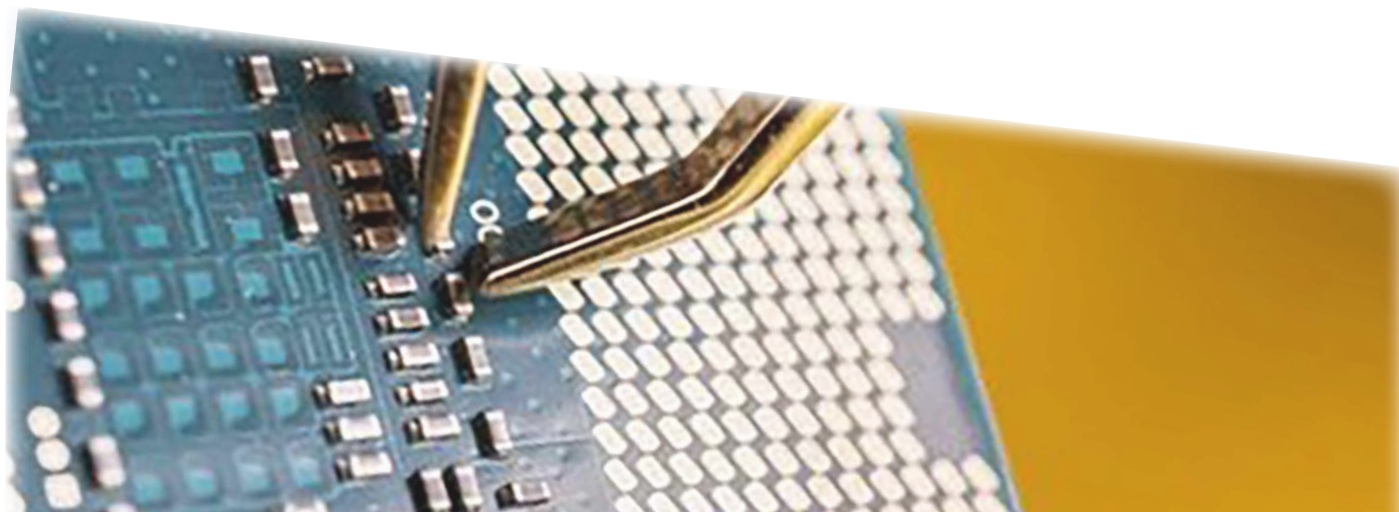


EU-TAIWAN SEMICONDUCTOR SUPPLY CHAIN: RESILIENCE AMID THE DIGITAL AND GREEN TRANSITION

Niklas Swanström and Kurt Abalos



As the European Union (EU) sets ambitious goals of maximizing a ‘Digital Decade’ through its Digital Transition plan and attaining carbon neutrality in its Green Transition plan, technology becomes the essential factor for the region to achieve its vision of a modern Europe. For decades, the region has relied on East Asia as a major source of technological inputs and finished products, especially for semiconductors. Among many major companies in the region, Taiwan’s Taiwan Semiconductor Manufacturing Corporation (TSMC) stands out to be the most important supplier of microchips for many modern economies. However, in recent years, supply chain integrity has become a significant topic for policy discourse amid various factors that may disrupt and negatively affect the flow of goods. This issue brief seeks to provide an overview of the EU-Taiwan semiconductor supply chain in the context of the EU’s Digital and Green Transitions, and suggestions to strengthen the supply line between both sides.

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Introduction

Semiconductors have been instrumental in the creation of modern-day technologies that affect all facets of life such as phones, and home appliances, among others. Moreover, they are used for security and critical infrastructure, such as defense technology, green technology, computers, and others.¹ In Europe’s case, the demand for semiconductors is set to increase over the coming years amid the implementation of the EU’s

Digital and Green Transitions, which seeks to propel the region into a net-carbon zero and digital future.² To establish Europe’s digital sovereignty and increase its reliance on renewable energy resources, advanced technologies are needed to accommodate the shift.³ As a result, critical inputs such as semiconductors must have a steady and secure supply flow into Europe, unaccompanied by political influence.

