



Critical technologies supply chains

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Key points

- Excessive dependence on a single manufacturing source, such as China, has exposed the vulnerabilities of many countries over the last few years, especially during the COVID-19 pandemic.
- Though there have been plenty of discussions within the Quad about the need for a common approach to the security of critical technology supply chains, most action has been undertaken unilaterally, or by a couple of countries.
- Stronger technological cooperation between Quad countries will not pan out organically, so politically-conscious decisions are necessary – especially from India due to its history and structural factors.

Policy recommendations

Quad countries should:

- Act more jointly to secure supply chains for critical technologies, as actions taken by larger groups of countries will be more effective.
- Discuss ways to mitigate the negative collateral consequences of measures such as sanctions and tougher export controls imposed by the US and its partners, as well as by China.
- Focus on building skills, within the Quad and like-minded partners, in areas such as semiconductors.
- Move aggressively towards standard-setting in telecom networks to ensure openness, diversity and security.

Ensuring the security of supply chains has become a growing concern due to two related developments. The first is centralisation of manufacturing and assembly of consumer products in China, creating a natural dependence on China as the centre of global manufacturing. The second is the increasingly tense geopolitical circumstances, which has led to China weaponising its central role in the global economy. Over the last few years, especially in the aftermath of the COVID-19 pandemic and heightened international tensions, dependence on China has turned into a vulnerability. The key question is how to address this vulnerability given China's central manufacturing role in the global economy.

While this is a general problem, it assumes even greater urgency when it comes to critical technologies. Although different countries may have different definitions of what critical technologies are, discussions within the Quad have helped narrow it down to specific areas, including semiconductors, advanced telecommunication technologies such as 5G and 6G, and battery storage. There are also concerns about critical materials used in various manufacturing processes. Production of many of these critical materials, especially rare earth elements, are now largely centred in China, which has demonstrated a willingness to leverage its control over rare earths for political purposes, such as by banning exports to Japan.¹

Some Quad countries are pushing back, but not together. For example, Geoscience Australia and the US Geological Survey (USGS) are already partnering to develop various critical mineral sources. Similarly, India and Japan are collaborating in developing and processing rare earth oxides through the Toyotsu Rare Earths project in India. There is also the US *Quad Critical Minerals Partnership Act*. Countries have also taken unilateral actions such as banning Huawei from various telecommunications markets. The Quad is likely to be more successful if it combines these efforts.

Semiconductors

Semiconductors are critical for almost all technologies including electronics, telecommunications and defence. It is an area in which the US and its partners maintain a significant lead, but where China is keen on making progress.

The US and its allies have acted to prevent China using Western technologies to enhance its semiconductor manufacturing capacity. The US, Netherlands and Japan have imposed export restrictions on various types of chip-making technology to limit China from building advanced semiconductor chips and manufacturing equipment.

There have been some concerns about the negative collateral effects of this action on American firms and US partners. For example, China has retaliated against the US chip-making company Micron and there are fears of consequences for other American companies. Given the integrated nature of manufacturing of high-technology products, negative effects on some non-Chinese technology companies cannot be ruled out. The Quad should prepare plans to help innovation leaders who are affected by Chinese retaliation. The Quad should also focus on skilling both within the Quad, but also among other like-minded partners, who could contribute to the area of semiconductors.

Telecommunication technologies

As with semiconductors, telecommunications technology is also critical to security and economic well-being in the Indo-Pacific and other parts of the world. Once again, China has attempted to centralise this technology by providing state support to Chinese telecommunication firms such as Huawei and promoting Huawei as a supplier for 5G technologies worldwide. Such concentrations of manufacturing of advanced 5G and 6G telecommunication technologies represents a serious threat in two ways. First is the obvious dependence on China for such technologies and products. Second, these technologies constitute a direct security threat because they can be used to compromise communication and network security in countries that use them.

Various countries are already cognisant of these problems and have begun to take action. In October 2020, the trade ministers of Australia, India and Japan decided to establish a supply chain resilience program for the Indo-Pacific region, the India-Australia-Japan Supply Chain Resilience Initiative (SCRI). The initiative was considered necessary by the three countries in order to strengthen diverse supply chains so as to counter China's excessive control on certain essential supplies.

Similarly, the Indian statement following the Quad Summit meeting in May 2022 points to the need for "harnessing critical and emerging technologies to enhance prosperity and security of the region". At the same summit, the Quad released a Common Statement of Principles on Critical Technologies Supply Chains that seeks to utilise the existing complementarities within the Quad to ensure diversity and competition in the semiconductor market. The Quad is also setting up an International Standards Cooperation Network to develop technology within the

Indo-Pacific. Going forward, the Quad should move aggressively towards standard-setting in telecom networks to ensure openness, diversity and security.

Notes

¹ Shunsuke Tabeta, “China weighs export ban for rare-earth magnet tech”, *Nikkei Asia*, 6 April 2023, accessed 16 October 2023, <https://asia.nikkei.com/Spotlight/Supply-Chain/China-weighs-export-ban-for-rare-earth-magnet-tech>



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About the Quad Tech Network


The Quad Tech Network (QTN) is an initiative of the NSC, delivered with support from the Australian Government. It aims to establish and deepen academic and official networks linking the Quad nations – Australia, India, Japan, and the United States – in relation to the most pressing technology issues affecting the future security and prosperity of the Indo-Pacific.

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