

The Quad Makes the First Siliconpolitik Move

Pranay Kotasthane

Summary

An earlier [paper](#) on ‘Siliconpolitik: The Case for a Quad Semiconductor Partnership’ made a detailed case for a Quad partnership on semiconductors. It argued that the Quad’s technology cooperation agenda should focus on semiconductors due to their ‘metacriticality’. Further, it reasoned that “since each Quad member enjoys a comparative advantage in a specific sub-domain of the semiconductor supply chain, this grouping is well-placed to collaborate.” With these arguments as a reference point, this paper analyses the semiconductor supply chain collaboration announcement at the first in-person Quad Leaders’ Summit.

The Key Takeaways

On 24 September 2021, the Quad leaders announced an initiative to “map capacity, identify vulnerabilities, and bolster supply-chain security for semiconductors and their vital components.” This initiative is a positive step for two reasons. First, it suggests an emerging consensus in the Quad on the centrality of the semiconductor supply chain in technology geopolitics. This consensus was not reached when the online Quad Leaders’ Summit was held on 12 March 2021. Back then, the [Summit Fact Sheet](#) did not identify technologies deemed “critical and emerging” by all four members. Hence, I had argued that the first item on the agenda of the Critical and Emerging Technology (C&ET) working group would be to prioritise cooperation on a few of them. The recent announcements clarified that the C&ET working group has done a prioritisation exercise and zeroed in on space, biotechnology, 5G communications, cybersecurity and semiconductors as five focus areas for further collaboration.

Second, the launch of a Semiconductor Supply Chain Initiative suggests a shift in mindset from national self-sufficiency to multilateral strategic cooperation. Over the last few months, each Quad member has been pursuing national efforts with the aim of de-bottlenecking the semiconductor supply chain. However, such efforts ignored the economics of the semiconductor supply chain. As manufacturing moves to newer and costlier nodes (2 nanometres and below), nation states will have to keep diverting their scarce resources repeatedly to rebuild and sustain a purely homegrown semiconductor manufacturing. Moreover, semiconductor manufacturing is just one stage in the hyper-globalised semiconductor ecosystem. No nation state has the financial material and human capital to eliminate all chokepoints across various stages of semiconductor production. Therefore, by prioritising semiconductors in its technology agenda, the Quad has signalled that multilateralism is a necessity, not a choice on semiconductors.

What Next?

An initiative to map capacity and identify vulnerabilities is a welcome first step. However, a lot more needs to be done to create a secure, resilient semiconductor supply chain. Another vital document released on 24 September 2021 – the [Quad Principles](#) on Technology Design, Development, Governance, and Use document – serves as a helpful guide for realising the ultimate goal.

One, the principles document [advocates](#) “close cooperation on supply chains with allies and partners who share our values will enhance our security and prosperity, and strengthen our capacity to respond to international disasters and emergencies.” A way to map this principle to the semiconductor domain would be to form a Quad semiconductor consortium that manages a jointly held Quad Supply Chain Resilience Fund. This consortium can then create a roadmap for new semiconductor manufacturing facilities across the Quad countries. The goal should be to ensure redundancy in the ecosystem such that this supply chain is not susceptible to geopolitical or geographic risks. For instance, while the United States (US) focusses on restarting manufacturing at leading-edge nodes (5 nanometres and below), the consortium could work together to build specialised analog, memory foundries operating at trailing-edge nodes (45 nanometres and above) in India, Japan or Australia.

Two, the principles document recognises the importance of “international standards development that foster interoperability, compatibility, and inclusiveness.” This principle can translate into cooperation on developing new standards for open-standard instruction set architectures such as RISC-V and for manufacturing on semiconductor composites such as Gallium Nitride.

Three, the principles document underscores that the Quad countries are “committed to facilitating the exchange of researchers and movement of highly skilled personnel to enhance science and technology collaboration.” This applies well to semiconductor research and development cooperation, where governments can do a lot to foster technology exchange, visitation and research participation, and joint development between companies in the Quad countries. For instance, lowering employment barriers for semiconductor professionals in the Quad countries could facilitate more joint development.

Key Factors for Success

The proposals in the previous section are contingent on a few factors.

One, the US needs to review its approach to technology protection in the semiconductor domain. In the past, the US government adopted strict trade and regulatory mechanisms restricting technology transfer. This restrictive approach needs to give way to a collaborative mode in the Quad. In a paper titled ‘An Allied Approach to Semiconductor Leadership’, Stephen Ezell [lists some measures](#) that the US could take. These include enrolling partner countries in trusted foundries programmes, co-investing in semiconductor moonshots, reducing export controls, lowering foreign investment screening barriers with like-minded countries and sharing information on intellectual property theft. Just as the US is now willing to share critical technologies with partners through the Australian, the United

Kingdom and the US defence arrangement, an allied approach should be adopted in the semiconductor domain.

Two, all four countries need to work to increase trust in each other's legal enforcement mechanisms. The four members need to harmonise their contract enforcement, regulatory practices, and patent protection mechanisms. Such measures will encourage companies to collaborate across borders.

Three, the Semiconductor Supply Chain Initiative should become a platform that coalesces other powers in this domain, such as Taiwan, South Korea, Israel, Singapore and the European Union. The larger the grouping of like-minded countries, the more resilient and secure the semiconductor supply chain is likely to be.

To conclude, the Quad Semiconductor Supply Chain Initiative marks a departure from efforts solely targetting national semiconductor self-sufficiency. As described above, the Quad should deepen this collaboration to achieve the goal of resilient, diverse and secure technology supply chains.

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Mr Pranay Kotasthane is Chairperson of the High-Tech Geopolitics Programme at the Takshashila Institution, an independent, non-partisan centre for public policy research and education. He has previously worked with two semiconductor companies. He can be contacted at pranay@takshashila.org.in. The author bears full responsibility for the facts cited and opinions expressed in this paper.