

The Semiconductor Long Game—the Way Forward for India and China?

By Konark Bhandari

In August 2009, the Indian Ministry of Electronics and Information Technology (MeitY) established a task force to look into strategies that could be used to further spur the growth of India’s vaunted information technology (IT) software and information technology enabled services (ITES) sectors. At the same time, the task force was also entrusted with the task of developing a plan to boost manufacturing in India’s hardware sector. In its **report** published in December 2009, the task force recognised that the electronics hardware sector was at an inflection point similar to where the Indian IT software industry was a decade earlier in 2000. Among one of the three sub-sectors identified by the report where manufacturing of hardware should be boosted, was the electronics systems and design manufacturing sector (ESDM), with a heavy emphasis on semiconductors. In addition, the **report** stressed that since most of India’s electronics imports were from China, it may want to “reckon this from a strategic perspective.” These words have now become prescient, given the global recalibration of semiconductor supply chains away from China, with the aim of establishing more resilient and secure supply chains.

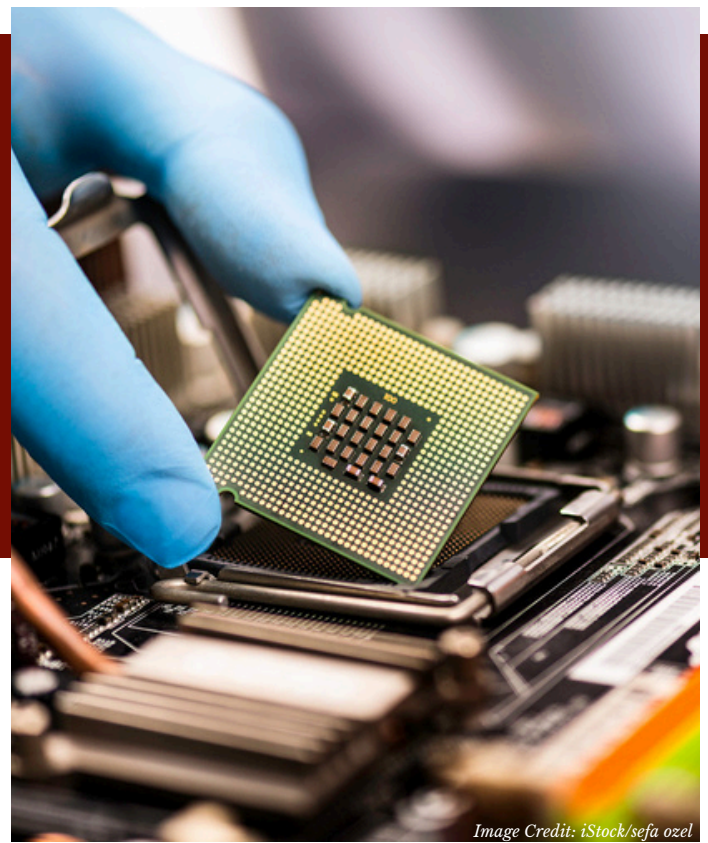


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However, no coherent policy outcomes regarding semiconductors came out of the 2009 MeitY report. Fast-forward a few years, with many companies pursuing a China+1 strategy and there being a heavy emphasis on de-risking from China, India introduced a semiconductor incentive scheme in December 2021. It also set up an agency within the MeitY, called the India Semiconductor Mission (ISM) that was tasked with building a sustainable semiconductor ecosystem in the country.

At the same time, Chinese semiconductor companies face an increasingly challenging business environment due to US export controls, which bars companies placed on Washington’s Entity List from receiving US exports. In October 2022, these rules were updated to especially block China’s access to high-end AI chips, as well as US chip design software, semiconductor manufacturing equipment (SME), and US-built

components. High-end AI chips could no longer be sold to any entity operating in China, regardless of whether it was Chinese or not. This subsequent broadening of the purview of the export controls to all entities operating in China, and not just those on the Entity List, has led to a noticeable surge in momentum in China's quest to pursue indigenous technology.

