



PROCEEDINGS

THE NEW SOUTHBOUND POLICY:
LEVERAGING
INDONESIA-TAIWAN TIES

Graduate Student
Research Colloquium

2025



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The New Southbound Policy: Leveraging Indonesia-Taiwan Ties

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Acknowledgments

This Graduate Student Research Colloquium (GSRC) is our first call for papers targeting Indonesian graduate students both at home and overseas, that should be seen as a vital effort in providing a publication platform for young and aspiring scholars. This year's theme, "The New Southbound Policy: Leveraging Indonesia-Taiwan Ties," explores opportunities, challenges, and pathways for deeper collaboration between Indonesia and Taiwan across a wide range of sectors. As we are all aware, Taiwan ranks among the top ten sources of foreign direct investment (FDI) in Indonesia, while Indonesia is among the top sources of migrant labour to Taiwan. Hence, we foresee the potential of Taiwan's New Southbound Policy (NSP) to further strengthen cooperation between the two.

The NSP reflects Taiwan's recalibrated engagement with its partners while also expanding its scope and scale beyond trade and economy, to also emphasize other areas, including technology and innovation, energy and sustainable development, cultural and people-to-people exchanges, and enhancing collaboration among think-tanks and nongovernmental organizations (NGOs). These various topics are reflected through the rich and diverse discussions addressed by the contributing authors in these proceedings.

In bringing these GSRC proceedings to completion, I have been fortunate to engage with many individuals whose ideas, time, and support have greatly enriched the process. I extend my sincere appreciation to the Taipei Economic and Trade Office (TETO) Jakarta for their invaluable support in making this publication possible. My gratitude also goes to all authors, reviewers, editors, colleagues, and partners for their respective contributions, insights, and constructive feedback.

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Sincerely yours,

Mohammad Hasan Ansori, Ph.D.
Executive Director

1

Rethinking Indonesia-Taiwan Economic Strategy under the New Southbound Policy

Indonesia's Economic Response to the US -China Trade War: Opportunities under Taiwan's New Southbound Policy+

Kezia Regina Setyono¹

ABSTRACT

Amidst the slowdown of the global economy due to the United States (US) tariff policy set on April 2, many countries, including Indonesia, have to devise new strategies to achieve their national interests. Indonesia, guided by the *Indonesia Emas 2045* vision and eight percent economic growth target, faces the challenge of expanding economic cooperation while maintaining its commitment to the One China Policy. This research analyzes how Taiwan's New Southbound Policy+ can be leveraged by Indonesia as a strategic opportunity to achieve national interest through Foreign Direct Investment (FDI). Moreover, this research argues that Indonesia can adopt a strategy of opportunism in forging deeper non-political ties with Taiwan, in accordance with the principle of independent and active foreign policy. While remaining committed to the One China Policy, Indonesia pragmatically engages in economic cooperation with Taiwan, leveraging this partnership as a means to advance its national interests. Such selective engagement reflects Indonesia's independent and active foreign policy, which prioritizes economic growth without compromising core diplomatic principles.

Keywords: Indonesia; Taiwan; New Southbound Policy+; Foreign Policy; National Interest.

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Introduction

On April 2, 2025, the President of the United States, Donald Trump, announced a universal “reciprocal” tariff of 10 percent on all imported goods, effectively implemented on April 5, with higher rates, up to 50 percent, targeted at specific trading partners depending on their trade balance with the United States. This policy, introduced on what he termed “Liberation Day,” aimed to counteract unfair trade practices. For decades, the US market had been inundated with foreign tariffs and other barriers that asymmetrically restricted American goods. Trump argued that such aggressive retaliatory measures would bring manufacturing back to the US and enhance domestic purchasing power for American-made products. Furthermore, the implementation of tariffs was framed as a mechanism to increase tax revenues and stimulate greater investments (Harithas et al., 2025).

On April 9, 2025, the US declared the suspension of tariff against 60 trading partners, excluding China. Trump strengthened his stance on China by increasing the tariff percentage to 145 percent (Martin, 2025). In response, China initiated the implementation of retaliatory tariffs of 125 percent on US goods. However, in May, the two countries reached an agreement to a trade ceasefire during a meeting in Geneva. As a result, the US has reduced its tariffs on Chinese goods to 30 percent. Conversely, China reduces its retaliatory tariffs against the US to 10 percent (Hoskins and Bicker, 2025).

The US tariff policy has caused a domino effect on the world economy (Clarke, 2025). The implementation of import tariffs has been demonstrated to have the potential to impede economic growth on a global scale, as well as within the countries that impose such tariffs (OJK Institute, 2025). Beyond its global economic implications, Trump’s reciprocal tariff policy may cause tensions between major countries and affect developing countries that depend on free trade. At the time of writing, Indonesia was subject to a tariff of 19 percent, lower than Association of Southeast Asia Nations (ASEAN) countries such as Thailand and Vietnam which are subject to tariffs of 36 percent and 46 percent respectively. In Trump’s trade policy, Indonesia’s position is significant, as Indonesia is listed as a contributor to the non-oil and gas trade surplus with the US of USD 16.08 billion in 2024, with major exports such as garments, electrical appliances, footwear, and vegetable oils (Muhid, 2025). The global economic uncertainty, largely due to the imposition of unilateral tariffs by the US, is forcing countries like Indonesia to diversify their trade and seek alternative paths of economic cooperation.