Although Europe has had a strong manufacturing industry and an export-focused economy, semiconductor production is not among its comparative advantages. Instead, the region sources most of its microchip supply halfway around the world in East Asia. Among the world's top semiconductor manufacturers, TSMC sits as the premier company that supplies the majority of microchips and a monopoly of advanced versions, strengthening Taiwan's importance for Europe amid its major transitions.⁴ However, recent events, such as the pandemic and geopolitical instability, have cast a shadow of uncertainty that jeopardizes the supply chain between Taiwan and Europe. As a response, the EU and Taiwan have been cooperating to strengthen the resiliency of their semiconductor supply chain to weather out the externalities.

Semiconductors in the making

For decades, Taiwan has been leveraging its capacity to manufacture semiconductors, making it an integral member of the global supply chain. In the present day, many companies rely on Taiwanese inputs to manufacture consumer goods, critical technology, and many other products. However, although Taiwan is an indisputable leader in the semiconductor manufacturing industry, it too relies on many imports needed to produce such technology. It could be noted that Taiwan has the lead in both fabrication and assembly, especially in the high-end segments, but design is still primarily in the U.S. with a 65 percent control.

Among the major necessary elements in microchip production is electricity. According to a study, TSMC alone uses 500 million kWh annually for its operations in Taiwan, which significantly overshadows the average electricity usage of high-tech industries on the self-governing island.⁵ In an overview, 12 percent of Taiwan's energy supply goes to the industrial sector.⁶ According to Taipower, Taiwan's state-owned enterprise for electricity, gas and coal made up 78.2 percent of the company's energy production, while renewable energy was at 2.2 percent last year.⁷ Likewise, Taiwan imports 98 percent of its thermal energy sources, while energy self-sufficiency was at 1.94 percent.⁸ Imported inputs include crude oil and petroleum (44 percent of total

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energy needs) from the Middle East, coal (30 percent of total energy needs) mostly from Australia, and natural gas (19 percent of total energy needs) from the U.S., Canada, and Australia.⁹ Although renewables comprise a minor contribution to Taiwan's energy mix, there are positive prospects for its growth. Between 2012 and 2022, renewable energy sources almost doubled from 4.6 percent to 8.6 percent. Major sources include solar, hydroelectric, waste gas, and wind.¹⁰ There are even plans by the government to invest more in offshore wind production to strengthen energy supply.

In addition to the high demand for electricity, Taiwan's semiconductor foundries require various chemicals and other intermediary inputs that are imported from different suppliers. According to a report, more than 70 countries are involved in the semiconductor industry.¹¹ With a comparative advantage in semiconductor manufacturing, Taiwan is among the largest markets for microchip inputs and manufacturing technology, such as silicon wafers, lithographers, and various kinds of chemicals. In 2021, Taiwan purchased USD 24 billion worth of semiconductor fabrication equipment from the U.S., Japan, South Korea, China, and other parts of the world.¹² It then consumed more than

a quarter of the world's supply of wafer fabrication materials in the following year. Although Europe relies much on Taiwan's supply of semiconductors, Taiwan's foundries rely much on European technology and other intermediary inputs, such as ASML's one-of-a-kind advanced EUV lithography machines.¹³

