range of issue areas for cooperation: defense, trade and investment, energy security, technology and innovation, multilateral cooperation, and people-to-people cooperation. Importantly, the "leaders announced the launch of the U.S.-India TRUST (Transforming the Relationship Utilizing Strategic Technology) initiative."*

One of the key areas of collaboration under the TRUST initiative, as highlighted in the joint statement, was civil space cooperation.[38] The joint statement described 2025 as the pioneering year for both countries in civil space cooperation with the ISRO-NASA-AXIOM mission that will place Indian Astronauts aboard the International Space Station for the first time and the launch of the NASA-ISRO Synthetic Aperture Radar (NISAR) mission that will study changes to Earth's surface using L & S-band radars.[39] The leaders emphasized cooperation on human spaceflight missions, spaceflight safety, and working on emerging areas like planetary protection. Furthermore, there were commitments toward commercial space collaboration in areas like connectivity, advanced spaceflight, satellite and space launch systems, space sustainability, space tourism, and advanced space manufacturing. Finally, both leaders announced INDUS Innovation, replicated after the INDUS-X defense platform, to promote industry and academic participation in space.[40]

Following the leaders' statements, this essay will explore the potential opportunities for both countries to take civil space cooperation forward under the TRUST initiative.

New Horizons: What are the Opportunities?

Strengthening Human Spaceflight Cooperation

Both India and the United States have increasingly converged on human spaceflight cooperation in the last two years, aligning with their envisaged Gaganyaan and Bhartiya Antariksh Station and NASA Gateway programs, respectively.[41] With NASA's decision to build new space stations through private sector involvement, after the retirement of the International Space Station in 2030, the collaborative opportunities are aplenty for both countries in this area.[42] In 2024, both countries concluded the Strategic Framework for Human Spaceflight Cooperation to deepen interoperability and facilitate advanced training for ISRO astronauts at the NASA Johnson Space Centre.[43] Later in August, two Indian astronauts completed their initial training and familiarization sessions with various onboard systems and the spacecraft.[44] With ISRO successfully testing rendezvous, docking, and undocking capabilities with its SPADEX mission in March and April 2025, both countries can explore opportunities for performing a joint docking mission as well as a roadmap for ISRO's participation in the NASA Gateway Program, a commitment from their June 2024 statement.[45]

Moreover, for Indian space ecosystem to truly realize the value of investing in human spaceflight and space station to achieve socioeconomic goals, both NASA and ISRO could consider organizing a joint workshop on identifying various experiment opportunities aboard the International Space Station, end applications, and spinoff technologies, including unlocking commercial opportunities for both countries' private ecosystems to participate in such joint missions.

Collaboration on Spaceflight Safety and Planetary Protection

The leaders' joint statement expands to cover other collaborative areas of human spaceflight, such as spaceflight safety and planetary protection. Spaceflight safety encompasses the protection of astronauts and human crew module in all phases of space missions. The Office of Safety and Mission Assurance, which supervises spaceflight safety in all of NASA's programs, can consider setting up a working group with ISRO Human Space Flight Centre in Bengaluru to exchange expertise and standards on spaceflight safety.[46] Developing a common space safety standard for joint spaceflight missions will be pertinent for both countries to expand their coordination on any joint human spaceflight missions.

Planetary protection involves the protection of celestial bodies from contamination by Earth life and Earth from any alien contamination returned from these celestial bodies.[47] With the United States and India being parties to the Outer Space Treaty, collaboration on planetary protection will be a vital part of their international obligation to prevent harmful contamination of celestial bodies as well as Earth during spaceflights or sample returns from celestial bodies.[48] To this end, NASA's Office of Planetary Protection and Planetary Protection

Center of Excellence can work with ISRO to share expertise on infrastructure and validation technology to ensure spacecraft sterilization, cleanliness, and quarantine facilities.[49] Finally, both countries can look to set up a joint lab for planetary protection in view of its importance for joint human space flight missions as well as joint missions on sample returns from the Moon, Mars and asteroids in the future.

