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Understanding Taiwan's Projection of Niche Power through Economic Statecraft in Southern Africa

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The Republic of China (Taiwan) has done much to reset how diplomacy stands as a viable approach in Southern Africa. In a region where it runs fewer embassies or representative offices and faces intense pressure from the People's Republic of China (PRC), Taiwan has followed a familiar playbook, that of building influence through economics as opposed to competing through politics. This is not unique to Southern Africa alone, Taiwan uses the same logic behind the New Southbound Policy in dealing with matters towards Southeast and South Asia, where formal diplomacy is the same, narrow. What sets Southern Africa apart is the extent of the economic footprint in terms of the massive production facilities, businesses, skills and supply chain presence that exist beyond trade ties alone. This type of industrial diplomacy strategy often will lead to the integration of Taiwan into the production systems of partner economies in the region.

Taiwan's diplomatic space in Africa has closed significantly in the last three decades, in that only Eswatini still maintains formal diplomatic ties with Taiwan. Most of the other countries (such as South Africa) shifted their recognition to Beijing in the late 1990s and early 2000s to fall strictly in line with the One China policy. This recalibration took place with the substantial growth of China's economic footprints on the continent. Africa-China trade had surpassed USD 280 billion by 2023, making Beijing the biggest friend to trade with in the continent.

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Image: Officials at Taiwan-supported Maphungwane–Lukhetseni potable water supply project in Eswatini, part of a rural infrastructure and sanitation initiative aimed at expanding access to clean water and strengthening development cooperation. (Image source: Embassy of the Republic of China (Taiwan) in the Kingdom of Eswatini/Wikimedia Commons)

That said, Taiwan refused to be bogged down. Instead, it has leaned towards enabling economic ties as the crux of its foreign policy. Research from the United Nations Conference on Trade and Development has shown that relationships built on investments and production pipelines are more likely to generate lasting economic ties than ones relying on trade alone. Accounting for a sizable portion of Africa's industrial output, with South Africa alone responsible for one-fifth of the continent's value-added manufacturing, Southern Africa is the right place for this approach to blossom. This makes it a strategic gateway for Taiwanese investors willing to put in their resources in the longer term.

From Trade to Industrial Diplomacy

In the late 1970s to peak of the 1980s, Taiwan cultivated a strong relationship with Southern Africa that was, and still is, based on trade. Taiwanese companies specialized in machinery and spare parts, electronics, plastics, and agricultural industrial inputs exported their products into the region. In 2018, the value of Taiwan's imports from Africa had plummeted to around USD 2.5 billion and USD 2.1 billion from exports. Consequently, there were fluctuations in Taiwan's trade with Africa, a reality that shows limitations arise when engagement between two countries is based on only trade. In response, Taiwan swayed to a more robust economic strategy as its industrial diplomacy. Instead of just exporting goods, Taiwanese companies focus their attention on local production, joint ventures, and supply chains. The reason is that local production adds tremendous value like creating jobs, enhancing skills, and stitching economies into global value chains. They have also moved into sectors like light manufacturing, electronics assembly, and industrial components, indicating that a transition from transactional cooperations to regulatory integration is taking place.

South Africa: Essential to Taiwan's Economic Presence

Out of all countries in the region, South Africa is the most important economic partner to Taiwan. Even after Pretoria's decision to switch diplomatic recognition in 1998, economic ties continued—and, in some instances, ties have been strengthened. Despite the fact that South Africa recognized the PRC in 1998, economic ties with Taiwan continued. Their relationship has demonstrated a trend of "we sell you raw materials, we buy finished products." In this arrangement, South Africa exports coal, iron, aluminum, minerals, and other commodities; while Taiwan exports manufactured goods like machinery, textiles,

computer components, and other high-end industrial products. South Africa accounted for about 2 percent of the imports and exports from Taiwan in 1985, but more recently, it has remained Taiwan's largest trading partner in Africa, with bilateral trade reaching R45.3 billion in 2022. In the 2010s, South Africa has maintained its position as one of Taiwan's most significant African economic partners, being Taiwan's 29th largest market in 2011, and Taiwan as its 15th largest export destination. However, roles are increasingly changing, as China's trade with South Africa reaches.

Aside from trade, Taiwanese companies are instrumental in impacting the industrial landscape of South Africa. Around 800 Taiwanese companies are operating in the country, adding a total investment of USD 2 billion and supporting at least 40,000 local jobs. Many of these companies are located in manufacturing hubs like Newcastle, where Taiwanese textile and garment factories helped to establish an industrial zone that serves export markets. In spite of the fact that some of these industries have faced challenges arising from global competition, Taiwan has remained active in electronics distribution, plastic manufacturing, and services.

Eswatini: Diplomacy Anchored in Development

Even as South Africa is the backbone of Taiwan's economic ties in the Southern African region, Eswatini continues to be its diplomatic and development partner. As clearly reflected through the International Cooperation and Development Fund (ICDF, 國際合作發展基金會), Taiwan led the implementation of programs on agriculture, healthcare, and education in Eswatini. In agriculture, they have supported irrigation systems, distribution of improved seeds, and led the modernization of farming techniques to help increase harvests and food security in the 57-year-old kingdom. Taiwan did not stop there; its medical teams have been instrumental in uplifting hospitals capacity in Eswatini, notably staff training and support of specialized services.

Among other programs is offering vocational training and educational scholarships to friendly countries including Eswati students. Far from being just initiatives, these programs have been successful in building the skilled workforce of the Kingdom. Since 2016, TaiwanICDF, in collaboration with Eswatini's Ministry of Education and Training, has operated the Technical and Vocational Education and Training Enhancement Project: which produces many graduates through short-term skills courses, working to align with the workforce and the demands of the labor market.