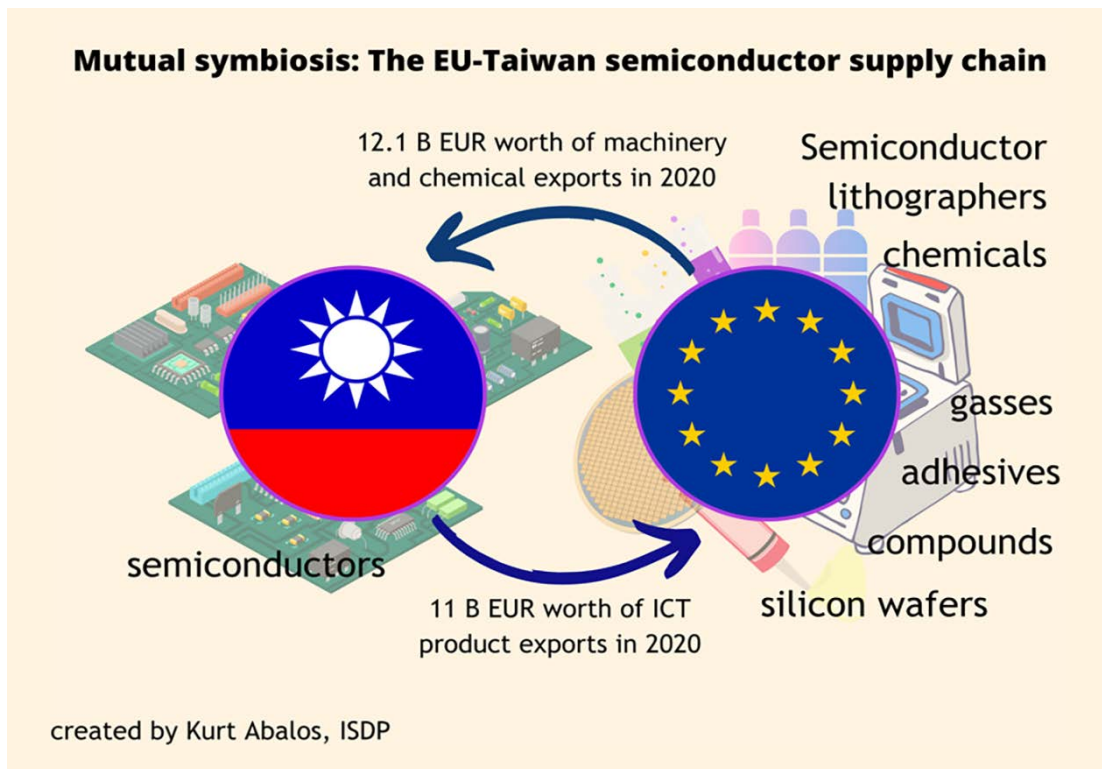
Altogether, Taiwan may be the world's leading manufacturer of normal and advanced semiconductors but it is very dependent on other supply chains that provide the necessary inputs and capital for their production. Given the great reliance on imported sources of energy, Taiwan's industrial capacity is endangered not only by conflicts far away from its island, but also direct threats from China. For instance, oil prices in Taiwan depend on the stability of Gulf state countries, where most of its oil imports are sourced. Likewise, Taiwan's semiconductor production efficiency may be jeopardized by shortages of rare earth elements from different countries, which are needed to create silicon wafers. Similar to Europe's situation, Taiwan is vulnerable to external shocks as it is embedded in the large and intricate web of interdependence in the semiconductor industry, but different from Europe,

Taiwan looms under a direct threat of sanctions or even invasion from China that will threaten any imports.

The Silicon Shield's Weakness

As Taiwan's semiconductor manufacturing industry relies on imported inputs, it significantly raises the risk of supply chain disruption as there are multiple unknown and dynamic factors that Taiwan alone cannot control. Among the most pressing is the geopolitical context that Taiwan is currently facing. Amid increasing tensions between the U.S. and China, China's growing actions to stake its South China Sea claims, and many others, Taiwan is situated in a region riddled with possible flashpoints. As a result of increasing tensions in the region, despite the great interdependency among regional neighbors, uncertainty and miscalculation heighten the risk of supply chain disruptions.¹⁴ Taiwan lies in a powder keg-like region as tensions rise among neighbors and hegemonic competitors.

Among the most pressing and direct tensions that Taiwan faces is China's increasing actions to strengthen its sovereignty claim over the island. After the election



of former Taiwan President Tsai Ing-wen in 2016, cross-strait relations have been at a low point amid China's opposition to the government. During the visit of former U.S. House Speaker Nancy Pelosi to Taiwan, China conducted military drills and launched a missile to simulate a blockade of Taiwan. Since then, China has been increasing its 'gray zone' tactics, such as conducting military flight patrols near Taiwan, sailing military vessels through Taiwan-administrated waters, and adjusting unilaterally flight paths into Taiwan-controlled airspace. Analysts predict a continuing trend in the next four years as President Lai Ching-te of the Democratic Progressive Party won an unprecedented third term in office. Despite great volumes of trade and commerce in the Taiwan Strait, tensions are expected to rise and further complicate stability in the region. This is not only a question about a full-scale invasion of Taiwan, but also the impact of more or less limited blockade of Taiwan and cyber-attacks on its digital infrastructure. Chinese de facto control of the South China Sea would, despite China's reassurances, reduce free and open access through the region, not least for Taiwan, which it argues is an integral part of its territory and is firm in punishing 'separatist forces', such as terminating international trade.

