

The Importance of Semiconductors in the Escalating Sino-American Strategic Competition

Key Takeaways:

- The recent national security concerns raised by China over Nvidia's H20 AI chip serve as a reminder of ongoing Sino-American tensions and escalating technological competition.
- The challenges faced by Nvidia underscore how individual companies can become caught in the crossfire of the Sino-American technological rivalry.
- With their broad range of applications, advanced semiconductors will become even more critical, retaining major economic and military significance. The global market is projected to reach \$2,062.6 billion by 2032.
- China's Made in China 2025 initiative and the Big Fund signal Beijing's determination to close the gap with the US and Taiwanese semiconductor capabilities, as well as achieve self-reliance.
- If the US loses its competitive edge in the semiconductor industry relative to China, it risks becoming politically, economically, and militarily subservient. By strengthening cooperation with like-minded allies, Washington can safeguard its position.

Nvidia Caught in the Middle of US-China tensions

On 31 July 2025, China [raised](#) concerns over potential security risks in Nvidia's H20 artificial intelligence (AI) chip, casting uncertainty over the US company's sales prospects in China. In particular, the Cyberspace Administration of China (CAC) took issue with the proposal for the chips to include tracking and positioning functions. The regulator subsequently summoned Nvidia to a meeting to explain whether the product had any backdoor security risks that could place Chinese user data and privacy rights at risk. Nvidia has [insisted](#) that the chip is "not a military product or for government infrastructure". It appears that the company has failed to persuade Beijing that this is the case. On 10 August 2025, a Chinese state-aligned social media account called Yuyuan Tiantian [concluded](#) that: "When a type of chip is neither environmentally friendly, nor advanced, nor safe, as consumers, we certainly have the option not to buy it".

Following the [introduction](#) of the Chip Security Bill in May 2025, US AI chips were subjected to export regulations requiring them to be equipped with location-tracking systems to aid in detecting diversion, smuggling, or unauthorised use. The company has also struggled to receive approval from Washington to take the devices to the Chinese market. An unprecedented deal was reached on 10 August 2025 for Nvidia to [give](#) the US government 15% of the revenues from chip sales in China in order to obtain export licenses. The arrangement underscores the sensitivities surrounding Sino-American technological competition and the particularly important role of semiconductors. As the world's second-largest economy, China is a critical market for Nvidia, [accounting](#) for 13% of total sales in 2024.

Semiconductors - What is all the Fuss About?

A semiconductor is a material that [conducts](#) electricity under certain conditions. They play a crucial role in modern technology, with applications ranging from smartphones to advanced missile guidance systems. The semiconductor supply chain is a complex, integrated global network, involving numerous stages from design and assembly to testing and distribution.

Advanced semiconductors below 7 nanometres have [played](#) a pivotal role in the current AI revolution, powering the data centres that run large language models (LLMs) such as ChatGPT, Gemini, and DeepSeek.

Given the variety of practical implementations, computer chips have [earned](#) the title of “the oil of the 21st century”. However, it would be a mistake to assume that computer chips only rose to prominence during the past two and a half decades. In the mid-1980s, then-US President Ronald Reagan [asserted](#) the importance of the US’ premiership concerning semiconductors to overcome the Soviet Union’s numerically superior military forces through more intelligent systems. Additionally, unlike oil, which is sourced and refined from multiple suppliers globally, the design and manufacturing of advanced semiconductors is constantly evolving and [concentrated](#) in a handful of companies and countries. This structure creates strategic vulnerability. The significant economic and national security implications of establishing a dominant position have initiated a semiconductor arms race between the US and China, with the two countries competing over the design, manufacturing, and technological progression of advanced chips. Analysts regularly [refer](#) to the situation as a “chip war”.

The global semiconductor market was [valued](#) at \$681.05 billion in 2024 and is projected to grow to \$2062.59 billion by 2032. The world’s major design and production centres are [found](#) in the US, China, Europe, South Korea, Taiwan, and Japan. The design stage is heavily concentrated in the US, which [accounted](#) for 47% of the semiconductor design process in 2023. However, the Netherlands holds a monopoly on the most advanced manufacturing equipment, including ASML’s lithography machines. Similarly, Taiwan leads advanced semiconductor manufacturing through Taiwan Semiconductor Manufacturing Company (TSMC), [producing](#) over 90% of the world’s most advanced chips.

Semiconductors play a crucial role in military technology. Applications [include](#) communication systems, encryption technologies, radar systems, missile guidance, and electronic warfare. Future developments in semiconductor technology will have profound [impacts](#) on defence systems, continuing to transform the landscape of military strategies and capabilities. Due to this importance, supply chain security and control over advanced chips heavily influence the military balance between nations.

US Design Dominance

The US enjoyed a first-mover advantage in the semiconductor industry. The transistor was [invented](#) in 1947 by US scientists at Bell Labs. During the 1950s and 60s, US firms such as Fairchild Semiconductors and Texas Instruments pioneered the development of the integrated circuit and microprocessor, investing in research and development, talent acquisition, and patent generation. Companies including NVIDIA, Intel, AMD, Broadcom, Qualcomm, and Texas Instruments play leading roles.

Presently, US firms [account](#) for 46% of global chip design sales and 72% of chip design software and license sales. The revenue from these sales contributes to continued investment in research and development, preserving the US’ dominant position in the field of semiconductor design. The CHIPS Act, enacted in 2023, demonstrated Washington’s continued recognition of the importance of semiconductors by [committing](#) \$53 billion over five years to support investment in research and development and capital investment.

However, there are areas in which the US has declined relative to other countries. For instance, while the US once [accounted](#) for 100% of the manufacturing capacity of semiconductors, today that capacity is 8%.