The Role of Taiwanese Firms and Supply Chain Integration

One feature of Taiwan's industrial diplomacy is the crucial role being played by private companies. Unlike traditional diplomacy in which the government leads the way, Taiwan relies on its firms as first agents of contact here. As such, these companies and businesses enjoy massive support from the Taiwan External Trade Development Council (TAITRA, 中華民國對外貿易發展協會), Taipei trade offices, and the Ministry of Foreign Affairs (MOFA, 外交部) in areas like organizing trade missions, investment forums, and business matchmaking. TAITRA ensures that Taiwanese businesses are connected with their Eswatini partners through sector exhibitions and delegations. Taiwan trade offices give their own support by facilitating market access, and carrying out market intelligence and risk mitigation. MOFA provides diplomatic protection to Taiwan's interests, manages geopolitical competition with the PRC, and works out memoranda of understanding with the host country to increase economic conditions for Taiwanese businesses.

In Southern Africa, Taiwanese businesses are serving as informal diplomatic actors in that they sustain friendship independently of political recognition (though Eswatini is excluded in this sense). Derlon, a Taiwanese textile company with over 30 years of history, employs 800 workers in Newcastle in South Africa. The company supplies more than 150 downstream sweater manufacturers in the country, a significant success that led to 50 to 60 more Taiwanese firms to set up operations in the region, even as some have since shut down under pressures coming from Chinese competition. Another Taiwanese company founded by stakeholders in 2017, known as Gemoto Industrial Alliance, has built itself into a supplier of automotive components within South Africa's aftermarket economy. These companies have operated with very little formal backing from the government, but they have sustained commercial relationships and good local employment without Pretoria's political recognition of Beijing.

The defining aspect of Taiwan's industrial diplomacy in Southern Africa is about entering supply chains rather than increasing ties through standalone projects. The central issue is that modern manufac-

Image: A container terminal at Durban Port in South Africa showing large cranes, stacked shipping containers, and cargo vessels used for maritime trade and a main regional logistics in Southern Africa. (Image source: Wikimedia Commons)

turing runs through divided cross-border production networks, and Taiwan has a strategy to plug into these systems. A research paper by Dr des. Sören Scholvin and Peter Draper note that, with its more advanced transport infrastructure, active industries, and access to markets in the region through the Southern African Development Community (SADC), South Africa is a vibrant route into a robust economic geography of more than 300 million people. The Taiwanese businesses based in South Africa are not only meeting domestic demands within the country, but are better positioned to supply other markets like Botswana, Namibia, and Mozambique.

Manifestations of this integration can be seen in the Taiwanese electrical and automotive components through vital corridors operated by South Africa. These goods move through Durban ports before reaching destination markets, connecting Taiwanese production networks to the consumption and assembly points.

This strategy has become increasingly important in the sense of diversifying the global supply chain. In fact, the Organization for Economic Co-operation and Development (OECD) and other policy institutions point out that companies are becoming more diversified towards their global supply chains in an effort to reduce overdependence on single-country production and to reduce exposure to concentrated dependencies in major sourcing locations.

While Southern Africa is still developing, it is a good alternative choice for light manufacturing. Taiwan's Minister of Foreign Affairs, Lin Chia-lung (林佳龍), acting as President Lai Ching-te's special envoy for a high-level Africa mission and policy briefing on Taiwan–Africa economic diplomacy that took place in Eswatini on April 2025, indicated that MOFA will continue to support Taiwanese enterprises expanding into African markets to enhance overseas economic cooperation by leveraging on Taiwan's industrial strengths.

Ongoing Political Pressure

Even with growing economic cooperation, Taiwan's footing in Southern Africa continues to be politically sensitive and contentious. Diplomatic progress for Taiwan has narrowed in the face of unending pressure from the PRC, which is using its economic influence and the "One China Policy" to change how governments in the region interact with Taipei. This pressure can render policy actions, such as the weakening of Taiwan's diplomatic presence and stricter limitations on official friendship with strategic countries like South Africa, which doesn't maintain diplomatic relations with Taiwan. Representatives of Taiwan run official activities of trade, investment facilitation, and cultural exchanges through liaison offices. These offices exist within a limited environment, controlled by the host governments to ensure they balance economic ties with China. The aim is to contain Taiwan's formal diplomatic footprints against any official relations with local authorities, even as economic interactions continue.

This pressure on Taipei has forced it to reexamine its approach on what it can immediately control. Rather than seeking legitimacy through official channels, it relies on business-to-business (B2B) ties and strong connections that are less exposed to the tensions of politics. The way that Taiwanese companies and development agencies are capable of conducting their affairs in ways that prioritize commercial outcomes over symbolic diplomacy should be recognized. For instance, Taiwan's business forums and industrial partnerships are often arranged without raising much public scrutiny, as with a Taiwanese trade delegation visit to Nigeria's commercial town Lagos in March, which was not televised and did not have a press conference, reduces the risk of political backlash while keeping commercial cooperation flourishing. Taiwan is creating another facet of influence that is difficult to dislodge without incurring economic costs for the host country. Even though it cannot compete fairly with the PRC in terms of formal diplomacy, Taiwan is gaining traction below the political surface, sustaining ties with mutual economic benefits.

Policy Implications

The realities in Southern Africa have shaped Taiwan's experience, where industrial diplomacy can substitute for formal diplomatic recognition if further deepened and systematized. This means moving outside the scope of episodic trade missions towards sustained industrial integration. One priority should be scaling the support for small and medium-sized enterprises through collaborative mechanisms led by TAITRA, focusing on establishing clusters of manufacturing sectors where Taiwan is very much present and has comparative advantages (such as electronics, light manufacturing, and renewable energy). These sectors should be paired with vocational training streams in collaboration with local institutions to ensure that technology transfer leads to a boost in the skilled workforce.