Unlocking the Potential of Earth Observation Through NISAR and Other Remote Sensing Programs

The NASA-ISRO Synthetic Aperture Radar (NISAR) mission, scheduled for launch in June 2025, offers an opportunity for both countries to leverage the rich datasets of Earth mapped by the dual radars.[50] Acknowledging the benefits, NASA conducted a workshop to raise awareness for its scientific community to leverage NISAR datasets and related funding opportunities in 2022.[51] Similarly, on April 29, 2025, ISRO's Space Application Centre (SAC), with IN-SPACe and New Space India Limited, has planned to organize a NISAR awareness workshop for Indian non-governmental entities "to inform, engage, and encourage" them to utilize NISAR's capabilities and datasets for technical and commercial opportunities to build Earth observation applications.[52] To expand on the workshops, both the U.S. Office of Space Commerce and the Indian Department of Space can release joint challenges under the newly proposed INDUS innovation to build applications, leveraging datasets from the NISAR mission. Furthermore, both the United States and India can look to build applications from NISAR datasets for other countries in the Indo-Pacific by roping in the private sector, complementing their vision for space under the Quad.[53] Finally, considering that Indian space startups and companies are rapidly advancing on their Earth observation capabilities like hyperspectral imagery, synthetic aperture radar, as well as edge computing and data fusion, both countries can explore possibilities of having the Indian private sector participate in programs like NASA's Commercial SmallSat Data Acquisition Program.[54] This will ensure access of market for many Indian space companies that have expanded or are looking to expand their footprint to the United States while enabling NASA and the United States to benefit from these Indian technological advancements in Earth observation.

Fostering Academic and Industrial Collaboration Through INDUS Innovation

Considering that the joint statements emphasized commercial space collaboration in connectivity, advanced spaceflight, satellite and space launch systems, space sustainability, space tourism, and advanced space manufacturing, these areas can be pursued under the newly announced INDUS Innovation. Replicating the INDUS-X, a defense innovation bridge that has led to several accelerators and academic and private sector collaborations between Indian and U.S. defense innovation ecosystems, the INDUS Innovation can serve as a space innovation bridge to foster commercial space collaboration in the aforementioned areas between both countries.[55]

Easing Restrictions on Exchange of Communication Between Indian and U.S. Companies Under the Same Holding

Both countries initiated the India-U.S. Strategic Trade Dialogue in 2023 to address long-standing barriers to strategic trade and technology and industrial cooperation, including in commercial and civil space sectors.[56] Currently, following India's space sector reforms in 2020, many Indian companies and startups are expanding to the United States. Amidst these developments, these Indian startups find it difficult to communicate or exchange information with their U.S. counterparts owing to International Traffic in Arms Regulations (ITAR) compliance. Such restrictions will curb technological collaboration between both countries' commercial space sectors, a goal envisioned by the leaders' joint statement. Pursuantly, the India-U.S. Strategic Trade Dialogue may look to address these concerns and ease restrictions on the exchange of communications between Indian and U.S. entities of the same holding company.

Conclusion

The India-U.S. civil space cooperation under the TRUST initiative represents opportunities for both countries to deepen their ties built on mutual trust and build technologies for a better future. Strengthening human spaceflight cooperation and collaborating on remote sensing programs and applications—not only for themselves but also for the world—will yield significant benefits and capacities for the global community to address global challenges. Most importantly, leveraging the respective private space sectors through the recently launched INDUS Innovation promises growth for both countries' space industries. Easing restrictions on the exchange of communications between Indian and U.S. companies of the same holding will catalyze commercial collaboration.

CHAPTER 5

Advancing Semiconductor Supply Chain Cooperation

Konark Bhandari

> *On February 13, 2025, Indian Prime Minister Narendra Modi and United States President Donald Trump met at the White House. Prime Minister Modi was on an official working visit to the United States. A seven-page-long joint statement followed. It covered a range of issue areas for cooperation: defense, trade and investment, energy security, technology and innovation, multilateral cooperation, and people-to-people cooperation. Importantly, the "leaders announced the launch of the U.S.-India TRUST (Transforming the Relationship Utilizing Strategic Technology) initiative."*

The leaders also committed, as part of the TRUST initiative, to build trusted and resilient supply chains, including for semiconductors and critical minerals. While the joint statement is lean in terms of its objectives for joint cooperation on semiconductor supply chains, that is understandably so, as India and the United States have already managed to make steady progress in this area over the years.

