

October 29, 2024

Geopolitical Limits of India's Semiconductor Ambitions

By: Sandeep Bhardwaj

The global semiconductor supply chain is heavily influenced by geopolitical factors, essentially US dominance. India's foreign policy and its relationships with major powers will significantly limit its ability to become a major chip-making hub.

In 2021, the Indian government launched a policy campaign of unprecedented scale to build a semiconductor industry in the country, a dream that has long eluded it. It is now seeking international investments and technology transfer by offering nearly **US\$10 billion** in subsidies and a promise to cut through red tape, while drawing attention to its highly skilled labour force and enormous domestic market.

Prime Minister Narendra Modi has thrown his weight behind the project—“India's semiconductor sector is on the brink of a revolution,” he [declared in September 2024](#). The government's efforts have met with some initial success, although it can be difficult to separate [actual progress from boosterish claims](#). Its plans, if realised, can have transformative implications for the Indian economy. The technology-intensive semiconductor manufacturing industry is economically lucrative and strategically critical because chips are the necessary building blocks of all advanced electronics and computing systems from phones to weapon systems to artificial intelligence (AI).

The government's promise of subsidies, low tariffs, cheap labour, government efficiency, and a friendly business environment follows the standard playbook of globalisation, often prescribed by liberal economists as a pathway for developing countries to set up new industries. However, such discussions often obscure the contradiction at the heart of semiconductor business—while it is a highly globalised industry, comprising supply chains based on an international division of labour, it has never followed the fundamental globalisation principle of free trade.

To understand the geopolitical context within which Indian ambition is operating, we must first look to how the current semiconductor supply chain emerged.

The high strategic value of semiconductors has made its trade subject to an unusually high degree of control by states, especially the US. The geography of its global supply chain is not determined by economic imperatives alone but based on security considerations, many going back to the Cold War.

While a nimble industrial policy may produce some success for India, its larger ambitions will be determined by its foreign policy. The foreign policy here does not just mean trade deals and technology cooperation, but the country's overall position in the global security order. India's current foreign policy and its strategic relationship with the US, China, and other Asian countries places limits on its plans to become a chip-making hub. To understand the geopolitical context within which Indian ambition is operating, we must first look to how the current semiconductor supply chain emerged.

Cold War Origins

One of the most striking features of the modern semiconductor supply chain is that its geography is still determined by strategic choices made more than half a century ago. The US chip industry emerged from World War II as a dominant player, far ahead of its European competitors. Recognising the strategic significance of the industry, Washington quickly developed a three-pronged policy, which has persisted to this day—to maintain the American technological and commercial lead over all other nations; to deny high-end technology to its geopolitical rivals; and, to bring in friendly nations into a US-led global supply chain whenever economic or geopolitical factors align. Histories of the semiconductor industry often celebrate the ingenuity of private enterprise, downplaying the interventions of the US government to steer it towards specific outcomes based on American strategic interests.

Japan became the first country to receive Washington's financial and technical support to develop an electronics industry as part of its [post-war economic recovery](#). The US was eager to build its Asian ally as a bulwark against communism and to wean it off aid by making it economically self-sufficient. By the 1960s, the Japanese semiconductor industry emerged as an exporter competing with the US.

Washington also poured aid into its two other frontline allies in Asia—South Korea and Taiwan—after the Korean War in 1953. Its aid arrived as both financial support and technical assistance. For instance, the US sent the [Hornig Mission](#) to Taiwan in 1967 to encourage technology transfer from private American companies to the Asian country. Both South Korea and Taiwan quickly transformed from largely agrarian economies to electronics powerhouses, specialising in different sub-sectors of semiconductor manufacturing (South Korea in memory chips, Taiwan in logic chips). Unlike Japan, the two became extensions of American production, as offshore sites offering cheap labour to US corporations.

|| The US never hesitated to use its power to protect its lead. When Japan came within striking distance of US industry in the 1980s, the Reagan administration threatened a trade war to bring it to the negotiating table.

A new wave of offshoring began in the 1980s, as the US sought out even cheaper labour markets of Southeast Asia. It opened up the lower end of the value chain—assembly and testing—to its allies (Thailand and Philippines) as well as friendly non-aligned countries (Malaysia, Singapore, and Indonesia) in the region. Taiwan and South Korea moved up the chain to fabrication while the US stayed at the highest end of chain by maintaining a lead in the design and Semiconductor Manufacturing Equipment (SME) production.

The global supply chain was an [American invention](#). By the mid-1980s, US companies were offshoring 80% of their semiconductor assembly, while the Europeans offshored less than 20%, and the Japanese only 5%. While offshoring was motivated by economic logic, it was made possible by Washington’s foreign policy and it operated within the confines of the US global security system.

The US never hesitated to use its power to protect its lead. When the Japanese competition came within striking distance of US industry in the 1980s, the Ronald Reagan administration threatened [a trade war](#) against its own ally to bring it to the negotiating table. The 1986 US-Japan Semiconductor Agreement forced Tokyo to adopt voluntary restrictions on its exports and open up its market to foreign competition. In a confidential letter on the side, the Japanese government promised to give away up to 20% its domestic market to American imports. The Japanese semiconductor juggernaut ground to a halt within a few years, although economists continue to debate whether the slowdown was caused by the agreement.