At the same time, Taiwan needs to consolidate its footing in South Africa as an important anchor in the region. Due to South Africa's improved logistics infrastructure and access to markets via SADC, investments in industrial parks, export processing zones, and supply chain pipelines can put Taiwan in a sustainable position in regional manufacturing networks. With that, it would fit with other global efforts towards diversifying supply chains, especially with respect to ongoing disturbances in Asia-centric production systems.

For countries in Southern Africa, ties with Taiwan give them a pathway to advanced industrialization without overdependence on a single foreign partner. Respective governments should actively integrate Taiwanese investment into their national industrial frameworks by providing clear regulatory laws, improving contract enforcement, and fixing their incentives models toward sectors that bring about employment and social value. Their partnerships with Taiwanese companies should be structured to consider the requirements for local content, such as the minimum local manufacturing baseline for specific sectors in South Africa, which require a set percentage of the value of a product to be manufactured locally instead of only being assembled from imported parts—alongside transfer of skills, and joint ventures—which can ensure that foreign investment contributes directly and sustainably to domestic production capacity.

Critically, policymakers and experts in Taiwan-Africa relations must adopt a flexible geopolitical approach. Instead of looking at diplomatic ties with Taiwan as a zero-sum choice against the PRC, Southern African countries can pursue complementary economic relationships that have the capacity to maximize their access to Taiwan's technology, investment diversity, and strategic flexibility. Taiwan's model anchored in precision manufacturing, SME growth, and human capital development fills the gaps that partners relying on infrastructure alone often leave behind.

The main point: Through industrial diplomacy, Taiwan is maintaining and expanding its influence in Southern Africa using businesses, strategic investment, and supply chains to bring about lasting economic partnerships, despite its challenges in gaining diplomatic recognition.

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China's Escalating Cyberattacks Threaten Taiwan's National Security

By: Min-Hua Chiang

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Amid intensifying cross-Strait tensions, Taiwan is among the world's most frequent targets of cyberattacks, predominantly attributed to Chinese state-backed hackers. Taiwan's National Security Bureau (NSB) has assessed that infrastructure on the island experienced a daily average of 2.63 million cyberattacks in 2025, more than double that of 2023. Energy, emergency rescue, hospitals, and communications infrastructure were the sectors that faced the most significant increases in the number of attacks in 2025, as compared to the previous year.

The increase in cyberattacks reflects Beijing's growing concerns over Taiwan's political landscape and global positioning. After over four decades of democratization, Taiwan is recognized as the 2nd freest country in Asia. Its thriving chip industry positions it globally as an invaluable economic asset, including in advancing China's own semiconductor technology. Wary of Taiwan's rapid political and technological development would make the cross-strait unification less appealing for the people in Taiwan, Beijing has used various tactics to intimidate Taiwan from developing a strong national identity. With advances in technology shaping the evolution of gray zone warfare tactics, cyberattacks have become an integral tool in the People's Republic of China (PRC)'s efforts to deter Taiwan from codifying its de facto independence. They are also an important mechanism to test Taiwan's resilience to a Chinese blockade should Beijing decide to invade.

Cyberattacks Targeting Taiwan's Political and Diplomatic Engagement

China further intensified cyberattacks on Taiwan following Lai Ching-te's election as Taiwan's president in January 2024. Chinese leadership views President Lai as a "separatist" who will drive the island away from Beijing's ultimate goal of unification under PRC control. Many of Lai's public statements—such as that "the Republic of China (Taiwan) and the People's Republic of China are not subordinate to each other" (during his inauguration speech on May 20, 2024), or that "China should take back the Chinese territory occupied by Russia since the 19th century if China cares about the Chinese territorial integrity" (September 2024)—have been condemned as provocative by the PRC, and even used as justifications for launching military exercises around Taiwan. Launching cyberattacks has become a routine element of the PRC's strategy to intimidate Taiwanese leadership into not making any political moves signifying Taiwan's de facto independence: the NSB's 2025 report recorded peaks in the number of Chinese cyberattacks while President Lai delivered public speeches or traveled abroad for diplomatic activities.

By targeting government services and infrastructure, China intends to weaken the Taiwanese public's confidence in their government's ability to protect the country. This aim was further operationalized through the displaying of slogans on hacked websites that claimed cross-strait unification had been accomplished. A survey conducted by the Taiwan Network Information Center in 2024 shows that only 41 percent of respondents in Taiwan believed the government capable of responding to various types of cyberattacks, whereas over 51 percent of them had complete or partial distrust. The targeting of public works infrastructure and incorporation of disinformation as a component of PRC cyberattack methodology emphasizes the severity of this threat to public trust in Taiwan.

China has used cyberattacks to isolate Taiwan from the global community. During former US House of Representatives Speaker Nancy Pelosi's visit to Taiwan in August 2022, several of Taiwan's government websites, public transportation websites, and retail sector sites were hacked, their contents replaced with messaging criticizing the Speaker's visit. Other Western nations with closer ties to Taiwan, like the Czech Republic, have faced increased cyberattacks by Chinese hackers in recent years.