However, semiconductors were also an area of focus at Carnegie India's 9th Global Technology Summit, co-hosted with the Indian Ministry of External Affairs. Some key areas and threads that emerged during the discussions convened were as follows:

A Bilateral Trade Agreement Will Guide Future Cooperation

In the past few years, significant investments have been made in India's semiconductor ecosystem, jumpstarting the supply chain in the country. At the same time, the view here increasingly appears to be that while the U.S. CHIPS Act (along with the Indian semiconductor incentive scheme) did provide massive financial wherewithal for these firms to invest overseas in countries like India, it was not concurrently accompanied by a resolution

of longstanding trade issues. Since approximately 70–75 percent of U.S. semiconductor firms get their demand from overseas markets, addressing trade barriers/market access issues in such markets would be critical to further cooperation in the semiconductor industry.[57] Accordingly, American semiconductor firms would be keen to be able to sell to overseas markets such as India, for which, building facilities in India itself may be a better option, if the trade issues between both countries are resolved. Therefore, "friend-shoring" would likely remain a pillar of building resilient supply chains in semiconductors.Although some commentators have suggested that friend-shoring may have been relegated to the philosophy of a bygone era, the Trump administration appears not to have altogether dismissed it. Instead, it merely appears to have put guardrails around it in three forms:

1. Friend-shoring is okay, as long as it is premised on fair trading arrangements and does not lead to the withering away of the American industrial base;

2. The purpose of supply chain cooperation is to build "resilient" supply chains that are not contingent on having access to the lowest priced chips, and would accordingly be governed by being placed in "friendly" countries like India, and;

3. The Trump 2.0 administration is not "transactional" on China, as has been claimed many times. It is keen to decouple from Chinese supply chains, including in semiconductors. This is in contrast to Trump 1.0, where tariffs and export controls were imposed on Chinese entities as a way to reach a trade deal. Now, on the other hand, the key realization is that the American and Chinese systems are fundamentally incompatible, and any "re-shoring" of semiconductor supply chains from China is welcome. Whether it is re-shored to the U.S. or to friendly countries like India is secondary. During the GTS, it was pointed out that India ought to focus on legacy node chips—an area where the Chinese are rapidly gaining market share.

Accordingly, two key recommendations under the TRUST initiative are as follows:

1. The two countries must work to reach a bilateral trade agreement. Each country impacted by the U.S. "Liberation Day Tariffs" has opened up avenues to do so, and the window for India to reach its own deal with the U.S. will be narrow. However, it can be done. Here, Indian negotiators are believed to have arrived at a well-structured trade deal with their American counterparts.[58]

2. Negotiations must address non-tariff barriers as well. Discussions at the GTS suggested that India will also be asked to address the non-tariff barriers (NTBs) that were laid out in the U.S. Trade Representative (USTR) National Trade Estimate (NTE) Report on foreign trade barriers.[59] This report was issued just a day before the "Liberation Day Tariffs" of the Trump White House and provided significant information on the perceived NTBs concerning India. India may do well to at least look at these, which range from import licensing requirements for refurbished capital goods (often a key input into the semiconductor industry), to India's own

customs valuation criteria, alleged to have raised the export prices of American firms, as Indian customs authorities are stated to reject the declared customs value of a product.

Legacy Nodes Should Be an Area of Focus for India

When it comes to building leading-edge fabrication plants, it was pointed out that while India should keep taking "a bite of the apple," the real focus must be on legacy node chips, which do not require the considerable investment that leading-edge fabrication plants require. Here, the surge in capacity by Chinese firms over the last few years has been a cause for concern, with a report by the Peterson Institute for International Economics estimating a surge in Chinese production of legacy chips.[60]

Also, as an aside, it should be noted that the Trump administration has also simultaneously announced a Section 232 "national security" investigation under the Trade Expansion Act of 1962 to "determine the effects on the national security of imports of semiconductors and semiconductor manufacturing equipment (SME) and their derivative products."[61] Meaning that the U.S. Department of Commerce will undertake a review of not just the imports of semiconductors, but also the downstream products in the electronics supply chain that these semiconductors are used in, hinting at assessing concentration in semiconductor imports by the United States from certain countries. This could be a beneficial development for India, as the result of the investigation could lead to the imposition of "national security" tariffs on Chinese legacy chip exports, if an over-dependence on them is identified.