Under the *Indonesia Emas 2045* (Golden Indonesia 2045) vision, the government has adopted a foreign policy that prioritizes economic expansion, targeting an eight percent growth rate during 2025-2029 (Irawan, 2025), as the cornerstone of national development (Kementerian PPN/ Bappenas, 2019). While domestic stability remains fundamental, Indonesia’s national interest equally encompasses strengthening its international economic standing through the opening of new markets, attraction of FDI, and deepening regional economic cooperation. In this context, Indonesia continues to pursue an independent and active foreign policy, yet this stance can complicate efforts to diversify trading partners. The relationship with Taiwan, in particular, presents significant opportunities in trade, investment, and human capital exchanges (Taiwan Economic and Trade Office Jakarta, Indonesia, 2024). Nonetheless, Indonesia’s adherence to the One China Policy, which precludes formal diplomatic recognition of Taiwan, poses a strategic dilemma for policymakers seeking to reconcile sovereignty commitments with the imperative of economic engagement (Kabinawa, 2013). Despite this, Taiwan stands as a pivotal trading partner and a substantial

source of investment for Indonesia. In 2023, bilateral trade between Indonesia and Taiwan totaled USD 10.421 billion, comprising USD 7.390 billion of Indonesian exports to Taiwan and USD 3.031 billion of Taiwanese exports to Indonesia. Moreover, Taiwan has consistently been Indonesia's major source of FDI, with cumulative Taiwanese FDI stock in Indonesia amounting to USD 0.27 billion by 2023 (International Trade Administration, 2025).

This research argues that by adopting an opportunistic strategy, Indonesia can continue pragmatically establish a non-political relationship with Taiwan without compromising its commitment to the One China Policy. This approach presents a strategic opportunism for Indonesia to enhance the realization of national interests within the framework of *Indonesia Emas 2045* vision.

Analysis

One China Policy and Indonesia's Independent and Active Foreign Policy

The One China Policy constitutes a fundamental tenet of China's foreign policy, asserting that there is only one sovereign state and legitimate government that represents the whole China. Referring to this definition, Taiwan is positioned not as an independent state, but as an inseparable part of China's sovereign territory. By this means, when a country implements the One China Policy, it only recognizes the Chinese government alone, excluding the recognition of Taiwan's sovereignty (Adhipramana and Maksum, 2021).

Indonesia is one of the Southeast Asian countries that upholds the One China Policy (Kabinawa, 2013). On August 8, 1990, an agreement was reached between Indonesia and China, as evidenced by the signing of a Memorandum of Understanding (MoU) by the respective Foreign Ministers regarding the implementation of the One China Policy. Consequently, Indonesia does not recognize Taiwan's sovereignty and has no diplomatic or consular relations with Taiwan (Wahyudi, 2021), only an economic and trade representative office. Although Indonesia adheres to the One China Policy, its foreign policy is guided by the principle of independent and active. To be independent refers to Indonesia's stance of not aligning with any major global powers, while being active reflects its proactive engagement in promoting peaceful initiatives and contributing to the resolution of international conflicts (Wardhani and Dugis, 2023).

Within the framework of national interest and global economic dynamics, Indonesia's independent and active foreign policy underpins its pragmatic engagement in non-diplomatic economic relations with Taiwan. Confronted by global economic uncertainty, Indonesia has pursued strategic economic partnerships to diversify its trading portfolio and advance both domestic and international objectives (Taiwan Economic and Trade Office Jakarta, Indonesia, 2024; Priyandita, 2019). In this vein, Indonesia and Taiwan are forging a strategic economic partnership that promises mutual prosperity and long-term sustainability. Their deepening cooperation, spanning merchandise trade, investment, joint industrial development, and collaboration in advanced sectors such as renewable energy and digital technology, has become a driving force for innovation in both economies (Prasetyo, 2024). By leveraging Taiwan's technological expertise alongside Indonesia's resource base and market scale, this partnership seeks to facilitate technology transfer, strengthen supply-chain resilience, and support sustainable development goals in each jurisdiction.

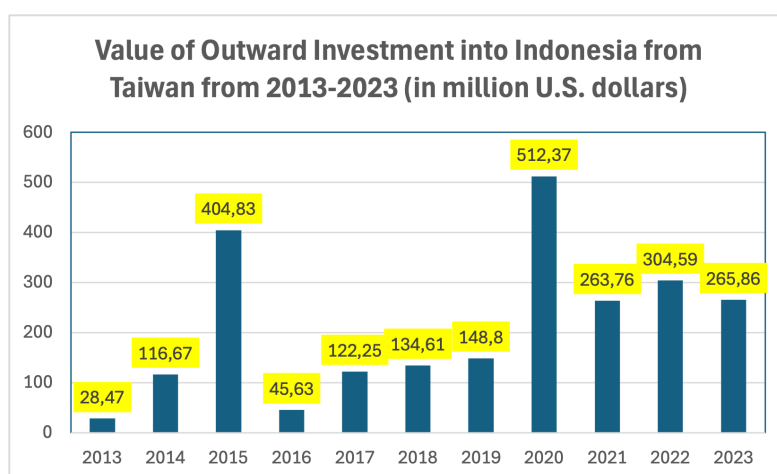
New Southbound Policy+ and Indonesia Emas 2045 Vision

Building on the 2016 New Southbound Policy, President Lai’s “New Southbound Policy (NSP+)” refines Taiwan’s value-based diplomacy by consolidating the three pillars—development, people-centered initiatives, and partnership—into a coherent strategy aimed at affirming Taiwan’s indispensable role in global trade and regional resilience. NSP+ extends beyond traditional economic and cultural engagement with 10 ASEAN states, as it also includes six South Asian countries, Australia, and New Zealand by articulating six strategic objectives: securing high-tech supply chains through innovative digital solutions, strengthening public-health and medical-services collaboration, enhancing resilience and disaster-preparedness capabilities, advancing economic and technological diplomacy among like-minded partners, mobilizing civil society and Non-Governmental Organizations (NGOs) to deepen people-to-people exchanges, and expanding regional think-tank dialogues to co-create policy frameworks. Together, these objectives leverage Taiwan’s semiconductor and Information and Communication Technology (ICT) expertise, its pandemic response and biotech innovations, and its growing network of academic and policy institutions to foster equitable, sustainable development and mutual prosperity across the Indo-Pacific (Global Taiwan Institute, 2024).