Cyberattacks have become part of the People's Lib-

Image: A Taiwan Ministry of National Defense "Graphic of Communist Chinese Methods of Cognitive Warfare" conducted online. (Image source: ROC National Defense Report 2021)

eration Army (PLA)'s routine actions against Taiwan, in tandem with the growing number of PLA aircraft crossing either the median line of the Taiwan Strait or Taiwan's Air Defense Identification Zone (ADIZ), from 380 sorties in 2020 to 5,709 in 2025. In the event of an invasion, China might use cyberattacks to interfere with Taiwan's communications network operations with the outside world—thereby disrupting Taiwan's defense efforts and delaying international assistance.

A Tool to Sustain Chinese Economic Influence

The PRC leadership believe economic integration across the Taiwan Strait would give China an advantage in exercising political coercion. In recent years, however, China has gradually lost its economic leverage due to declining economic ties across the Strait. According to Taiwan's Ministry of Finance, China and Hong Kong's shares in Taiwan's exports dropped from 44 percent in 2020 to 27 percent in 2025. China accounted for nearly 84 percent of Taiwan's outward foreign direct investment in 2010; the share declined to less than 4 percent in 2025, according to data from Taiwan's Ministry of Economic Affairs and calculations by the author. China's economic slowdown,

due to property market stagnation, low private consumption, and trade tensions with the United States, has further weakened its capability to threaten Taiwan economically. To counterbalance its fading economic influence, cyberattacks have been used more frequently to menace Taiwanese businesses. Chinese hackers might try to extract huge payments for unlocking important data, or even demand political concessions from the Taiwanese government and private companies.

Taiwan's hardware and semiconductor industry is the most targeted of its sectors. As the largest chip maker in the world, the shutdown of chip plants due to cyberattacks could inflict a significant impact on the global economy, including that of China. Although China might not want to sabotage Taiwan's semiconductor industry for the sake of its own domestic manufacturing production and economy, it might intend to steal technology information and sensitive business data from Taiwanese semiconductor firms through Chinese hacks. US export control measures have made it increasingly difficult for China to purchase equipment and key components with high-technology intensity from Taiwan, further incentivizing China to find other means to acquire its technology. The loss of intellectual property rights and overseas customer information to Chinese hackers could risk collapsing the entire semiconductor industry in Taiwan. Both Taiwan's economy and the wider global supply chain network would suffer catastrophically from major disruption toTaiwan's semiconductor industry.

Taiwan Needs a Strong Cybersecurity Policy to Respond to China's Surging Cyberthreats

China's cyberattacks on Taiwan can be traced back over 20 years. Nevertheless, it was not until 2016 that former President Tsai Ing-Wen started to incorporate cybersecurity into Taiwan's national security strategy. The Ministry of Digital Affairs (MODA), established in 2022, is responsible for planning and implementing cybersecurity policies.

Along with the establishment of the cybersecurity department, regulations, and initiatives, the government allocated NT 8.8 billion (about USD 300 million) for its national cybersecurity development program over four years (2025-2028). Despite rising expenditures on cybersecurity over the past few years, it is not sufficient to cope with the increasing volume of cyberattacks. Compared to the top 20 spenders on cybersecurity worldwide, the Taiwanese government's expenditure (USD 75 million per year from 2025 to 2028) is far behind. A greater cybersecurity budget could reinforce Taiwan's cyber defense against the growing cyberthreat to Taiwan's national security.

The shortage of talent in cybersecurity is another concern. Over the past few decades, Taiwan has focused on building hardware manufacturing capacity, but software development is lagging. The lack of talent in cybersecurity poses a challenge to firms in Taiwan, which are increasingly aware of Chinese cyber-threats – and thus growing their investment in securing their business data. In addition to on-the-job training for current employment, expanding talent acquisition from overseas is key in tackling the immediate cyber threat from China.

Greater international cooperation in cybersecurity with like-minded countries is another way to enhance Taiwan's digital competence and strengthen its national defense. International cooperation can incorporate private business participation, which will assist the cybersecurity industry's development potential and build Taiwan's strength from it. For example, the *Taiwan Cybersecurity Resiliency Act* of 2023 aimed to promote military cybersecurity cooperation between the United States and Taiwan, including protection of military networks and infrastructure, and cybersecurity training activities. Taiwan and Paraguay also concluded a partnership in information security and smart technology, digital governance, and judicial cooperation in May this year. More collaboration with other countries should be promoted.

China's persistent cyberattacks are an imminent threat to Taiwan's national security and sovereignty. Taiwan must not hesitate to build up a strong cyber defense system in order to protect its economic assets, public trust, and democratic values.

The main point: Cyberattacks have become an important tool in China's plans for cross-Strait unification. Through cyberattacks, China aims to intimidate Taiwanese leaders, weaken trust in Taiwan's government, and maintain its influence over Taiwanese businesses. In order to combat this, Taiwan needs to increase its budget for acquiring cybersecurity talent, hardware, and software, as well as to increase collaboration with other countries to better defend Taiwan's democracy and economy.

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Taiwan as a "Macro-City" Designed for Chip Manufacturing

By: Ryan Shih

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Semiconductor chips may be the smallest manmade object in human history. The smallest production size of 2 nanometers matches the scale of human DNA. By the end of 2026, Taiwan will have five fabs capable of mass-producing 2nm chips, setting it apart from any other country. It is commonly believed that Taiwan's chip manufacturing is the product of immense R&D investment and gigafabs. However, this view overlooks Taiwan's 40-year spatial transformation, spearheaded by Taiwan Semiconductor Manufacturing Company (TSMC, 台灣積體電路製造公司). Indeed, in order to manufacture the world's most advanced chips, the Taiwanese have had to design not just gigafabs, but also entire cities—and perhaps, their whole nation.