Despite Europe's safe geographic distance from the region, any supply chain disruption affecting Taiwan will immediately be felt in Europe. The European Commission's study noted that Asia takes up 65 percent of the market share of the semiconductor industry alone and identified 50 choke points that have a risk of being disrupted. For instance, a partial or full blockade of Taiwan would instantly create negative consequences on major electronics manufacturers greater than the microchip shortage at the height of the COVID-19 pandemic.¹⁵ Moreover, Taiwan's high integration rate into the world economy has heightened the possibility of creating a ripple effect in other European industries that are outside the focus of its Digital and Green Transitions.¹⁶ It would be virtually impossible to continue any advanced production without Taiwan, and the high-end semiconductors have functioned as a nuclear deterrence of sorts (see box: Taiwan's 'nuclear' deterrence).

Taiwan's 'nuclear' deterrence

Rumors have been spreading that Taiwan would destroy its production capacity in microchip production in event of a Chinese invasion, threatening global production and diminishing international trade for years. This has forced both China's and Taiwan's international partners to reconsider their dependency in the region and diversify to more stable alternatives. Likewise, Taiwan has been investing more in its capacity to uphold its security. Taipei carefully ensures that the threat is not too apparent but does not wholly discount such a possibility. It is, therefore, very unlikely that Taiwan would relocate its high-end production to other states, as it would impact its national security. The discussions that Europe and the U.S. have a deficit of technical personnel might be true, but there is growing reluctance for both to continue their dependency on Taiwan, thus affecting the island's Silicon Shield.

Hence, Europe must appreciate the gravity of Taiwan's situation in the global political economy and adopt policies that will prevent disruptions and catastrophes in the semiconductor supply chain. It is imperative that the EU clarify its red lines for military actions and the consequences of a direct military invasion or blockade of Taiwan. This is, as noted, not a question of political status, but ensuring that the economic lifelines of Taiwan are respected internationally. By clarifying the EU's position, and ensuring that consequences are evident for any military aggressor, there is a better chance of avoiding another Ukraine.

After understanding the risks of the EU's interdependency on Taiwan's semiconductor supplies,

the union must adopt various measures to strengthen access to microchips amid its push for a digital and greener future. Among the first steps is to identify the weak links in the supply chain to anticipate possible scenarios before they happen.¹⁷ For instance, a possible chink in the EU-Taiwan semiconductor supply chain is Taiwan's heavy reliance on energy imports, which may be susceptible to adverse developments such as the current Israeli-Hamas war, Houthi rebel piracy in the Red Sea and the Gulf of Aden, or even potential maritime supremacy of China in the South China Sea that would effectively blockade Taiwan. As a result, energy prices would increase, prompting a potential rise in prices and a decrease in the supply of semiconductors. Another potential weakness of the EU's reliance on Taiwanese imports is the shortage of other imported intermediary inputs necessary for the manufacturing semiconductors, such as silicon wafers, chemicals, and critical machinery. Such shortages will also raise prices and delay production, which jeopardizes the EU's Digital and Green Transitions. In retrospect, strengthening the EU-Taiwan semiconductor supply chain entails fortifying Taiwan's connection with the rest of the global economy from geopolitical tensions.

Reviving Europe's Factory

Currently, the EU's response to strengthen its supply chain of semiconductors is by "homeshoring". Through the EU Chips Act, the region aims to revive its semiconductor manufacturing capacity by doubling it to 20 percent of global chips by 2030.¹⁸ The EU has set aside EUR 43 billion worth of investments to shore up domestic industry among its member-states. In support of the EU's initiative, Taiwan has engaged various member-states in improving their semiconductor manufacturing capacity. Among the most significant is TSMC's support for the European Semiconductor Manufacturing Company in Dresden, Germany, and Universal Scientific Industrial Co.'s Polish investment in a manufacturing facility. Other Taiwanese support initiatives include inter-corporation collaboration for research and development, sponsored education programs, and facilitated technology transfers. However, it is important to note that the EU's 'homeshoring' policy runs counter to the status quo of the EU-Taiwan