The US also intervened in the direct flow of technology, even when American companies were not involved. For instance, the Richard Nixon administration [blocked France](#) from trying to offshore its semiconductor assembly to Poland citing defence concerns.

|| China, the largest importer of semiconductors, remains heavily reliant on foreign technology. Rarely has China failed to develop dominance in a manufacturing sector in this way during its incredible growth run.

More than three decades have passed since the Berlin Wall fell, but the geography of the semiconductor supply chain remains remarkably similar to the Cold War era. According to an [industry assessment](#), the US continues to dominate the highest end of the value chain with a 43% share of design revenue and a 41% share of SME sales. The majority of wafer fabrication plants, 58%, continue to be located in the US, Taiwan, Japan, and South Korea. Assembly and testing is still concentrated in Southeast Asia, with Malaysia and Singapore in the lead.

Several factors have ensured relative stability of the supply chain, including a first-mover advantage, smart industrial policy, and the high capital requirements of the industry. However, the chain also persists because the US-led international security architecture within which it was conceived is still around.

Chinese Challenge

That the Cold War era supply chain still endures is all the more remarkable because the rest of the world economy has undergone a sea change in the last three decades because of China’s rise. While China has emerged as an electronics manufacturing behemoth, it has failed to develop a substantial semiconductor industry.

According to [the US Congressional Research Service](#), China’s semiconductor production today can meet only less than one-fifth of its domestic demand and it remains limited to low-end chips. China, the largest importer of semiconductors, remains heavily reliant on foreign technology. Rarely has China failed to develop dominance in a manufacturing sector in this way during its incredible growth run.

Observers such as Chris Miller, author of *Chip War: The Fight for the World's Most Critical Technology* (2022, Scribner), blame Beijing's bureaucratic inefficiencies and quest for self-sufficiency, but they understate the role of American technology policy. Even as the US welcomed and aided China's integration into the world economy in the heyday of globalisation, it also **blocked** the country from becoming a chip manufacturing hub. Washington led 33 countries under the 1996 Wassenaar Agreement to maintain a strict export control regime denying China access to dual-use technologies, including high-end semiconductors and semiconductor manufacturing equipment. Even after the US relaxed some restrictions in 2007, China never received the same technological access as American allies.

Frustrated by the slow progress of its semiconductor industry, the Chinese government initiated a major policy push in 2014, including massive subsidies and indigenisation efforts. Alarmed, Washington quickly **declared Chinese ambitions** as a threat to both the global economy and world peace. The Donald Trump administration **introduced** a slew of tariffs and export restrictions to slow China's progress. The Joe Biden administration drastically **escalated** this by imposing sweeping new measures aimed at degrading Chinese capabilities. In a display of its striking institutional power, the US government began targeting specific Chinese companies using precise economic tools, driving some to extinction.

The Covid-19 supply chain disruptions have led the US to further diversify away from China. It is investing enormous sums to boost its domestic production. It also **established** the US\$500-million International Technology Security and Innovation (ITSI) Fund in 2023 to bring new international players into its fold.

India's Rising Ambitions

Sensing an opportunity, the Indian government has launched a serious bid to break into the global semiconductor supply chain. India has always loomed as a potential semiconductor hub to observers, although it has repeatedly fallen short of realising its potential.

During Indira Gandhi's last term, in 1983, the government launched a new electronics policy and invested US\$40 million to establish the Semiconductor Complex Limited. One of Rajiv Gandhi's **first acts** after taking office was to declare a package of measures to promote computer manufacturing, including chip-making. The Manmohan Singh government sought to attract semiconductor manufacturing in 2007 by **offering a suite of incentives**, including 25% capital subsidies; and again, in 2012, with a promise of government support under the **National Policy on Electronics**. All these initiatives came to naught.

Indian ambitions are spurred by the window of opportunity created by the ongoing US-China conflict. They also sit within the emerging narrative that India can potentially become a counterweight to China in the global power balance.

The government's latest push is its most ambitious yet. It launched the Semiconductor Mission in 2021, promising US\$10 billion to incentivise investments, including capital subsidies up to 50%. Prime Minister Modi has personally tried to mobilise the bureaucracy and attract foreign investments. "Our dream is that every device in the world will have an Indian-made chip," he declared in September 2024. Although the dream faces the usual set of risks—infrastructure deficiencies, private investor hesitation, low quality control, a restrictive bureaucracy, and sudden policy U-turns—the government is hoping that strong political will and enormous public investment can overcome them.

Indian ambitions are certainly spurred by the window of opportunity created by the ongoing US-China conflict. They also sit within the emerging narrative that India can potentially become a counterweight to China in the global power balance. New Delhi has tried to exploit its advantage by deepening technology cooperation with the US through a series of agreements over the last two years. The two countries have **announced a partnership** in September 2024 to explore semiconductor supply chain opportunities under the ITSI Fund.