To operationalize these goals, NSP+ establishes six thematic corridors that integrate government priorities with civil-society leadership. The high-tech supply chain and innovative digital solution corridor leverages Taiwan’s technological assets to fortify critical supply networks, while the public health and medical services corridor shares healthcare infrastructure and expertise to bolster regional health security. The resilience and disaster preparedness corridor co-develops early-warning systems and community-based resilience training. Complementing these are three people-centered channels, an NSP Think Tank corridor, which expands policy-research partnerships, an NSP NGO corridor, positioning Taiwan as a regional NGO training hub, and an NSP Youth corridor, which nurtures Asia’s next generation of leaders through exchange and mentorship programs (Global Taiwan Institute, 2024).

Within the framework of Taiwan’s NSP+, Indonesia occupies a strategic position as a key trading partner, particularly in the domain of FDI. Cumulatively, Taiwan is listed as one of the five largest investors in Indonesia, contributing significantly to job creation—estimated to have generated employment for approximately one million local workers. The attractiveness of Indonesia as a major destination for FDI in the Asia-Pacific region is inseparable from the strength of its large domestic market and the availability of abundant natural resources. This makes it a high-value economic partner in the expansion of Taiwan’s economic network in Southeast Asia (CRIF Asia, 2024). Furthermore, Indonesia’s long-term development vision, *Indonesia Emas 2045*, projects an increasingly favorable investment climate in both regional and global context. The ratio of FDI Inflows to Gross Domestic Product (GDP) is projected to reach 4.5 percent by 2045, with an average annual investment growth rate of 6.4 percent (Kementerian PPN / Bappenas, 2019).

Figure 1.1 *Value of Outward Investment into Indonesia from Taiwan from 2013-2023*



Source: Statista, 2024

Despite a decline in investment value in 2023 compared to 2022, the overall trend from 2013 to 2023 indicates a positive trend in Taiwan's investment flows to Indonesia—though it has yet to reach the peak levels recorded in 2015 and 2020. Geopolitical tensions, the global economic landscape following the tariff policies enacted during the second Trump administration, and domestic reforms aimed at improving the investment climate have indirectly influenced global FDI patterns. According to United Nations Conference on Trade and Development (UNCTAD), global FDI fell by 11 percent, marking the second consecutive annual decline, underscoring a deepening slowdown in productive capital flows (UNCTAD, 2025). In the second quarter of 2025, Indonesia recorded its steepest year-on-year FDI decline—down 6.95 percent to IDR 202.2 trillion—largely attributable to renewed tariff pressures on Indonesian exports to the US.

Strategic Opportunism within the Framework of Independent and Active Foreign Policy

Within the converging agendas of *Indonesia's Emas 2045* vision and Taiwan's NSP+, several sectors emerge as particularly strategic for bilateral cooperation—namely advanced manufacturing and semiconductors, renewable energy, digital services and fintech, public health technology, and disaster resilience systems—because they directly advance Indonesia's goals of technology-driven growth, human-capital enhancement, and sustainable development, while leveraging Taiwan's strengths in high-tech supply chain security, medical innovation, and civil-society engagement.

The concept of strategic opportunism in international relations captures a state's capacity to exploit transient geopolitical or economic opening, prioritizing outcome-driven engagements over rigid alliance commitments. In bilateral economic relations, strategic opportunism underscores how states can selectively engage partners to fill policy gaps and diversify dependencies (Huntley, 2023). Amidst lingering US-China tariff disputes, Indonesia and Taiwan can thus seize upon NSP+'s emphasis on interdependent "survival chains," using its people-centered, multi-sectoral corridor approach to channel Taiwanese FDI into Indonesia's digital-services zones and medical-device manufacturing clusters—initiatives that not only dovetail with Indonesia Emas 2045's target of eight percent growth and equitable development but also exemplify strategic opportunism's adaptive, mutually reinforcing logic.

Among the six NSP+ corridors, the high-tech supply chain and innovative digital solutions and public health and medical services channels offer the greatest immediate impact and efficiency for Indonesia-Taiwan cooperation. The former leverages Taiwan's world-class semiconductor and ICT capabilities to modernize Indonesia's manufacturing base and accelerate its digital economy—directly supporting *Indonesia Emas 2045's* emphasis on technology-driven growth and human-capital development (Presidential Regulation of the Republic of Indonesia Number 12 of 2025 on the National Medium-Term Development Plan (RPJMN) 2025-2029, 2025). By facilitating Taiwanese FDI into electronics clusters and smart-city platforms, this corridor can rapidly generate value-added production, knowledge transfer, and employment. Similarly, the public health corridor capitalizes on Taiwan's proven pandemic-response infrastructure and biotech innovation to strengthen Indonesia's healthcare systems and workforce, addressing critical gaps in medical services while generating scalable, people-centered outcomes. Together, these two corridors concentrate resources on sectors where both parties possess complementary strengths, yielding high returns on investment and forging interdependent “survival chains” that underpin sustainable, bilateral prosperity.