Take, for example, extreme ultraviolet (EUV) machines that employ lasers to produce cutting-edge microchips. Each EUV machine is the same size as a double-decker bus, and a single gigafab will install more than 60 to 80 of these machines. A Gigafab comprises a continuous cleanroom crisscrossed by skyway tracks delivering parts. Under the cleanroom is the sub-fab, housing mechanical, electrical, and plumbing (MEP) systems supporting the cleanroom. The sub-fab is double the size of the cleanroom itself. These dynamics contribute to the enormous scale of modern gigafabs.

Surrounding infrastructure presents an another challenge. Cutting-edge chips are time-sensitive products, and must be shipped to end customers as soon as possible. Robust transportation and logistics systems are therefore crucial to a given country's chip manufacturing industry. Hence Taiwan's chip fabs operate along a single transportation line running north to south on the island, connected to numerous ports and air cargo gateways. The global semiconductor industry is a cross-border operation, and Taiwan functions as a one-stop shop cluster that dominates the middle and end of the supply chain. Decades of infrastructure investments from the Taiwanese government have allowed TSMC to push its manufacturing to the limits. This process has created the single most efficient production city-island in the world.

How Industrial Planning and Transportation Made Taiwan a Powerhouse

Before TSMC transformed Taiwan into a global technology titan, the Taiwanese economy was highly reliant on a mix of light, labor-intensive manufacturing and state-backed heavy industries. During the 1970s and 1980s, multiple export processing zones (EPZs) were founded across Taiwan—combining industrial parks with free trade zones. For a city like Kaohsiung, the EPZ and petrochemical industries have shaped the entire cityscape. Whether visiting by rail or sea, a visitor would encounter a smoky, bustling harbor city that powered one of the fastest industrial expansions in modern history.

In this phase of industrialization, Taiwan was divided into different areas according to economic function. Taipei served as the administrative and financial center, while power plants and factories with large land footprints were deployed to surrounding cities. Alongside a population boom and rapid urbanization, Taiwan's economic growth surged. It was also at this time that SMEs began to thrive and became the backbone of the Taiwanese economy.

From the longitudinal railway line (running from Keelung in the north to Pingtung in the south) and national highway system to the later completion of high speed rail (高鐵) in 2007, the major north-south transportation avenues not only changed Taiwan's landscape but collapsed its entire western corridor into a single macro-metropolis. It was a modern revolution of time and space, enabling humans and supply chain to effortlessly flow across the island, thus establishing a vital lifeline for the fast-paced semiconductor industry.

As early as the 1970s, Taiwan realized that its labor-intensive industries, such as textiles manufacturing, could no longer guarantee growth in a rapidly developing world. In order to develop high-tech industries, the government founded the Industrial Technology Research Institute (ITRI, 工業技術研究院), an applied R&D organization based in Hsinchu.

In the 1980s, ITRI then empowered its director, Dr. Morris Chang (張忠謀), to develop a next-generation industrial plan. Chang himself founded TSMC in 1987, in Taiwan's first Science Park (科學園區) in Hsinchu. Indeed, the Hsinchu Science Park was the physical outcome of a study on the successes of Silicon Valley. Today, there are three main Science Parks: in northern, central, and southern Taiwan. The Science Parks form nodes in the island's "Western tech corridor" (西部科技廊帶) connected by several transportation arteries.

Today, Science Parks serve as spatial tools through which Taiwan has concentrated its infrastructure, talent, and production. TSMC plays the decisive role in planning. Its massive capital expenditure allows it to shape the development of Science Parks according to its needs. Its R&D center is currently located in the original Hsinchu Science Park in the north—which is also close to the geopolitical and policymaking center of Taipei. Meanwhile, it has scaled up production capacity in southern Taiwan through multi-billion-dollar investments. TSMC's strategic planning has rendered southern Taiwan—including cities such as Chiayi and Tainan—into a "mega-cluster" for sub-2nm chip production and chip-on-wafer-on-substrate (CoWoS) packaging development.

How a Facility Shapes a City: TSMC's Fab 18 as an Example

TSMC Fab 18, located in the Southern Taiwan Science Park (STSP) in Tainan, is arguably the single most critical piece of industrial infrastructure on Earth. This is not just because of its massive financial value—the total investment in Fab 18 exceeds NTD 1.86 trillion (USD 57 billion) and the 3nm technology it produces may generate USD 1.5 trillion in half a decade. Rather, the physical scale of Fab 18 and associated infrastructure has shaped the landscape of southern Taiwan. TSMC broke ground on construction of Fab 18 in 2018. Commercial volume production at the fab began in early 2020 with the first wave of 5nm chips. Fab 18 combines a total of eight production phases for both the 5nm and 3nm chips, with a total site area sitting at nearly 100 hectares. The production phases employ an interconnected cleanroom with an automated skyway allowing silicon wafers to be transferred efficiently.

Gigafabs like Fab 18 resemble "vertical sandwiches," featuring layers of engineering spaces. The cleanroom in the middle is the most important space, and features the highest concentrations of ASML extreme ultraviolet (EUV) lithography machines in the world. The cleanroom accounts for around 20-25 percent of total floor space. Beneath the cleanroom floor sits the massive sub-fab (containing MEP systems) that represents the biggest single functional space in the gigafab architecture. Counting the various floor layers together—including the cleanroom, sub-fab, and others—the total interior square footage reaches 410,669 square meters (about 77 American football fields).

The massive scale of Fab 18 results in a high demand for water and electricity, and has challenged the infrastructure of the host city of Tainan—particularly since the Southern Taiwan Science Park is located in an agricultural area. Rather than letting Fab 18 drain freshwater from local reservoirs, developers built a water reclamation network for the Science Park, and a wastewater treatment center is located next to Fab 18. The water management system allows Fab 18 to essentially use each drop of water 3.5 times before disposal. In response to rising energy demands, the city of Taiwan has accelerated renewable energy development, especially in solar energy.