Geopolitical Limits

The same geopolitical conditions that created the opportunity for India also place limits on what India can achieve in the short to medium term. There are four such limits to consider.

First, it is important to note that while Washington is eager to draw the semiconductor supply chain away from China, it is largely agnostic about the new direction the chain may take. In an effort to diversify the supply chain, it is exploring several new destinations. In the last one year, it has **signed ITSI partnerships** with seven countries other than India—Costa Rica, Indonesia, Kenya, Mexico, Panama, the Philippines, and Vietnam.

These countries are as eager as India to exploit the opening. In the last year, [Vietnam](#), [Indonesia](#) and [the Philippines](#) have also launched serious bids to expand their semiconductor industries. All are seeking to pursue some variation of the same strategy as India—build a base of assembly and testing facilities and leverage it to move up the value chain in the long run.

Although India enjoys some advantages over its potential competitors—a large domestic market and a pool of highly skilled engineers—it also faces some weaknesses. Countries such as Vietnam boast a larger electronics manufacturing sector and are already integrated in global value chains much more deeply than India. The incipient competition will not only be an uphill battle for India, but also could create an undesirable situation where countries race to the bottom by offering chipmakers greater and greater subsidies and tax breaks, getting little in return.

They would also find it difficult to digest if India refused to comply with Western export controls, which deny cutting-edge semiconductor technology to Russia and Iran, both friends of New Delhi.

Second, as we have seen, the US has historically offered a leg up to its allies to ascend to the high end of the semiconductor value chain. Such strategic bargains are symbiotic—the US remains directly involved in the defence of the production facilities and the ally enjoys a greater security commitment from Washington as its strategic value rises. While India and the US have moved somewhat closer in recent years, New Delhi is unlikely to sign up as a treaty ally anytime soon. Moreover, India’s close relationship with Russia remains a stumbling block in the India-US strategic partnership.

If India were to succeed in moving up the value chain to high-end chip fabrication, many Washington strategists would be probably uncomfortable with technology transfer to a country outside the US alliance system. They would also find it difficult to digest if India refused to comply with Western export controls, which deny cutting-edge semiconductor technology to Russia and Iran, both friends of New Delhi. Satisfying US security requirements while retaining strategic autonomy can become a difficult tightrope walk.

Third, despite the US challenge, the expansion of China’s semiconductor industry is inevitable. Beijing has already invested close to US\$100 billion since 2014 (compared to India’s semiconductor fund of US\$10 billion). It is also seeking out international partners to support its ambitions.

India is unlikely to benefit from Chinese investments and imports because the two neighbours have been locked in a tense border standoff for nearly four years, and New Delhi has targeted Chinese technology companies. India’s potential competitors in Southeast Asia have maintained a softer approach towards China, managing its aggression while avoiding confrontation. Accordingly, they are better positioned to exploit the opportunities that arise in China. For instance, Malaysia has recently forged [closer semiconductor cooperation](#) with China even as it remains a major offshoring hub for US chipmakers.

Finally, India’s ambitions will be hampered by its [limited economic integration](#) with East Asia, home to the bulk of the global semiconductor supply chain. Several factors have caused India to remain politically and economically aloof from its east—the fear of Chinese economic dominance being one of them.

New Delhi can do little to remove its competitors or suddenly bring about dramatic changes in its relationships with the US or China. It can, however, seek deeper economic and strategic integration with its East Asian neighbours.

In 2019, India [refused to sign](#) the Regional Comprehensive Economic Partnership (RCEP), a free trade agreement between 15 Asia-Pacific countries. In 2021, India [opposed ASEAN’s inclusion](#) in an India-Japan-Australia initiative to make supply chains more resilient. Such moves stemmed from New Delhi’s determination to stay at a distance from China-centric trade networks. As a result, India has limited policy experience, diplomatic infrastructure, or business connections to integrate itself into region-wide value chains.

These geopolitical limits will not hinder India’s efforts to capture a small piece of the low end of the semiconductor value chain by setting up assembly and testing plants, but they will come into play as the country moves closer to its avowed goal of becoming a major semiconductor power.

New Delhi can do little to mitigate the first three limits—it cannot remove its competitors or suddenly bring about dramatic changes in its relationships with the US or China. It can, however, seek deeper economic and strategic integration with its East Asian neighbours. This will allow India to access at least low-end technology and technical know-how, while also positioning it more as a collaborator

than a competitor to its Asian neighbour. The government has already made some progress in this direction by [signing a semiconductor partnership](#) with Singapore. A more sustained and focused policy of outreach towards the East is bound to pay dividends.

The international battle over the semiconductor supply chain is portentous. As globalisation comes under greater strain, geopolitics will increasingly influence the direction of trade and technology flows. In such an environment, developing nations such as India will have to learn the art of effectively combining industrial policy with foreign policy.

Sandeep Bhardwaj is a Singapore-based independent researcher specialising in the international history of South and Southeast Asia.