High risk, high rewards

As Europe intends to revive its semiconductor manufacturing capacity, it must address the industry's exceptionally high sunk-cost investment to become sustainable. Among the high initial costs businesses would experience is procuring capital-intensive equipment such as lithographers. For instance, TSMC plans to use ASML's latest lithographer, which costs more than EUR 320 million. Fortunately, the most advanced lithographers are still produced in the EU, arguably adding to European expertise and tax as an advantage of a low-cost barrier for those entering the industry. However, property and building facilities are another factor amid rising labor costs and materials. Likewise, sustaining efficient operations entails the procurement of costly maintenance and high-quality inputs for great yields and economies of scale. Imports and other segments that need to be developed from scratch are more expensive and will need support. Case in point, Taiwan has been giving its semiconductor industry great attention and support as it has provided as high as 30 percent tax cuts on companies' annual income taxes. Hence, should Europe want to continue reviving its semiconductor manufacturing, it should consider providing great amounts of state support for businesses to enter the industry and become sustainable in the long run, such as subsidies, tax incentives, and deregulation among many others.

division of labor as the EU seeks to corner its share of the semiconductor market, which may compete with Taiwan's manufacturing dominance as well as access to

European intermediate inputs—while in the national interest of the European Union, it leaves Taiwan vulnerable.

Rather than enacting more policies to strengthen Taiwan's capacity to meet Europe's semiconductor demand, the EU seeks to minimize the risk of interdependency by moving away from the mutually beneficial arrangement. The EU seeks to drive up domestic production by attracting investments and providing support for companies that are willing to take on the risky and costly business of beginning semiconductor production instead of relying on Taiwan's robust manufacturing capacity. Notably, the EU will have to address Europe's high entry barrier environment for business as costs in Taiwan and other Asian countries are more conducive for companies. Here, the automation of industries or a whole new regime of subsidies could save European production, but at the moment the costs are prohibitive. Overall, an efficient workforce and a more liberal business environment may entice businesses to invest in the industry.

Furthermore, despite Taiwan's continued support for Europe's venture of reviving its manufacturing capacity, the semiconductor leader is not keen on vacating its

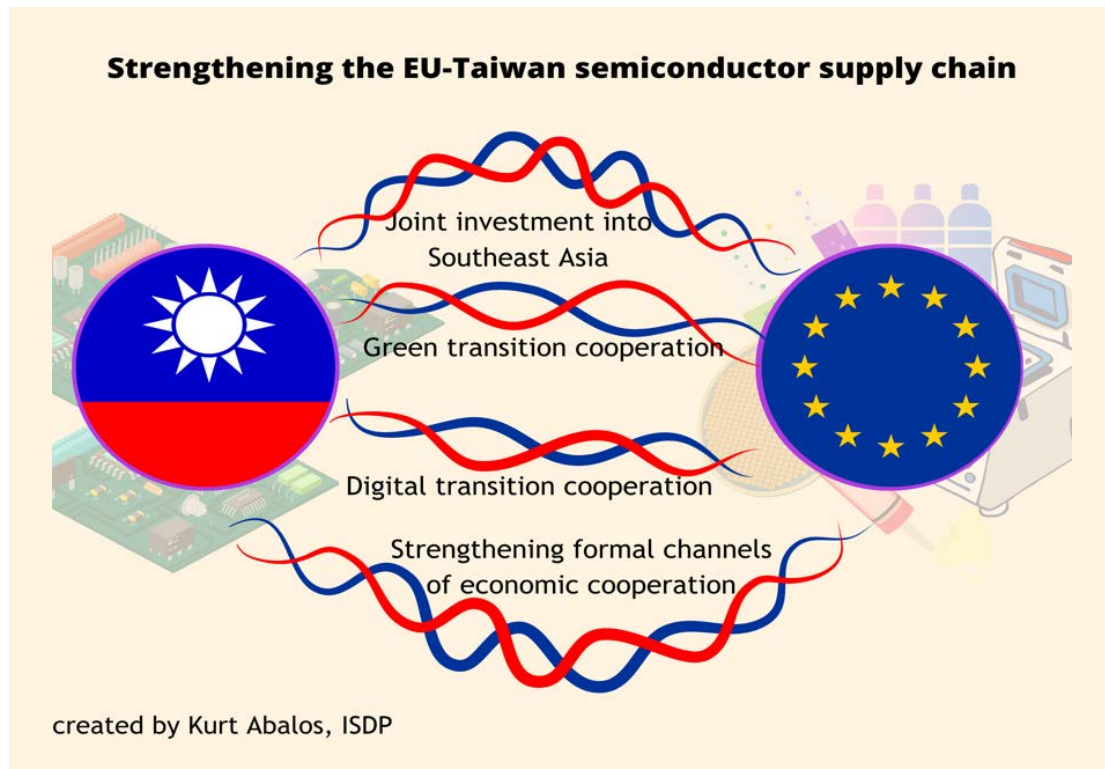
“The EU will have to address Europe's high entry barrier environment for business as costs in Taiwan and other Asian countries are more conducive for companies. Here, the automation of industries or a whole new regime of subsidies could save European production, but at the moment the costs are prohibitive.”