Fab 18 is estimated to employ 14,000 workers. The site does not just create jobs but also spatial effects. It has boosted real estate values in nearby towns like Xinshi, Shanhua, and Anding, and also spawned a massive commuter corridor stretching from the site to Tainan City center and beyond. The Tainan local government has not only sought to expand major roadways but also build public transit, since most commuters rely on scooters and private cars. Commuter trends create an idiosyncratic culture. Entry-level engineers will buy a house in nearby towns because they must frequently respond to sudden call-ups when problems arise, and senior professionals will move closer to downtown Tainan where they can maintain families or more stable lifestyles—yet they must also commute further for work.

Beyond fabs, the semiconductor industry has noticeably shaped logistical infrastructure in Taiwan. Because cutting-edge semiconductors must reach customers quickly or else snag manufacturing lines, upgrades have been essential. Since the 1990s, Taiwan has maintained a goal of becoming the Asia-Pacific region's operations center. Because of AI-driven demand for Taiwan's chips, air transshipment centers have appeared at Taoyuan International Airport. The

Image: A building complex in the Southern Taiwan Science Park in Tainan (May 2025). (Image source: Wikimedia Commons)

airport will complete its Terminal 3 in 2027, and a new runway is slated for operation in 2032. The new infrastructure will accommodate more advanced logistics centers within the airport's free trade zone. The Taoyuan airport expansion illustrates a "virtuous cycle" wherein expanding semiconductor exports fosters more advanced logistical infrastructure—which in turns allows for greater exports.

Balancing Efficiency and Livability

Over the past century of rapid spatial modernization, Taiwan has transformed from an agrarian society into a silicon manufacturing hub. While this evolution has generated massive fortunes for those involved, and established a foundation for national security, it has also left undeniably negative effects on Taiwan's lived environment. Many employees work non-stop inside monolithic, isolated industrial compounds. Although planners have made improvements through architectural and landscape design—such as next-generation "green fabs" that will aim not just for carbon capture but also healthier working conditions—these measures cannot counter the reality that life inside Taiwan's Science Parks is deeply dichotomous: split between a rigid, grid-like campus and an organic, sometimes chaotic urban environment.

Italian architecture theorist Aldo Rossi said: "The city is the biggest man-made object in the world." To Rossi, the city was not a random collection of buildings or a passive backdrop to economic activities. Through this lens, Taiwan has successfully transformed itself into a highly efficient and unified man-made artifact. The west coast of Taiwan is one of the most important tech corridors in the world, and this "macro-city" has been designed to process silicon at a global scale, far beyond people's imagination. Yet there remains another layer in this landscape transformation process: memory. At the center of Southern Taiwan Science Park is a grand building clad in stone. It is the Museum of Prehistory, dedicated for the artifacts discovered by construction teams when the Science Park was built. This chiseled, onyx structure reminds us that this silicon island still wants to

be remembered for other things, besides just industrial efficiency.

Conclusion

Over decades of continuous infrastructural investment, Taiwan has harnessed spatial organization in order to compete in global trade. When conceptualizing Taiwan's comparative advantages in semiconductors, take note that the island's strengths are not only technological—they are geographical, institutional, and infrastructural. That is what makes Taiwan's experience in spatial management valuable to other countries.

Indeed, the key lesson Taiwan can provide spatial planners is not its specific orientation of transport networks or Science Parks, but rather how it has adapted rather disadvantageous territory to support its semiconductor industry. Taiwan is a narrow island divided by mountains, yet it has adjusted to this geography by constructing a north-south corridor connecting all of its manufacturing and trade infrastructure. For policymakers, Taiwan's lesson in spatial management is the requirement to understand one's geographical canvas and to bridge local nodes and the global supply chain.

Policymakers should be aware that different locations confer their own advantages. For instance, in the emerging semiconductor cluster in less-populated Arizona, a high-volume transportation system can be planned when developers first come in. Early planning would greatly enhance future standards of living. And in Kumamoto, where TSMC jointly operates another fab, how the facility productively complements the city's legacy industry cluster will be another important consideration.

As other countries seek partnerships with TSMC to cultivate native semiconductor industries, they will inevitably ask the planning questions that have preoccupied Taiwan for decades. Therefore, Taiwan is not only exporting semiconductor manufacturing, but an entire model of spatial organization.

The main point: Taiwan's semiconductor success is not just a result of technology or capital investment, but the outcome of decades of continuous spatial transformation. By integrating Science Parks and advanced gigafabs across its western transport corridor, Taiwan has become a hyper-efficient, island-sized production system. As TSMC expands globally, Taiwan is exporting not only chip manufacturing, but an entire model of spatial organization.

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China's Maritime Militia in a Taiwan Crisis: The Logistical and Regulatory Foundations behind a Maritime Quarantine

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The People's Armed Forces Maritime Militia (PAFMM, 中国海上民兵), the People's Republic of China (PRC)'s "Third Sea Force" (中國的第三海軍), serves a critical role in Beijing's calculus regarding "unification" with Taiwan. The militia is particularly valued for its capability to transition between peacetime and wartime operations (平战转换). More specifically, in PRC's southeastern Fujian province, the PAFMM enables maritime quarantine: a low-kinetic contingency scenario that bridges both gray-zone operations and conventional military escalation.