Conclusion

In conclusion, the NSP+ represents a substantive evolution from its 2016 predecessor by systematizing value-based diplomacy into six thematic corridors—technology, health, resilience, think-tank, NGO, and youth—that directly address contemporary trade-tension challenges and *Indonesia's Emas 2045* priorities. Unlike the original NSP, NSP+ embeds targeted investment-facilitation mechanisms and people-centered frameworks even amid US-China tariff volatility. By channeling Taiwanese FDI into Indonesia's high-tech manufacturing clusters and digital-services zones through the high-tech supply chain and innovative digital solutions corridor, and by leveraging pandemic-response expertise via the public health and medical services corridor, NSP+ creates agile “survival chains” that reinforce supply-chain security and public-health resilience. Moreover, this approach epitomizes strategic opportunism—Indonesia pragmatically exploits the policymaking window opened by NSP+ to deepen non-political ties with Taiwan, thereby maximizing economic gains while adhering to the One China Policy and preserving diplomatic flexibility. This argument underscores that, through selective engagement and cooperation, Indonesia can leverage NSP+ as a tool of its independent and active foreign policy to achieve its national interest—particularly its eight percent growth target—without compromising core diplomatic principles, thereby forging an enduring, mutually beneficial partnership in an era of heightened geopolitical uncertainty.

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‘Friendshoring’ the Silicon Shield

Nanda Yudha Ikhwan Pradana¹

ABSTRACT

The escalating US-China techno-strategic rivalry has renewed interest in ‘friendshoring’ to mitigate Taiwan’s supply-chain exposure to the Taiwan Strait. The study examines whether a Taiwan-Indonesia semiconductor corridor, advanced under Taipei’s NSP+, can maintain Taiwan’s ‘silicon shield’ while facilitating Indonesian industrial upgrading. Indonesia emerges as a prime landing pad for Taiwan’s friendshoring efforts due to its abundant silica reserves, Southeast Asia’s largest STEM talent pool, a trillion-dollar domestic market, and government commitment to fast-track a semiconductor ecosystem under the Golden Indonesia 2045 agenda. Against technocratic and realist accounts, this article utilizes Gramscian Geopolitical Economy (GPE), drawing on publicly available data such as peer-reviewed articles, policy documents, and reputable news articles to unpack the multi-scalar power relations and state-capital coalitions shaping semiconductor friendshoring, revealing how geopolitical risk, industrial policy, and social contestation co-evolve to enable or constrain Taiwan’s manufacturing friendshoring to Indonesia. This article argues that friendshoring emerges as a contested geopolitical fix, neither a zero-sum loss of deterrence nor a purely technocratic resilience. Friendshoring is best conceived as a contested geopolitical fix whose outcome hinges on how effectively Taiwanese and Indonesian state-society complexes articulate diversification by forging a durable strategic coupling while overcoming rival domestic coalitions and regional rivalries.

Keywords: Friendshoring; Semiconductor supply chain; NSP+; Geopolitical economy; Industrial upgrading

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Introduction

‘Friendshoring’—the relocation of production to politically aligned and trusted nations (Klarin & Sosnovskikh, 2024)—presents Taiwan with a strategic pathway to build resilience amid intensifying geopolitical and security tensions with China. Through the New Southbound Policy Plus (NSP+), Taiwan can deepen cooperation by developing semiconductor corridors and establishing fabrication plants (fabs) in Southeast Asian states that pursue a hedging strategy². This would enhance geopolitical flexibility for Taiwanese firms such as Taiwan Semiconductor Manufacturing Corporation (TSMC), which often find that many Chinese firms trading with Taiwan now face United States (US) pressures and sanctions, directly impacting Taiwan’s economy (Chien-chung & Huang, 2025; Javali, 2024). At the same time, Taiwan’s efforts to reshore production in the US have resulted in “reciprocal tariffs” under the second Trump administration (Leu, 2025; Ting-Fang, 2025), highlighting the domestic political fragility and limits of relying solely on Western partners.

Indonesia holds significant potential as an NSP+ partner for Taiwan in advancing semiconductor cooperation. The country aspires to become a regional semiconductor hub and possesses abundant natural resources critical to supporting the industry (Putra & Ginting, 2025). Indonesia has a steady pipeline of engineers and technicians for potential support of the proposed semiconductor industry, since 23.92% of all Indonesian tertiary graduates are in science & engineering disciplines—the highest share in Southeast Asia (Wang et al., 2024, pp. 7–8). Indonesia, which is also rich in silica—one of the key critical minerals used in global semiconductor wafer fabrication (Kurniawan, 2024; Putra & Ginting, 2024), has begun actively forging partnerships with major semiconductor players, including Taiwan and the United States (Nakhiengchanh, 2024; Putra & Ginting, 2025; Taipei Economic and Trade Office in Surabaya, 2024), and has integrated the development of a domestic semiconductor ecosystem into its broader downstream acceleration agenda under the flagship vision of Golden Indonesia 2045 (Kementerian Koordinator Bidang Perekonomian Republik Indonesia, 2024). Taiwan’s advanced semiconductor ecosystem, combined with Indonesia’s natural resource wealth and industrial ambition, positions the two countries as ideal and mutually beneficial partners.

The Arguments

Several groups of scholars have raised critical concerns regarding the proposals outlined above. From a realist perspective, the foundational assumption is that semiconductor trade, particularly in sectors tied to national security, operates on a zero-sum basis in which technological gains by one nation are a potential security threat to others (see Kochumon & C.A, 2025; Liu et al., 2025; Zhang, 2024). Taiwan’s centrality in the global semiconductor supply chain serves as a strategic deterrent to Chinese military aggression (see Barthwal, 2025; Javali, 2024; Sacks, 2023)—the ‘silicon shield’ (Addison, 2001). Offshoring such strategic industries, including advanced chip production, is believed to weaken Taiwan’s deterrence capacity against potential Chinese aggression (Javali, 2024; Sevastopulo & Hille, 2022). The United States, for instance, imports 44.2% of its logic chips from Taiwan and has projected a potential domestic price surge of up to 59% in the event of a supply disruption (Jones et al., 2023). Similarly, China, where 26% of total exports consist of electronics and