position willingly as it would be counterintuitive to its interests. For Taiwan, Europe is a marketplace for its products and a supplier of technology to manufacture semiconductors, but not primarily an investment destination. Therefore, Europe's policies must account for Taiwan's interests in addition to addressing external disruptions to the EU-Taiwan supply chain, to strengthen their interconnectedness. Compromises could easily be struck, but it would force Europe to ensure that Taiwan's position is not compromised.

What Else can be Done?

Another option for Europe to strengthen its semiconductor supply is by investing in Taiwan's respective Digital and Green Transitions. Noting the high rates of imported energy sources, Taiwan's industrial capacity may be at risk of geopolitical tensions that will disrupt supply chains. As a response, the Taiwanese government and some major companies have been studying how they may adopt renewable energy sources in their mix to mitigate the risk of energy shortages. It may be possible for Europe to use its comparative advantage of sourcing energy from renewables, such as Sweden's experience, through selling European green technology and conducting technology transfers, joint ventures, and research and development projects.¹⁹ The EU may also direct the European Investment Bank to support Taiwan's Green Transition through the European Fund of Sustainable Development.²⁰ Moreover, digitization is also a venture for cooperation between the EU and Taiwan. Amid Taiwan's labor shortage, its semiconductor industry is facing a scarcity of human resources.²¹ Given that both economies are aging societies, maintaining cost-efficient semiconductor production requires expensive labor.

However, the advent of modern technology and artificial intelligence may help lessen the cost. Amid the EU's shift towards a 'Digital Decade', there may be an avenue of collaboration to share practices and conduct research and development, which may provide its semiconductor industry with a steady flow of labor for a more sustainable future. Likewise, Taiwan would be incentivized further to support Europe's Digital Transition and technology development by



strengthening the integrity of the semiconductor supply chain.

The EU may also strengthen its ties with the self-governed island by supporting its presence in economic-related multilateral institutions or crafting unilateral agreements among Taiwan’s top importers of semiconductor inputs. Considering Taiwan’s unique diplomatic status, it is only part of some important but outdated and ineffective international organizations such as the World Trade Organization. Despite its large footprint in the global economy, it is not well represented by international organizations that delve into topics related to global trade and economy, which leaves Taiwan compromised on the world stage.²² The EU may further aid Taiwan’s connection by supporting its international presence or crafting limited alliances to strengthen supply chains of necessary inputs. Currently, the EU interacts with Taiwan through several other initiatives and there are prospects of ties becoming stronger. For instance, the EU and Taiwan may improve relations through the EU-Taiwan Industrial Policy Dialogue Mechanism, and the Dialogue on the

Digital Economy, among many others.²³ Moreover, a strengthened relationship with Taiwan showcases the EU’s interests in the region, assuring other players of its intentions and possibly decreasing the risks of military threats and blockades of Taiwan due to the increased costs for any hostile power.

Similar to “homeshoring”, the EU may aid in diversifying Taiwan’s semiconductor manufacturing capacity into Southeast Asia. Although Taiwan seeks to maintain its leadership in the industry, it has been constrained by relying on its factories on the island alone. Hence, it has invested in other factories globally but with certain limitations to preserve its competitiveness. A possible destination to increase resiliency and Taiwan’s production strength is Southeast Asia.²⁴ Unlike Europe’s costly business environment, Southeast Asian economies are relatively more conducive for businesses due to various factors. Emerging economies such as Malaysia, Vietnam, and the Philippines already have established semiconductor industries and could be further advanced with the help of the EU’s Global Gateway campaign and Taiwan’s New Southbound Policy. There are challenges

with infrastructure, the workforce, and corruption, but Southeast Asia has increasingly become an interesting alternative for both the EU and Taiwan.