This essay attempts to make sense of these parallel initiatives by both India and China to build their semiconductor ecosystems. While India attempts to integrate itself into a global supply chain from which it was largely missing, China, at the same time, is seeking to pursue self-sufficiency. While the latter may be a tall order, given that the semiconductor global supply chain is dispersed all over the world, China is at the very least seeking to avoid being held hostage by US export controls on 'chokepoint' technologies.

Industrial Policy 2.0

A lot of the success in onshoring semiconductor supply chains for India, and for building resilient and domestic capability in semiconductors in China, is due to the revival of semiconductor industrial policies. India and China are far from the only countries pursuing such industrial policies, with the US also keen on rebuilding its capability in semiconductors through the CHIPS and Science Act.

With its semiconductor incentive scheme, India has gotten off to a fairly respectable start. In June 2023, a **fact sheet** released by

the White House highlighted recent investment announcements by US semiconductor companies in India. Cumulatively, these investments were worth billions of dollars and included notable projects like Micron's \$825 million investment for a new assembly and test facility, as well as Applied Materials' \$400 million commitment to set up a collaborative engineering center in the country. The promising domestic market in India and the fact that the Indian government moved in record time to clear up taxation issues with certain key players certainly played a part. India introduced new initiatives, like the Production Linked Incentive (PLI) schemes—incentive packages for certain sectors, including mobile handset and electronic items—which have become the foundational basis for India to position itself as an investment destination for companies pursuing a China+1 strategy. The **PLI schemes** provide incentives based on the incremental sales achieved over the overall base of the previous year at a rate of 4-6 percent for most sectors and 4-7 percent for telecom and network products manufacturing. Therefore, the incentive system is predicated on the applicant company meeting incremental targets, and in the process, scaling operations in India. The scheme for mobile handset manufacturing has been a runaway success, at least when judging by the number of exports, which in FY2024 so far, have already jumped to **\$15.6 billion**.

Critical takes on the PLI schemes do persist, however, inasmuch as the scheme for mobile handsets has only led to an increase in mostly assembly operations and not large-scale manufacturing. That being said, even the requirement for more assembly operations necessitates importing the chips that go into the handsets and other devices as well. For instance, since major original equipment manufacturers (OEMs) like Apple have announced plans to move operations to India, suppliers such as Foxconn have followed suit.

China, on the other hand, recently announced **plans** to set up a new state-run semiconductor investment fund, with a corpus of \$47.5 billion. This is China's second major attempt. Indeed, in 2014, China had announced a "Big Fund" worth approximately \$15 billion for semiconductors to promote domestic semiconductor companies. This was accompanied by a plan by the State Council in 2014 for China to become a leader in various stages of the semiconductor supply chain. However, there was little to no prior experience required for companies to apply for the Big Fund, and at one point, as per **Chinese state media**, 58,000 companies were registered as semiconductor companies in China over the period January-October 2020! A **massive crackdown** on semiconductor firms ensued, as many could not repay their debts. Why should things be different with the second iteration of China's semiconductor fund?

Reports say that the managers of the new fund will play a more hands-on role and that is the key change from the earlier Big Fund. However, what may have prompted this move is the ratcheting up of US export controls on key SMEs. Also, China's perceived success in successfully managing to create 7 nm chips, which was not thought possible a few years ago, may have encouraged Chinese planners to try again.

Interestingly, both **India** and **China** are reportedly planning to hike the local content requirement (LCR) for products manufactured in their countries. It should be noted, though, that India's plans are centred around federal procurement only and are likely to exempt the electronics and manufacturing sectors. On the other hand, China's LCR plans mandate that carmakers in China should target using only Chinese chips for their manufacturing operations by 2025. The supposed benefits include the creation of more jobs and greater involvement of local small-medium enterprises in supply chains. However, the longer-term goal may be to attain technological self-sufficiency when it comes to the supply chains for mature node chips or legacy chips, which are used largely in automobiles.

To sum up, this is India's first sincere attempt at an industrial policy on semiconductors, where it seeks to use both the ISM's semiconductor incentive scheme and the PLI scheme for electronic items to address both the upstream supply component of semiconductors and the

downstream demand component through providing incentives to OEMs. On the other hand, for China, the newly announced fund is the next iteration for building an increasingly self-reliant semiconductor ecosystem. However, given its recent success in manufacturing leading-edge node chips more swiftly than was expected, this could lead to better results, this time around.