² While maintaining formal adherence to the One-China policy and remaining de facto neutral in the US-China tech rivalry, ‘hedging strategy’—as implemented by Malaysia, Singapore, Vietnam, and Indonesia—is a flexible, risk-diversifying posture whereby smaller states deliberately cultivate positive relations with several major powers and spread cooperation across economic, diplomatic, and security spheres to avoid over-reliance on any single state uncertainty (Wicaksana & Karim, 2023; Zhao, 2025).

machinery (Trading Economics, n.d.), receives 58% of Taiwan's semiconductor exports (Tung, 2024), underscoring its continued reliance on Taiwanese chips to support its manufacturing sector. Taiwan's control over this critical supply chain provides it with strategic leverage, enabling it to exert diplomatic pressure on allies—including the US, the Quad³, and Chip-4⁴ partners—to defend its interests and deter China from taking military action, such as a potential 'quarantine' or invasion of Taiwan by 2027. Any attack that disrupts Taiwan's advanced foundries would trigger significant economic fallout globally (Y. Lee et al., 2021; Sacks, 2023)—including for China itself.

However, despite Taiwan's persistent efforts to maintain its dominance in global chip production, Beijing has set a clear ambition to increase the share of domestically sourced semiconductors from 10% in 2015 to 75% by 2030 (Umbach, 2024)—backed by a substantial USD 47.5 billion fund (Gao, 2024)—to reduce overdependence on imports from Taiwan. Simultaneously, the risk of Chinese assertiveness has prompted technologically advanced nations to pursue semiconductor self-sufficiency⁵. These shifting geopolitical dynamics are rendering Taiwan's security paradigm—predicated on the assumption that an invasion is unlikely due to global economic fallout (see Javali, 2024; Sacks, 2023), less tenable because such efforts incentivize others to develop alternatives that sideline Taiwan's primacy.

The second strand of technocratic assumptions critiques the capacity and institutions of host states to absorb offshored semiconductor production, given the industry's complexity. While TSMC has initiated diversification through new fabs in Japan, Germany, and the United States (Ryugen, 2024; Tech in Asia, 2025; TSMC Arizona, n.d.), these efforts remain limited to mature nodes and face persistent constraints, particularly in terms of technical expertise and talent acquisition (Liu et al., 2025). For example, due to technical issues, the Kumamoto fab in Japan and Dresden fab in Germany focus on producing 22/28-nm and 12/16-nm chips for the automotive sector (Goodrich, 2025), do not substitute for the most advanced sub-5nm nodes critical to military and high-performance computing applications (Liu et al., 2025). Talent shortage also persists. For example, Dresden fab will require up to 30,000 skilled workers by 2030, a demand that far exceeds the available talent pool within the European Union (Liu et al., 2025; Zielke, 2024). These technical hurdles underscore how even in developed nations, new fabs struggle to mirror Taiwan's finely tuned manufacturing ecosystem, resulting in slower ramps and persistent difficulties in achieving cutting-edge production efficiencies, yet demonstrate that Taiwan's central position in the global semiconductor supply chain is a role that cannot be easily or rapidly replicated elsewhere.

Technocratic critiques overlook the adaptive capacity that friendshoring unlocks when Taiwan embeds production within Southeast Asia's emerging geoeconomic corridors (Campbell, 2024). Critical geoeconomic scholarship demonstrates that friendshoring directs state capital toward reterritorializing high-tech networks without unravelling

³ The Quadrilateral Security Dialogue (Quad) is a minilateral forum linking the United States, Japan, Australia and India to support a 'Free and Open Indo-Pacific' (Fraser & Soliman, 2023).

⁴ Chip 4 is a US-led semiconductor minilateral comprising the United States, Japan, South Korea, and Taiwan to coordinate export-control policies, share supply-chain information, and build collective resilience against geopolitical shocks (Liu et al., 2025).

⁵ The United States' CHIPS and Science Act 2022 sets aside USD 52.7 billion in grants and tax credits while 'guard-rail' clauses bar recipients from expanding cutting-edge capacity in China, exemplifying a new era of techno-nationalism (Luo & Van Assche, 2023). South Korea's 'K-Chips Act' lifts investment tax credits on semiconductor capital expenditures to as high as 25% and broadens R&D deductions to accelerate onshore production (He-rim, 2023).

global interdependencies (Alami et al., 2023; Hsueh, 2023). Malaysia, for example, has lured Advanced Semiconductor Engineering's (ASE) fourth and fifth packaging plants, allowing TSMC to keep its sub-5nm lines at home while incorporating Malaysia into the assembly, testing, and packaging parts of the industry (Teng, 2025). Similarly, the Taiwan-Thailand accords pair subsidies with targeted training, bridging workforce gaps far faster than Europe's greenfield fabs (Hsueh, 2023). These cases reveal both the promise and the limits of friendshoring, as success depends on shared governance and continuous skill upgrading, yet it does not require exporting Taiwan's most advanced nodes. Taiwan's semiconductor leverage, established through partnerships with Southeast Asia nations, will become a credible new pillar of the Silicon Shield, strengthening regional resilience while preserving Taipei's strategic deterrence.

Grounded in the Gramscian tradition of geopolitical economy (GPE), this study treats friendshoring not simply as a firm-level logistics choice but as part of a broader conjuncture in which geopolitical rivalry, capital accumulation and state projects intertwine (see Alami et al., 2023; Desai, 2022; Glassman, 2018; Sparke, 2025). GPE insists that the spatial reorganisation of production is always the provisional outcome of struggles among state-society complexes, whose material interests, ideological visions, and positionalities in the world market are historically produced and uneven. Accordingly, the proposed Taiwan-Indonesia semiconductor corridor is read as a moment in the ongoing, dialectical co-constitution of geopolitics, the search for security and strategic leverage and geoeconomics—the pursuit of techno-industrial competitiveness through territorial and extra-territorial statecraft (Lee et al., 2018; Sparke, 2025).