Conclusion

As Europe aims for a digital and green future, advanced technologies have become essential to achieving such goals. Simultaneously, Taiwan's semiconductor supplies have become critical for Europe to create such technologies, emphasizing supply chain security. However, geopolitical tensions have created uncertainty and raised risks of disruption, which jeopardizes the EU's vision. Like Europe, Taiwan heavily relies on the global economy for its semiconductor manufacturing as it imports energy sources, natural resources, and intermediary inputs from different parts of the world. As a response, the EU announced its Chips Act seeking to revive Europe's semiconductor foundries and maintain a secure supply of microchips for its goals.²⁵

However, the EU may conduct other initiatives to strengthen its supply chain of semiconductors from Taiwan, such as investing in Taiwan's Digital and Green Transitions, supporting Taiwan's membership in multilateral organizations, and investing in Southeast Asia's semiconductor manufacturing capacity. Europe's demand for semiconductors will grow in the following years, and it must find a stable source for inputs, whether it be "homeshoring" or strengthening Taiwan's supply chains against disruptions. In addition, the EU must acknowledge and account for Taiwan's interests in crafting and implementing policies, for both sides to effectively cooperate to create a strong and sustainable supply chain.

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References

- Arrian Ebrahimi and Yipei Lu, "Taiwan vs US Chip Subsidies – Bolstering the Sacred Mountain," May 23, 2023, <https://chipcapitols.substack.com/p/taiwan-vs-us-chip-subsidies-bolstering>.
- Gaurav Tembey, Adriana Dahik, Christopher Richard, and Vaishali Rastogi, "Navigating the Costly Economics of Chip Making," BCG Global, September 29, 2023, <https://www.bcg.com/publications/2023/navigating-the-semiconductor-manufacturing-costs>.
- Chetan Arvind Patil, "The Economics of Semiconductor Yield," January 4, 2024, <https://www.chetanpatil.in/the-economics-of-semiconductor-yield/>.
- Toby Sterling, "ASML's next Chip Challenge: Rollout of Its New \$350 Mln 'high Na Euv' Machine," *Reuters*, February 10, 2024, <https://www.reuters.com/technology/asmls-next-chip-challenge-rollout-its-new-350-mln-high-na-euv-machine-2024-02-09/>.
- European Economic and Trade Office in Taiwan, "歐盟—台灣雙邊關係概況 EU–Taiwan Relations 2021," July 26, 2021, https://www.eeas.europa.eu/sites/default/files/2021_eu-taiwan_relations_brochure.pdf.