The January 2026 "Floating Wall"

In January 2026, an L-shaped vessel array composed of thousands of Chinese fishing boats temporarily blocked the Taiwan Strait. It extended for approximately 300 miles and disrupted commercial activities and maritime transportation for over 30 hours. Coordinated by the provincial PAFMM of Fujian and Zhejiang provinces, the array consisted predominantly of fishing vessels from those two provinces. *(Editor's note: For analysis and graphics of past barrier formations of PAFMM vessels produced by the* New

York Times, *see here.)* In addition to PAFMM assets, these two coastal provinces host critical PLA bases, brigades, and the Eastern Theater Command, as well as dual-use military assets that constitute the PRC's critical entities involved in a Taiwan contingency.

The floating barricade represented an unprecedented mass mobilization of civilian vessels. It was believed to be a simulation for potential future quarantines or blockades, signaling the maritime militia's mobilizational readiness and political resolve: civilian vessels registered under PAFMM can quickly form a maritime barricade, establish a quarantine zone, and escalate a gray-zone scenario into a more serious contingency.

Rationale Behind a Maritime Quarantine

An amphibious assault on Taiwan would entail extraordinarily high costs, due not only to personnel and logistical requirements, but also to political pressure from both international and domestic audiences. By contrast, quarantine and blockade operations have significantly lower operational costs. [1]

On the one hand, a quarantine scenario relies on both the legal ambiguity caused by Taiwan's international status and the PRC's own declared legal frameworks. The PRC claims that Taiwan is a province of the PRC, thus authorizing state-sponsored local actors (such as PAFMM vessels and militia) to execute tasks to enforce unification. On the other hand, a blockade is generally considered a state-versus-state action—involving state forces, such as the People's Liberation Army Navy (PLAN, 中国人民解放军海军) and the Chinese Coast Guard (CGG, 中国海警局). [2] China's past military exercises, including the *Joint Sword series (see here and here)* and the April 2025 *Strait Thunder* exercise, have demonstrated this pattern whereby the PLAN and CCG jointly execute a blockade simulation (e.g., against Kaohsiung Port).

Despite these differences, both quarantine and blockade operations interrupt civilian maritime activities. In a quarantine scenario, international actors are less likely to interfere (as long as no casualties are incurred) and the operation offers greater flexibility and reversibility. Conversely, a blockade may trigger third-party intervention—including the United States and its regional allies, such as Japan and the Philippines. Thus, given its cost-benefit effects, a declared quarantine would be the most preferred option for the PRC.

In line with this, Taiwan's Whole-of-Society Defense Resilience Committee (全社會防衛韌性委員會) conducted a tabletop military exercise (桌推) on June 25, 2026, centered on a scenario involving maritime coercion in certain waters surrounding Taiwan (台灣周邊部分水域). Significantly, this was the committee's first tabletop exercise specifically focused on "high-intensity maritime coercion" (高強度海上脅迫). The scenario modeled phased escalation initiated by the PRC Coast Guard, which began with harassment around Taiwan and progressed to requirements that vessels entering and departing Taiwanese ports report through China's International Trade Single Window (國際貿易單一窗口), followed by inspection (查驗), boarding and inspection (登檢), and detention or seizure (扣押). Eleven government ministries and agencies participated in the exercise, in which responses involving maritime and land transportation controls, material acquisition, and the security of supply reception and transfer were examined.

Functions of the PAFMM in a Maritime "Quarantine" Scenario

The PAFMM serves multiple functions during a quarantine scenario:

(I) Enhancing intelligence, surveillance, and reconnaissance (ISR) activities before the quarantine;

(II) Gaining sea control;

(III) Assisting in the execution of quarantine-related tasks, including vessel interception and inspection; and

(IV) Signaling, supporting, and sustaining sea denial, and blocking vessels that attempt to interfere.

Vessels and maritime assets involved.

Four types of civilian vessels would be most likely to participate in the floating barricades for the quarantine: regular fishing vessels; roll-on/roll-off (RO-RO) ferries (heavy-duty transportation vessels that transport passengers); cargo ships; and other types of vessels, including passenger ships, tankers, and supply ships.

The fishing vessels are particularly useful due to their multiple functions in surveillance, as well as their number, availability, and operational flexibility. Fujian's robust fishing industry can provide considerable logistics and personnel support for the PAFMM in a

Image: PRC-flagged merchant vessels—evidently acting as maritime militia vessels—anchored in formation near Whitsun Reef in the South China Sea (March 2021). (Image source: Philippines Coast Guard / Wikimedia Commons)

potential quarantine scenario.

According to the Fujian provincial government, at least 12,000 fishing boats (among which 7,000 are medium to large vessels) and approximately 22,6000 fishermen are formally registered under governmental records. The detailed number of fishermen officially registered under the PAFMM, however, is unconfirmed. Furthermore, the active presence and broader coverage of critical sea lines of communication (SLOCs) by these fishing vessels facilitate the efficient implementation of quarantine mobilization. The distance between Xiamen (Fujian's major port city renowned for its deep-water port and two naval hubs) and Taipei is only 172.5 to 191 nautical miles (319 to 353 km). In contrast, Fuzhou, capital city and headquarters of the Eastern Theater Command Army, lies 115 to 160 miles (185 to 250 km) across from Taipei.

Moreover, the Taiwan Shoal (臺灣淺灘), a body of water located near the southern end of the Taiwan Strait, only allows smaller vessels to operate in it: in the sea area 30 nautical miles (55.6 km) southwest of Penghu (澎湖), it has an average depth ranging between only 8 and 40 feet (10 and 30 meters). Thus, fishing vessels are prioritized for quarantine measures in such shallow waters.