Seen through this lens, friendshoring is neither a zero-sum offshoring of Taiwan's deterrent capacity nor a straightforward technocratic exercise in supply-chain resilience. It is, instead, a contested geopolitical fix: a spatial strategy through which rival blocs attempt to resolve crisis tendencies—over-concentration, security vulnerability, and resource dependence—by producing new circuits of accumulation and new territorial configurations. Its ultimate trajectory will depend on whether Taiwanese and Indonesian state-society complexes can forge a durable historic bloc capable of coordinating finance, skills, and technology while navigating the contradictory imperatives of US containment, Chinese countermeasures, and regional development aspirations.

Geopolitical Context, Class Alignments, and Industrial Upgrading

The broader geopolitical economy of the semiconductor 'chip war' will shape prospects for any TSMC move into Indonesia. As a Taiwanese firm, TSMC is deeply entwined in US-led efforts to restructure the global chip supply chain, shifting away from its reliance on China (Jones et al., 2023; Mui, 2025). Under the current US administration, policy has become more interventionist and unpredictable as witnessed by 'reciprocal tariffs' and related measures have already imposed new cost and compliance pressures on Taiwanese suppliers and their partners, while tighter CHIPS Act guardrails heighten scrutiny of cross-border production and sourcing (Denamiel et al., 2025; Leu, 2025; Ting-Fang, 2025). At the same time, Washington's CHIPS and Science Act (2022) and associated initiatives continue to promote friendshoring with trusted partners. Indonesia features in this calculus. In late 2023, Presidents Biden and Jokowi elevated the US-Indonesia Comprehensive Strategic Partnership to include cooperation to *'build secure and resilient semiconductor supply chains in support of our respective national interests and by respective national legislations'* (The White House, 2023, para. 11). Taken together, these dynamics position Indonesia within a strategy to contain China's

technological rise by cultivating alternative manufacturing hubs in Southeast Asia, even as tariff- and guardrail-driven uncertainty intensifies pressure on firms navigating the US-China rivalry.

This geopolitical alignment has a significant influence on Indonesia's domestic class configurations. First, it empowers the transnationalist fraction of Indonesia's elite—those political and business leaders oriented toward Western capital and global markets. For instance, officials in the Ministry of Industry and the Coordinating Ministry for Economic Affairs gain external backing—expertise, funding, and political leverage—for their semiconductor ambitions (Antara News, 2024b), strengthening their position in intra-state debates. These actors can leverage the US partnership to push through policy reforms and infrastructure spending for the chip sector, countering more sceptical voices (Antara News, 2024b). Indeed, Indonesia's engagement with the US and the Organisation for Economic Co-operation and Development (OECD) on a semiconductor roadmap has provided intellectual and financial resources that bolster the pro-foreign direct investment (FDI) camp (Antara News, 2024a; Mealy et al., 2023; Putra & Ginting, 2024). This recalls historical patterns similar to how Cold War geopolitics spurred industrialisation in South Korea and Taiwan through US support, the emerging 'Chip Alliance' with Washington could accelerate Indonesia's industrial upgrading, provided domestic actors capitalise on it (Crook, 2016; Glassman & Choi, 2014). In Gramscian terms, the '*internationalised*' elements of the state—links to donors, global firms, alliances—act as an external pressure and support for specific class interests—technocratic planners, modernising capital—to prevail internally (Hameiri & Jones, 2016, 2017).

Conversely, Indonesia's ruling *politico-business oligarchy*—a term used to describe the powerful conglomerate owners and political families that dominate its economy—may exhibit a more pragmatic, hedging behavior often called 'polyalignment' (see Aulia, 2022; Wijaya & Jones, 2025). These elites have benefited immensely from Chinese investments in infrastructure and resource processing (e.g. nickel smelters for EV batteries) while also courting Western investors (Tritto, 2023; Wijaya & Jones, 2025). Rather than cleaving solely to the US camp, they prefer to maximise opportunities from all sides (Yuniar, 2025). The nickel sector is instructive as Indonesian tycoons formed joint ventures with Chinese firms to build stainless steel and battery supply chains, even as the government also seeks deals with American firms (such as Tesla) (The Economic Times, 2022; Tritto, 2023). This suggests that if TSMC arrives as part of a US-backed reshoring, Indonesian business groups will still attempt to maintain workable relations with China. They might, for example, insist that Indonesia remain open to less sensitive Chinese tech investments or that any chip exports from the TSMC plant not explicitly exclude specific markets, so as not to antagonise Beijing (Antara News, 2025).

The Indonesian state's official stance remains one of non-alignment—or '*free and active*' diplomacy—and economic polyalignment, seeking benefits from both superpower blocs. Internally, this stance is supported by business-nationalist groups who caution against becoming a pawn in great power rivalries (Myers, 2025; Yuniar, 2025). They will likely push for assurances that Indonesia can continue its trade with China (its largest trading partner) even as it develops a semiconductor industry linked to the West. Such dynamics illustrate that the geopolitical economy is '*always articulated*' with the socio-spatial context. Indonesia's approach to strategic coupling with TSMC is being calibrated to its unique position as a large nation in the Global South, navigating the 'Second Cold War'. The

outcome—whether Indonesia tilts more overtly Westward with this high-tech partnership or balances adroitly—will be determined by how these class and geopolitical pressures play out.