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Endnotes

- 1 Niklas Swanström, and Mrityika Guha Sarkar, “Japan, Taiwan, and EU in a Global Supply Chain Partnership?” *In Defense of the Liberal International Order*, 149–65 (Stockholm, Sweden: Institute for Security and Development Policy, 2024), <https://www.isdp.eu/publication/in-defense-of-the-liberal-international-order/>.
- 2 European Commission, “A Europe Fit for the Digital Age,” n.d., https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age_en; European Commission, “The European Green Deal,” n.d., https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.
- 3 Ibid.
- 4 Ibid.
- 5 Chien-chung Chang, and Frances Huang, “TSMC Maintains Long-Term Profit Margin Goal despite Power Rate Hikes - Focus Taiwan,” *Focus Taiwan*, March 23, 2024. [https://www.taipower.com.tw/tc/chart_m/a01_%e9%9b%bb%e5%8a%9b%e4%bc%9b%e9%9c%80%e8%b3%87%e8%a8%8a_%e9%9b%bb%e6%ba%90%e9%96%8b%e7%99%bc%e8%a6%8f%e5%8a%83_%e6%ad%b7%e5%b9%b4%e7%99%bc%e8%b3%bc%e9%9b%bb%e9%87%8f%e5%8f%8a%e7%b5%90%e6%a7%8b.html?230224](https://focustaiwan.tw/business/202403230011#:~:text=TSMC%20is%20said%20to%20belong,500%20million%20kWh%20per%20year;Feng-FanLiao,andWun-HwaChen,“Willthemanagementstructureofenergyadministratorsaffecttheachievementoftheelectrical efficiency mandatory target for Taiwan factories?” <i>Energies</i> 14, no. 7 (2021).6 Feng-Fan Liao, and Wun-Hwa Chen, <i>ibid.</i>7 “Taipower System’s Power Generation and Purchase over the Years,” 圖表 – 台灣電力股份有限公司, 2024. <a href=).
- 8 Pacific Green Energy, “綠能知識庫】台灣能源情勢懶人包 | 認識台灣能源政策、能源比例與再生能源現況: PGE 太平洋綠能: 太陽能板種電: 全民電廠.” PGE 太平洋綠能 | 一起用太陽能板種電, 2023, <https://blog.pgesolar.com.tw/2021/02/25/%E5%8F%B0%E7%81%A3%E8%83%BD%E6%BA%90>.
- 9 Joseph Webster, “Does Taiwan’s Massive Reliance on Energy Imports Put Its Security at Risk?” Atlantic Council, November 29, 2023, <https://www.atlanticcouncil.org/blogs/new-atlanticist/does-taiwans-massive-reliance-on-energy-imports-put-its-security-at-risk/>.
- 10 Pacific Green Energy, n. 8.
- 11 Akhil Thadani, and Gregory C. Allen, “Mapping the Semiconductor Supply Chain: The Critical Role of the Indo-Pacific Region,” CSIS, May 30, 2023, <https://www.csis.org/analysis/mapping-semiconductor-supply-chain-critical-role-indo-pacific-region>.
- 12 Ibid.
- 13 European Council, “The Semiconductor Ecosystem,” July 12, 2022, <https://www.consilium.europa.eu/media/58112/220712-the-semiconductor-ecosystem-global-features-and-europe-s-position.pdf>.
- 14 Steve Banker, “The World’s Most Vulnerable Supply Chain Impacts All Supply Chains,” *Forbes*, February 20, 2023, <https://www.forbes.com/sites/stevebanker/2023/02/17/the-worlds-most-vulnerable-supply-chain-impacts-all-supply-chains/?sh=46bacb444cd6>.
- 15 Peter Sayer, “Will Taiwan Be the next Supply Chain Bottleneck for It?” CIO, April 19, 2023, <https://www.cio.com/article/474431/will-taiwan-be-the-next-supply-chain-bottleneck-for-it.html>.
- 16 Stephen Nagy, “Taiwan’s Pivotal Role in Supply Chains in the Indo-Pacific: Protecting a Global Public Good,” Canadian Global Affairs Institute, February 2024, https://www.cgai.ca/taiwans_pivotal_role_in_supply_chains_in_the_indo_pacific_protecting_a_global_public_good.
- 17 Niklas Swanström, and Mrityika Guha Sarkar, n. 1.
- 18 European Commission, “European Chips Act,” n.d., https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-chips-act_en.
- 19 Brian Iselin, “Taiwan’s Energy Transition: Opportunities for Collaboration with Sweden and the EU,” Institute for Security and Development Policy, April 2024, <https://www.isdp.eu/publication/taiwans-energy-transition-opportunities-for-collaboration-with-sweden-and-the-eu/>.
- 20 European Commission, “European Fund for Sustainable Development Plus,” n.d., https://international-partnerships.ec.europa.eu/funding-and-technical-assistance/funding-instruments/european-fund-sustainable-development-plus_en.

-
- 21 CakeResume, “Labor Shortage in Taiwan’s Semiconductor Sector & the Vital Role of Southeast Asian Talents,” LinkedIn, April 19, 2024, <https://www.linkedin.com/pulse/labor-shortage-taiwans-semiconductor-sector-vital-role-hc7mc/>.
 - 22 Jörn-Carsten Gottwald, Steffi Weil, and Markus Taube, “The European Union, Taiwan and Global Supply Chain Security,” November 2022, https://reinhardbuetikofer.eu/wp-content/uploads/2022/12/EU-Taiwan-Studie_digital_final.pdf.
 - 23 Ibid.
 - 24 Niklas Swanström, and Lwanga Egbewatt Arrey, “EU-Japan-Taiwan Cooperation: Building a Blue Supply Chain,” Institute for Security and Development Policy, July 2023, <https://www.isdp.eu/publication/eu-japan-taiwan-cooperation-building-a-blue-supply-chain/>.
 - 25 European Commission, n. 20.