

Expanding the Depth and Breadth of the US-Taiwan Technological Partnership via the Semiconductor Ecosystem

By Andrew Wylegala

As key enablers of technological development, semiconductors are omnipresent in today's digital age. From spaceships and electric vehicles (EV) to 5G and the ubiquitous smartphone, almost every piece of technology humans use requires the support of semiconductors.

No more critical juncture in the complex production of these postage-sized components exists than the technological powerhouse that is Taiwan. Not only is Taiwan the birthplace of the lucrative and much-relied-upon foundry model of contract manufacturing chips for integrated circuit (IC) design houses and tech firms, but it is also home to a complete and well-functioning semiconductor manufacturing ecosystem, replete with a world-renowned packaging and testing sector.

Like many of Taiwan's technological bona fides, the development of this industry would not have been possible without the support, cooperation, and incubation provided by government agencies, private industry, and other institutions in the United States. Indeed, Morris Chang, the founder of the Taiwan Semiconductor Manufacturing Co. and the originator of Taiwan's foundry model, was educated at the Massachusetts Institute of Technology and Stanford and later worked as an engineer and then upper-level manager at Texas Instruments.

Over the years, the two sides have come to work closely with each other in terms of semiconductor trade, investment, and research and development (R&D). For example, the US imports billions of dollars in integrated circuits and other components from Taiwan each year, while Taiwan consistently ranks as the largest export market for US-made semiconductor capital equipment and machinery.

The recent car chip shortage has brought the importance of the semiconductor industry into sharp relief. And while Taiwan's chip suppliers were quickly called into action at the outset, stretching their production to full capacity to help fill the gap, countries around the world have also initiated legislation to grow their domestic semiconductor ecosystems in order to avert a similar crisis in the future. It is clear that chips are critical not only for consumer goods, but also for national security, to the extent that the United States, European Union, Japan, and South Korea have even upgraded the semiconductor industry's status to that of a national strategic industry, moving to invest enormous capital in local chip manufacturing and assembly to lower their dependence on foreign supplies.

Globalize the Chip Supply Chain

There are strong reasons for enhancing semiconductor production capacity on American soil. Given the clear ties between the availability of semiconductors and national security, maintaining the resilience of the domestic semiconductor manufacturing supply chain should absolutely be listed as an urgent priority for the United States. Indeed, it has been noted by at least one of the authors of the US [Creating Helpful Incentives to Produce Semiconductors \(CHIPS\) for America Act](#) that Taiwanese firms such as TSMC and UMC have already been invaluable in contributing to the effort to recover a share of fabrication capacity in the continental United States. In a similar manner, pulling trusted foreign partners beginning with Taiwan into production, advanced manufacturing and basic R&D programs funded under the CHIPS Act and other US government programs would likely accelerate this healthy and, from a US national security perspective, essential development.

Andrew Wylegala, President of AmCham Taiwan and former US Senior Foreign Service Officer, explains that "increasing domestic chip production capacity should be accompanied by the recognition that the semiconductor industry functions most efficiently as a globalized industry."

However, increasing domestic chip production capacity should be accompanied by the recognition that the semiconductor industry functions most efficiently as a globalized industry. In addition to considering the manufacturing efficiency of individual countries and massive capital investment, it is even more crucial to bolster the international ecosystem by combining the strengths of different countries and continually optimizing supply chain efficiency to produce the best technology and products. This is the most efficient production model and has been proven to be incredibly effective, as demonstrated by the rapid development the semiconductor industry has experienced in recent years.

The resources that countries invest in the semiconductor industry, such as technology and talent, work together to create high-efficiency chips, which in turn accelerate innovation and R&D for applications in different sectors such as transportation and medical care. For example, chip innovations contributed to advancements in supercomputing that enabled COVID-19 vaccines to be developed in record time. With many countries contributing to the semiconductor supply chain, more resources are dedicated to creating the fastest and most effective solutions for major issues concerning humanity's survival.

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Deepen US-Taiwan Cooperation

Over the past few decades, the United States and Taiwan have built a complementary and interdependent economic relationship. The two sides have enjoyed long-term and friendly supply chain cooperation and trade ties. The United States is the second largest trade partner of Taiwan, and one-third of the goods it imports from Taiwan are Information and Communications Technology (ICT) related products.

Furthermore, in terms of the IC design industry, the United States is the largest regional market for Taiwan's semiconductor manufacturing industry based on the market shares of IC design brands. Major US tech companies, including NVIDIA and Qualcomm, are the biggest clients of Taiwan's semiconductor manufacturing industry, just as Taiwan semiconductor manufacturers represent the largest regional market for American equipment and material suppliers in terms of total capital expenditures. These mutually dependent, close, and collaborative ties drive the development of the US-Taiwan partnership.

This cooperative model displays tremendous market value. With Taiwan's semiconductor manufacturers investing massive capital to establish fabs and build a highly resilient semiconductor supply chain, American IC design houses free up significant funds to be invested in R&D that can generate greater returns, enabling various innovative applications to be rapidly developed by American high-tech companies. Additionally, this model of cooperation, in which Taiwan assumes primary responsibility for manufacturing, has also helped to relieve the labor shortage problem suffered by the American semiconductor manufacturing industry.

Seek out Future Opportunities for Collaboration

Thus, whether looked at from a market or a supply chain perspective, the United States should not see Taiwan as a competitor but as a trusted ally and key strategic partner in all international alliances. The American Chamber of Commerce (AmCham) in Taiwan and its more than 1,100 members look forward to both sides expanding bilateral investments and in-depth exchanges across industry areas. In terms of semiconductors, 5G, and EVs, AmCham strongly supports the expanded cooperation afforded by the establishment of the Technology Trade and Investment Collaboration (TTIC) framework between the United States and Taiwan last year.

The future of the digital economy will undoubtedly require that the United States and Taiwan work together on innovative technologies, including sustainable manufacturing, information security, and other new-generation applications such as EVs, AI, 5G, or even green energy. American enterprises are proactively investing in Taiwan, assisting their Taiwanese supply chain partners with upgrading their operations and building strong supply chain partnerships. Working hand-in-hand, both governments and industries can build upon their respective areas of expertise and forge a more resilient global supply chain based on sustainable cooperation.

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