Can Asia's Giants Innovate?

Somewhere in this discussion on semiconductors is also the underlying question of whether India and China can truly innovate in hardware manufacturing and migrate from low-cost manufacturing. For instance, China's quest to innovate has been labelled as "**quixotic**" by a few observers, even as it catches up to the US in **several areas**. However, recent developments in both China and India have been encouraging. For instance, **recent reports** have estimated that China has largely managed to wean off its reliance on foreign suppliers and that some of its flagship technology companies spend as much on research and development as mainstream American Big Tech companies. India too, has managed to see an exponential surge in its **patent filings** over the last decade. This could have been driven by India's wave of fresh policies in the semiconductor, space, robotics, drones, and with more policies on a deep-tech ecosystem in the offing, the momentum when it comes to patent filings may well continue.

How Do Their Respective Semiconductor Policies Impact Trade between India and China?

In the short run, more Indian imports from China, particularly in the electronic components segment, are quite likely. The reasons are not hard to fathom. For instance, as India increasingly becomes a **viable destination** for companies pursuing a China+1 strategy, it may see more assembly operations to start off with. This may lead to a surge in intermediate imports from China in the form of electronic inputs and components. Indeed, a recent **report** posits that there has been a surge in "industrial imports" from China in recent years. Therefore, we should expect more calls in India in the months if not years ahead for increasing LCR.

Next Battleground between India and China—Mature Node Chips?

Interestingly, mature node chips are currently the **focus** of a lot of the semiconductor policy world. They are defined by the US Department of Commerce as those built with 28 nm or older process technologies. China's surge in **global market share** and **robust projections** for an enhanced market share when it comes to mature node chips have led to fears of China leveraging its market power in this segment, as well as possibly creating a **price-war** in mature node chips. While this increased capacity in mature nodes may be a means of serving the domestic market in China—owing to restrictions on chip exports under US law, it does not quite

square up with the fact that Chinese foundries are running at **very high capacity** for mature node chips—which is unusual at a time when the Chinese economy is seeing a downturn. Alarmed by the rapid clip of such mature node chip production in China, the Biden administration recently announced its plans to impose **tariffs** of 25-50 percent on mature node chips from China by 2025. This could create an opening for India when it comes to accessing the US market, as India’s upcoming Tata-PSMC foundry is set to produce mature node chips.

What Could Change?

What could side-track the recent successes, however **modest**, of India’s semiconductor incentive scheme or of China’s new domestic semiconductor fund? India’s semiconductor investments were driven by commercial considerations, but also favoured by the US government under the Initiative on Critical and Emerging Technologies (iCET) with India, which was keen to see its enterprises de-risk from China. Could a change in US administration in the 2024 elections change things? There is talk that a Trump 2.0 administration would see further ratcheting up of export controls which are widely believed to have **spared legacy nodes and packaging industries**—sectors where Chinese firms still compete. Furthermore, **announcements** of a possible spike in tariffs imposed on China as well as a blanket

10 percent tariff hike on all imports, including from partner nations and allies, could trigger a fresh round of retaliatory tariffs that would make it difficult for India to access inputs from China as well as access the US market at competitive rates. India’s burgeoning partnership here with the US as well as Taiwan—which played a **key role** in advocating for the Tata-PSMC foundry in India—would be highly determinant of the way forward.

Conclusion

Increasingly, wielding power in the current state of geopolitics is not merely about hard military power but also about economic statecraft. The recent spate of semiconductor industrial policies the world over are a testament to that. Recent experiments in industrial policies in India and China have met with initial success. But the way forward is uncertain and will be decided by whether major semiconductor companies decide to invest.

Konark Bhandari is a Fellow with Carnegie India. He contributes regularly to discussions on the semiconductor ecosystem, with his contributions being acknowledged in semiconductor “readiness assessment” report under the iCET (initiative on Critical and Emerging Technology). He had also worked earlier at the Competition Commission of India (CCI), where he was a member of the Internal Coordination Committee on the Think Tank on Digital Markets.