Finally, the implications for Indonesia's pursuit of industrial upgrading are profound. Securing a TSMC investment could jump-start the country's nascent semiconductor ambitions, moving it up the value chain from primarily resource-based activities toward advanced manufacturing. The government's semiconductor roadmap acknowledges that success hinges on acquiring know-how from global leaders (Ghifari, 2023). A partnership with TSMC would bring cutting-edge process knowledge, supplier networks, and an entire ecosystem (design, testing, materials) that Indonesia currently lacks (Mak, 2024). However, the distribution of gains from this upgrading is a matter of contestation. If dominated by foreign capital with minimal linkage to local firms, the fab might remain an enclave with limited spillovers—a concern raised in public debates about avoiding a mere 'branch plant' economy (Grunsvén & Hutchinson, 2014). Hence, Indonesian policymakers (backed by domestic capital) are likely to negotiate for technology transfer and local participation clauses. The Build-Operate-Localise model, already applied in the Foxconn deal—whereby foreign investors commit to gradually increasing local content and involvement (Antara News, 2023)—could be a template for TSMC. This model reflects an effort to transform global production networks into vehicles for domestic capability building, consistent with the variegated developmentalist strategy Indonesia employs (Hon Hai Precision Industry, 2022). Rather than pure laissez-faire or pure self-reliance, it adopts a hybrid approach in which the state orchestrates foreign and domestic partners to foster new industries, while managing risks (e.g., dependency, technology lock-in) through regulation and proactive industrial policy.

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Taiwan's New Southbound Policy Plus and the Think Tank Corridor: A Transnational Advocacy Network Approach

Dama Rifki Adhipramana¹

ABSTRACT

This paper examines the role of “potted-state NGOs” as hybrid actors sustaining Taiwan–Indonesia relations under the constraints of the People’s Republic of China’s (PRC) “One China” policy. By analyzing the Yushan Forum, the Taiwan-Asia Exchange Foundation (TAEF), and the transnational networks of Hakka scholars, the study highlights how Taiwan leverages epistemic platforms to bypass the limits of formal diplomacy. Drawing on transnational advocacy network (TAN) theory, the paper argues that these entities convert academic and civic initiatives into policy-relevant cooperation, reducing transaction costs between theory and practice. While the Yushan Forum demonstrates the symbolic limitations of high-level dialogues, pilot projects and thematic working groups (TWGs) illustrate the potential for more sustainable and scalable collaboration in areas such as digital economy, disaster resilience, and civil society engagement. This study contributes to the literature on small-state diplomacy by showing how Taiwan’s civil society organizations act as quasi-state instruments, offering lessons for other diplomatically constrained actors seeking international visibility and influence.

Keywords: New Southbound Policy Plus; Taiwan; Transnational Advocacy Network; TAEF; Potted-State NGO; Think Tank Corridor

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Introduction

Taiwan's foreign policy is shaped fundamentally by its contested status in the international system. According to Article 1 of the 1933 Montevideo Convention, four traditional criteria define statehood: (1) a permanent population; (2) a defined territory; (3) a functioning government; and (4) the capacity to engage in international relations (Pertiwi et al., 2020). Despite meeting these criteria, Taiwan lacks full empirical statehood, as its foreign policy autonomy is significantly constrained by the People's Republic of China's (PRC) enforcement of the One China Policy. This policy asserts that diplomatic recognition of the PRC precludes formal recognition of Taiwan, resulting in Taiwan's exclusion from most international organizations and treaties (News, 2016). Consequently, Taiwan has limited access to intergovernmental institutions, international legal mechanisms, and official diplomatic engagement.

In response to these constraints, Taiwan has sought alternative pathways to international engagement. Under President Lai Ching-te's administration, the New Southbound Policy (NSP) expanded into NSP+ in 2024, emphasizing value-based diplomacy and the strategic role of civil society. NSP+ institutionalizes its outreach through three new thematic corridors: (1) Think Tank Corridor, fostering epistemic exchange and policy dialogue; (2) NGO Corridor, positioning Taiwan as a hub for regional civil society cooperation; and (3) Youth Corridor, cultivating future Asia-Pacific leaders (TAEF, 2024).

At the center of these initiatives is the Taiwan Asia Exchange Foundation (TAEF), the first policy-oriented think tank focused on Southeast and South Asian affairs. TAEF bridges state objectives with transnational networks by facilitating collaboration among think tanks, NGOs, and youth groups. While organized as a nongovernmental entity, its close alignment with Taiwan's foreign policy apparatus reflects a hybrid institutional character (TAEF, 2025a).

This study applies Transnational Advocacy Network (TAN) theory, particularly the typologies of information, symbolic, leverage, and accountability politics (Keck & Sikkink, 1999), to analyze how TAEF and related actors implement NSP+. It introduces the concept of "potted-state NGOs" to describe hybrid transnational organizations that, though nongovernmental in form, operate as extensions of state strategy. Through semi-structured interviews and qualitative analysis, the article explores how Taiwan's think tank diplomacy contributes to norm diffusion and regional governance in the Indo-Pacific.

Theoretical Framework

TANs comprise coalitions of NGOs, research institutions, social movements, and other civil society actors that collaborate across borders to promote policy change and shared norms. Their influence derives from four core strategies: information politics, symbolic politics, leverage politics, and accountability politics. Applying this framework to NSP+ allows an assessment of how Taiwan mobilizes hybrid actors—particularly the TAEF—to project normative power and navigate its diplomatic constraints. Keck and Sikkink (1999) categorize TAN strategies into four core dimensions:

- (1) Information politics – a capacity to produce and disseminate politically relevant, credible information to target audiences in timely and impactful ways.
- (2) Symbolic politics – a strategic way of using narratives, images, or events to frame a certain issue to resonate with distant audiences.
- (3) Leverage politics – an ability to mobilize more powerful actors—such as states,

international organizations, or the media—to influence outcomes that weaker actors cannot change on their own.