Regulations involved

Fuzhou City has explicitly implemented municipal regulations on civilian acquisition and contingency mobilization. The "Contemporary Regulations on Civilian Vessel Requisition and Crewmen Mobilization," designed to"meet the needs during wartime and special circumstances during the regular time," details institutional actors, procedures, and specific vessel types involved in the requisition process.

Regarding a maritime contingency, all vessels that can navigate through type II water bodies are mandatorily registered for acquisition. [3] Additionally, maritime machinery fishing vessels of more than 50 tons are also subject to mandatory acquisition. They must be registered under the provincial Defense

Transportation Authorities (省国防交通管理机构) for "combat-readiness formation" (战备编队). The regulation further states that the "defense transportation authorities at the municipal, county, and district levels are responsible for the mobilization and requisition of civilian vessels within their respective regions."

The Fuzhou City Regulation is a pioneering framework designed to support mobilization readiness. Similar municipal-level regulations from Zhangzhou, Xiamen, and Quanzhou have not been made public yet. Whether a unified, provincial-level mobilization regulation would be unveiled and available remains unknown.

Tech Platforms and communication networks involved: Civil-military integration in practice.

All registered fishing vessels in Fujian are required to incorporate the BeiDou Navigation Satellite System (BDS), a satellite navigation system developed by the China National Space Administration. The BDS interoperates with GPS, providing consistent real-time location, positioning, and timing of fishing vessels and crews. Local regulations mandate that fishing vessels ensure the continuous operation of the BDS on a 24-hour basis.

In addition, all fishing vessels must be equipped with the Automatic Identification System (AIS). Compatible with a 9-digit ID issued by the managing and operational system of the Chinese Fishery Administration Command System, the AIS allows vessels to exchange real-time navigational data—including ID, position, course, and speed- making this valuable for fast mobilization and operational coordination during a contingency.

In addition to manually calling the militia members, the notification process for regular communication and mobilization now relies heavily on "smart mobilization systems" (智慧动员系统) and mass SMS and messaging platforms. This communication system allows militia members to be notified by Application messages and texts. Meanwhile, Local PAFMM members and institutional actors are also connected through dual-use instant-messaging platforms, including WeChat and DingTalk. The platforms are managed respectively by two China-based technology corporations, Tencent and Alibaba. Both have been recently included on the US Department of Defense's Section 1260H list. The Department identifies Tencent as indirectly affiliated with the PLA and Alibaba as a contributor to China's defense industrial base through military-civil fusion, citing its affiliation with the Ministry of Industry and Information Technology (MIIT).

Taken together, the integration of the BeiDou system and commercially operated communications platforms into local mobilization mechanisms illustrates how civilian technological infrastructure can support military readiness. This arrangement reflects the PRC's broader approach to military-civil fusion (军民融合), through which civilian technologies, infrastructure, and organizational resources can be incorporated into defense and mobilization requirements.

Countermeasures: Recommendations for Observers and Stakeholders

To effectively counter and detect the operations of the PAFMM during a quarantine scenario, the following recommendations should be followed by Taiwan.

First, Taiwan should use AI and drones for early warnings to increase maritime domain awareness in critical SLOCs, especially around the offshore islands closer to Fujian (e.g., Quemoy and Matsu). The 2026 National Defense Budget and the recently passed "Special Budget for Strengthening Defense Resilience and Asymmetric Capabilities" (強化防衛韌性及不對稱戰力計畫) have both provided the necessary frameworks, regulations, and appropriated resources. Despite the internal divisions in Taiwan's Legislative Yuan, the 10 billion TWD procurement of AI-assisted C5ISR and the 335 billion TWD procurement of uncrewed systems and anti-defense systems provide a window of opportunity to develop such a strategy.

Second, Taiwan should continue to enhance intelligence-sharing cooperation with allies and partners (e.g., Japan and the Philippines) in PAFMM monitoring, allowing critical time for responses and coordination.

Third, the Taiwanese military should simultaneously focus on bolstering its cyber warfare capabilities to disrupt PAFMM communications.

Conclusion

The PAFMM will function as a core asset for the Chinese military in executing any quarantine scenarios directed against Taiwan, as its civilian assets and personnel serve as valuable instruments for sea denial and SLOC control. Moreover, through its role in gray

zone activities, the PAFMM is also a valuable asset for the Chinese government to assert sovereignty over Taiwan. Thus, the PAFMM's gray-zone operations will persist as the norm across critical SLOCs in the East and South China Seas, and potentially extend to the First Island Chain. In the context of U.S. -China maritime competition, the PAFMM is a relevant means for the PRC's broader strategic ends: it functions as a force multiplier in expanding the PRC's maritime interests, advancing the goal of becoming a maritime power while seeking unification with Taiwan.

The main point: A Taiwan contingency could begin with a lower-level kinetic scenario, such as a maritime quarantine. Fujian's maritime assets and geographic proximity to critical SLOCs around Taiwan provide a foundation for such an escalation scenario; fishing vessels, PAFMM personnel, and other dual-use assets could therefore play a leading role in advancing China's ultimate goal of unification with Taiwan.

[1] Both quarantine and blockade involve sea control and aerial denial, but different actors intervene and thus generate separate jurisdictional and political consequences. In a quarantine scenario, local actors operate alongside state forces to control domestic waters under internal law-enforcement authority. In contrast, a blockade involves state forces and may impact a larger body of water, including the exclusive economic zone, and may extend to the high seas beyond the 200 nautical miles. As a result, a blockade scenario may violate international law and lead to interference from other international actors.

[2] The Chinese Coast Guard is considered a state force.

[3] Fujian defines "Type II sea zones" as near-sea navigating zones, which include waters that fall within 10 nautical miles and 200 nautical miles from the shore.

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