The Role of Taiwan

Taiwan holds a dominant position in the global semiconductor industry, particularly regarding advanced chips. Taiwan produces 92% of the world's most advanced semiconductors, mostly through Taiwan Semiconductor Manufacturing Company (TSMC). The firm's three and five-nanometre nodes [power](#) everything from smartphones to stealth fighters. With the decline in US onshore semiconductor manufacturing, US firms now firmly [rely](#) on Taiwan for the production of the most advanced devices. The critical importance of TSMC to US defence and national security further increases the geopolitical importance of Taiwan and the risks associated with a Chinese invasion of the island.

The Challenge from China

Recognising the strategic importance of closing the gap with the US and Taiwan, China has prioritised the development of its domestic semiconductor industry. In 2015, the country [launched](#) its ambitious "Made in China 2025" industrial policy, setting out to reduce foreign reliance by meeting 70% of its semiconductor demand through domestic production. China's National Integrated Circuit Industry Investment Fund, commonly known as the Big Fund, has seen several phases of investment. While the first phase, [formalised](#) in 2014, involved an investment of 139 billion yuan (\$19.2 billion), the second phase, launched in 2019 with 204 billion yuan (\$29 billion). The third phase began in December 2024 with a hefty investment of 340 billion yuan (\$47.5 billion). In addition to state support, the programme has drawn upon investment from state-owned enterprises, financial institutions, private investors, and major banking institutions. Reflecting the long-term importance of semiconductors, the duration of phase three is set to last until 23 May 2039.

In addition to extending self-reliance, China [hopes](#) to secure technological leadership, find new growth sectors, and create high-tech jobs. These efforts are particularly crucial given China's search for new growth drivers in response to the country's economic slowdown and persistent structural challenges, including a property sector crisis, youth unemployment, and an ageing population.

Sino-American Strategic Competition

The important role semiconductors played during the Cold War demonstrates that such a rivalry is not unfamiliar territory for Washington. However, with a larger economy and more advanced technological base than the Soviet Union possessed, China represents an even more formidable strategic challenge. If the US loses its competitive edge in the semiconductor industry relative to China, it risks [becoming](#) economically, politically, and militarily subservient. Whereas from the Chinese perspective, failure to match or surpass advanced US chips will prevent the country from realising its objective of prevailing in its strategic competition with Washington. Although China is strong in lower-end chip assembly, it [lags](#) in advanced semiconductor manufacturing.

In the US, there is bipartisan recognition of the importance of preventing China from achieving a dominant position in the domain of advanced semiconductors. A range of sanctions and export controls have been imposed by consecutive administrations to achieve

this. During US President Donald Trump's first administration, the decision was taken to [cut](#) off Chinese companies' access to advanced US semiconductors and production technology. Washington has also embarked on a campaign to pressure third-party countries such as the Netherlands into implementing similar restrictions on Beijing. The Biden administration subsequently [expanded](#) the limits on China's access to advanced microchip technology. By highlighting Beijing's reliance on the US for top-end semiconductors, these measures sped up China's drive for self-sufficiency.

Although Taiwan is a US ally, Washington's reliance has introduced strategic vulnerabilities. As [highlighted](#) by the Chair and Vice Chair of the National Security Commission on Artificial Intelligence: "Given that the vast majority of cutting-edge chips are produced at a single plant separated by just 110 miles of water from our principal strategic competitor, we must re-evaluate the meaning of supply chain resilience and security". A [takeover](#) of Taiwan's chip industry would give China significant leverage over the global economy. Washington is working to reduce its reliance on Taiwan by investing in domestic production and diversifying supply chains. Trump's threat of imposing massive tariffs on the global chip industry successfully [persuaded](#) TSMC to boost its existing \$65 billion US presence by \$100 billion. Although the size of the deal requires approval from the government in Taipei, which has not been given, the move could lead to the eventual development of crucial technology in the US, far away from the threat of China. However, given that the deal could diminish Taiwan's so-called "silicon shield" and reduce the incentive for US intervention in any conflict with China, it remains to be seen whether the Taiwanese government will approve the plans.

Conclusion - Failure is Not An Option

With all major US defence systems [relying](#) on semiconductors for their performance and the civilian economy reliant on chips to function, any reduction in the US' dominance relative to China would pose dire consequences. Securing the integrity of the supply chains that design, manufacture, package, and distribute advanced semiconductors is imperative. Recognising that this is not a challenge that must be faced alone could strongly benefit Washington's strategy. By strengthening cooperation with like-minded allies, the US can safeguard its position against China's bid for dominance. There have been promising examples suggesting that this is occurring. For instance, while US companies, including Intel and GlobalFoundries, have [received](#) EU funding, UK defence company BAE Systems was the first firm to receive funds under the US CHIPS and Science Act. By focusing on specialisation, with different countries and companies managing various stages along the supply chain, the US and its allies can ensure the best possible end product.

Business Implications

The world witnessed how a chip shortage can impact global trade during the COVID-19 pandemic, when factory closures [snowballed](#) into a global shortage that delayed manufacturing and sent prices of cars and other products soaring. Although the chip war isn't currently triggering global shortages, it does raise the prospect of concentrated supply disruptions. With regulatory pressures, market realignments, and heightened security concerns stemming from a geopolitical competition that shows few signs of subsiding, the number of companies requiring tailored strategic advice is growing. The challenges faced by Nvidia underscore how individual companies can become caught in the crossfire of the Sino-American technological rivalry. Global Situational Awareness's planning and forecasting

services are supporting clients in navigating geopolitical shifts such as those seen in the semiconductor industry.