

# The world is dangerously dependent on Taiwan for semiconductors

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As China pushes the world to avoid official dealings with Taiwan, leaders across the globe are realizing just how dependent they've become on the island democracy.

Taiwan, which China regards as a province, is being courted for its capacity to make leading-edge computer chips. That's mostly down to Taiwan Semiconductor Manufacturing Co., the world's largest foundry and go-to producer of chips for Apple Inc. smartphones, artificial intelligence and high-performance computing.

Taiwan's role in the world economy largely existed below the radar, until it came to recent prominence as the auto industry suffered shortfalls in chips used for everything from parking sensors to reducing emissions. With carmakers including Germany's Volkswagen AG, Ford Motor Co. of the U.S. and Japan's Toyota Motor Corp. forced to halt production and idle plants, Taiwan's importance has suddenly become too big to ignore.

U.S., European and Japanese automakers are lobbying their governments for help, with Taiwan and TSMC being asked to step in. Chancellor Angela Merkel and President Emmanuel Macron discussed the potential for shortages last year and agreed on the need to accelerate Europe's push to develop its own [chip](#) industry, according to a French official with knowledge of the matter.

The [auto industry](#)'s pleas illustrate how TSMC's chip-making skills have handed Taiwan political and economic leverage in a world where technology is being enlisted in the great power rivalry between the U.S. and China—a standoff unlikely to ease under the administration of Joe Biden.

Taiwan's grip on the semiconductor business—despite being under constant threat of invasion by Beijing—also represents a choke point in the [global supply chain](#) that's giving new urgency to plans from Tokyo to Washington and Beijing to increase self-reliance.

By dominating the U.S.-developed model of outsourcing chip

manufacture, Taiwan "is potentially the most critical single point of failure in the entire semiconductor value chain," said Jan-Peter Kleinhans, director of the technology and geopolitics project at Berlin-based think tank Stiftung Neue Verantwortung.

The Trump administration exploited that pinch point to deny Beijing access to technology. By banning access to all U.S. chip technology including design, it was able to cut off the supply of semiconductors from TSMC and other foundries to Huawei Technologies, hobbling the advance of China's biggest tech company.

It also negotiated with TSMC to establish a \$12 billion chip fabrication plant in Arizona. South Korea's Samsung Electronics Co. is set to follow, with a \$10 billion facility in Austin, Texas.

The "CHIPS for America Act" introduced to Congress last year aims to encourage more plants to be established in the U.S. Michael McCaul, a Texas Republican, plans to reintroduce the bipartisan bill this year with a view to securing \$25 billion in federal funds and tax incentives. McCaul said in a statement he's working with colleagues in the House and Senate "to prioritize getting the remaining provisions of CHIPS signed into law as quickly as possible."

News that Intel Corp., the onetime industry leader, was considering outsourcing production of some chips to TSMC under its former CEO underscored the need for a U.S. player that can fabricate at the leading edge, said a member of the Foreign Affairs Committee staff who is not authorized to speak publicly.

The European Union aims to bolster the bloc's "technological sovereignty" through an alliance armed initially with as much as 30 billion euros (\$36 billion) of public-private investment to raise Europe's share of the global chip market to 20% (without a target date) from less

than 10% now.

It's also encouraging Taiwan to increase investments in the 27-nation bloc, with some success. GlobalWafers Co.—based in TSMC's hometown of Hsinchu—just boosted its offer for Germany's Siltronic AG to value the company at 4.4 billion euros, an acquisition that would create the world's largest silicon wafer maker by revenue.

That's not to say Taiwan is the only player in the semiconductor supply chain. The U.S. still holds dominant positions, notably in chip design and electronic software tools; ASML Holding NV of the Netherlands has a monopoly on the machines needed to fabricate the best chips; Japan is a key supplier of equipment, chemicals and wafers.

But as the emphasis shifts to ever smaller, more powerful chips that require less energy, TSMC is increasingly in a field of its own. And it's helped Taiwan form a comprehensive ecosystem around it: ASE Technology Holding is the world's top chip assembler, while MediaTek has become the largest smartphone chipset vendor.

Tokyo, too, is attempting to attract TSMC to set up in Japan. With 110 billion yen (\$1 billion) earmarked last year for R&D investment and another 90 billion yen for 2021, some of that may go to a TSMC facility, which reports have said the company is considering setting up in Japan.

"TSMC is becoming more and more dominant," said Kazumi Nishikawa, an official working on technology issues at Japan's Economy Ministry. "This is something everybody in the chip industry must find a way to deal with."

China, in its five-year plan presented in October, is channeling help to the chip industry and other key technologies to the tune of \$1.4 trillion through 2025. Yet even that kind of money doesn't negate the need for

Taiwan. Indeed, China has long tapped the island for chip-making talent; two key executives at China's top chipmaker, Semiconductor Manufacturing International Corp., used to work at TSMC: co-Chief Executive Officer Liang Mong Song and Vice Chairman Chiang Shang-yi.

But with Washington stymieing China's progress, there is also speculation that Beijing could resort to stealing chip IP, with Taiwan at the heart of those endeavors.

Taiwanese cyber security firm TeamT5 has observed a steady increase in attacks on the island's chip industry corresponding to the tightening of U.S. export controls on China. While it's not always possible to know if these are Chinese state actors, "they are all attacking the Taiwanese semiconductor industry," Shui Lee, a T5 cyber threat analyst, said.

Fellow analyst Linda Kuo said the Taiwanese government was alarmed by a ransomware attack on TSMC in 2018 and had announced plans for some \$500 million to help the industry become more aware of cyber security issues.

The greater worry is that TSMC's chip factories could become collateral damage if China were to make good on threats to invade Taiwan if it moves toward independence.

TSMC's capital spending of as much as \$28 billion for this year suggests it's going to stay out in front.

"Taiwan is the center of gravity of Chinese security policy," said Mathieu Duchatel, director of the Asia program at the Institut Montaigne in Paris. Yet while Taiwan's status in the global chip supply chain is a "huge strategic value," it's also a powerful reason for Beijing to stay away, said Duchatel, who's just published a policy paper on China's push



for semiconductors.

Assuming Taiwanese forces were to be overwhelmed during an invasion, "there is no reason why they would leave these facilities intact," he said. And preserving the world's most advanced fabs "is in the interests of everyone."

For all the moves to reel back domestic chip fabrication, it's optimistic to think the supply chain for such a complex product as semiconductors could change in short order, Peter Wennink, ASML chief executive officer, told Bloomberg TV. "If you want to reallocate semiconductor build capacity, manufacturing capacity, you have to think in years," he said.

In the meantime, geopolitics means chip shortages could become a more regular occurrence, according to Joerg Wuttke, president of the EU Chamber of Commerce in China.

"This is going to move on to the point where actually because of export controls, because of governmental intervention, there will be all of a sudden supply chain disruptions not just because of capacity problems," he told Bloomberg Television. "So better get prepared."

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