ATMP Has Been a Win for India

India did well to position itself as a destination for the build-out of assembly, testing, marking, and packaging (ATMP) plants for semiconductors. Micron broke ground when it built a nearly $3 billion facility in Gujarat, India, attracting other players in the semiconductor ecosystem.

The main takeaway from the discussions was that India needs to build on this promising start. However, our view is that the "Liberation Day" tariffs, as currently implemented, may pose challenges for India as an ATMP hub by potentially opening the doors for increased competition from countries like Mexico. For instance, the tariffs mean that importing equipment to the United States for building AI infrastructure, such as data centres and servers, will be more expensive now from other countries. And even though standalone chips are exempt, chips are rarely imported as standalone products, often packaged as a part of a larger product. Here, the exemption provided to Mexico under the United States-Mexico-Canada Agreement (USMCA) means that chips assembled in Mexico will likely receive preferential treatment. This further underscores the need to reach an agreement on a U.S.-India bilateral trade agreement (BTA), which is, understandably, receiving priority attention from both sides now.

Conclusion

Discussions at the GTS highlighted how significant government-to-government engagement through the earlier avatars of the TRUST initiative led to the incubation of a semiconductor ecosystem in India, further aided by U.S. firms looking to diversify and strengthen their supply chains. However, these discussions also made clear that with that push now in the past, the onus is now on market dynamics to take over. Meaning, it is crucial to strike the right balance between State action and private incentives, because at the end of the day, if onshoring, re-shoring, or friend-shoring fail to pass market tests, it won't work. Here, it is unlikely that a BTA will resolve all outstanding trade issues between India and the United States. It might, however, enhance market access for enterprises from both countries. That in itself may be the boost needed to build resilient semiconductor supply chains for the two countries.

About the Authors

Rudra Chaudhuri is the director of Carnegie India. His research focuses on the diplomatic history of South Asia, contemporary security issues, and the important role of emerging technologies and digital public infrastructure in diplomacy, statecraft, and development. He and his team at Carnegie India chair and convene the Global Technology Summit, co-hosted with the Ministry of External Affairs, Government of India.

Amlan Mohanty is a nonresident research fellow at Carnegie India. He is also a technology lawyer and policy consultant based in Bangalore, with over ten years of experience working with big tech, law firms, think tanks, and the government. Before going independent, he led Google's public policy and government affairs portfolio in India across privacy, content regulation, competition, and AI.

Shruti Sharma is a research fellow with the Technology and Society Program at Carnegie India, where she is currently working on understanding risks emerging from biotechnology research and ways to boost India's bioeconomy. In addition to studying ways to strengthen biosafety and biosecurity in India, she is working closely with stakeholders from the government, academic and scientific community, and representatives from the private sector to explore avenues of collaboration within the iCET, Quad, and the G20.

Tejas Bharadwaj is a senior research analyst with the Technology and Society Program at Carnegie India. He focuses on space law and policies and works on areas related to applications of artificial intelligence and autonomy in the military domain and U.S.-India export controls. Tejas is also part of the group that convenes Carnegie India's annual flagship event, the "Global Technology Summit," co-organized with the Ministry of External Affairs, Government of India.

Konark Bhandari is a fellow with Carnegie India. He is a lawyer who has researched certain areas in the digital economy, focusing primarily on approaches to antitrust regulation of companies in the digital realm. He had earlier worked at India's antitrust regulator, the Competition Commission of India (CCI), where he worked closely with senior officials on a variety of matters. While at the CCI, he was a member of the Internal Coordination Committee on the Think Tank on Digital Markets.

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