- (4) Accountability politics – an effort to hold powerful actors accountable to their previously stated commitments, particularly in contexts where policy promises are vague or inconsistently implemented.

TANs influence policymaking at key moments: when new issues emerge, when agendas are framed and support is mobilized, when institutional rules are challenged, and when new norms begin to take root. Their strength comes from turning local concerns into cross-border campaigns that can shift state actions and shape public debate.

Analysis

GONGOs, State-Aligned CSOs, and Potted-State NGOs

Government-Organized Non-Governmental Organizations (GONGOs) are entities that outwardly resemble NGOs but are established, funded, and tightly controlled by the state to advance its political or social agenda, leaving them with very low independence. Examples include Chongryon in Japan, Nashi in Russia, the Myanmar Women's Affairs Federation, and the China Youth Development Foundation's Project Hope (Naim, 2025). In contrast, state-aligned civil society organizations (CSOs) occupy a middle ground between wholly independent NGOs and GONGOs. Constituted as associations, trusts, or foundations voluntarily formed by citizens or private actors, these organizations retain some operational autonomy but often align with government initiatives, particularly when partnerships deepen state oversight (Friedman, 2025).

The TAEF illustrates this hybrid model. Its collaboration with government-linked cultural diplomacy, particularly through the Hakka Affairs Council, underscores its alignment with official policy. Although engaging civil society and Track II diplomacy, TAEF relies on state-anchored networks, where Hakka channels function less as grassroots movements and more as administrative extensions of cultural policy.

This study introduces the concept of the “potted-state NGO” to capture such hybrid organizations—formally nongovernmental, but deeply embedded in state-defined frameworks. They typically share four features: (1) initial funding or mandates from state-linked bodies; (2) governance blending government appointees with independent experts; (3) operational autonomy to conduct Track II diplomacy and research; and (4) active engagement with civil society and diaspora networks. The model also manifests at the individual level, where figures simultaneously hold state-linked and independent positions. For example, Michael Hsiao, as Chairman of TAEF and Chair Professor of Hakka Studies at National Central University, bridges think tank and cultural diplomacy.

During an interview, Tonny Dian Effendi (Universitas Muhammadiyah Malang) emphasized how such dual roles enable cross-cutting linkages (Effendi, 2025). A concrete case was the December 2019 establishment of the Global Hakka Studies Alliance. Supported by the Hakka Affairs Council, it brought together eleven institutions from seven countries, including leading universities in Taiwan, Indonesia, Japan, Malaysia, Singapore, Thailand, and the United States (Hakka, 2020). The initiative illustrates how Hakka scholars, while formally outside government, operate as influential actors within Taiwan's transnational networks.

Tonny further noted that although the NSP has widened in scope, its long-term depth remains uncertain. He pointed to the shared maritime histories and colonial legacies of Taiwan and Indonesia, including Indonesian movement to Formosa under the Dutch East India Company, which add cultural resonance to present-day cooperation.

These patterns suggest that TAEF and Hakka initiatives are increasingly interconnected, reflecting a more integrated approach to Taiwan's regional engagement. In Indonesia–Taiwan relations, potted-state NGOs hold particular strategic value: they can “speak the language of civil society” in ASEAN contexts where Taiwan cannot act as a state. Their credibility stems from appearing independent and research-based, while their alignment with state goals enhances influence in policy and academic circles. Acting as policy translators, they convert academic dialogue into actionable recommendations, reducing the gap between theory and practice.

The Yushan Forum exemplifies this role. While limited in symbolic impact, it provides TAEF with a platform to sustain cooperation in areas such as disaster resilience and the digital economy—domains that are economically important yet relatively free from security sensitivities (Alan H. Yang & Ding-Liang Chen, 2019). In this way, potted-state NGOs operate as bridge-builders, quietly advancing Taiwan–Indonesia cooperation despite PRC pressure and the broader turbulence of U.S.–China rivalry.

Assessing NSP+ through the Transnational Advocacy Network (TAN) Framework

Taiwan's NSP and its subsequent evolution into NSP+ can be analytically assessed using the TAN framework by Keck and Sikkink (1999), particularly through its typologies of information, accountability, symbolic, and leverage politics. The Industry–Academia Collaboration Program exemplifies information politics by facilitating the transfer of expertise and human capital between Taiwanese and Indonesian institutions, producing knowledge that is both credible and policy-relevant. Taiwan's enhanced protections for Indonesian migrant workers—such as free legal aid and translation services during legal proceedings—reflect accountability politics, ensuring that host-country institutions uphold rights and standards for foreign labor.

The development of NSP+ represents a refinement of these transnational linkages, with more structured and targeted engagement of non-state actors. At the center of this approach is the TAEF, which anchors the Think Tank Corridor. Its mission includes strengthening regional linkages through international think tank cooperation and conducting policy research to build joint task forces on governance. While chartered and supported by the government, TAEF operates with NGO-style flexibility, mobilizing scholars, entrepreneurs, and grassroots actors. This hybrid identity enables it to act simultaneously as an agenda-setter, knowledge broker, and normative entrepreneur—combining state authority with civil society legitimacy (TAEF, 2025).

For Taiwan, constrained in traditional diplomacy, this hybrid civil society strategy provides a pragmatic alternative to rigid state-to-state channels. In Indonesia, the approach is particularly effective given the country's dense policy research ecosystem, with nearly 200 organizations collaborating closely with ministries, parliament, and local governments on development planning and advocacy (Lassa et al., 2023). Embedding Taiwanese semi-official think tanks in these networks creates reciprocal benefits: Indonesia gains access to Taiwan's expertise in technology transfer, labor rights, and soft power, while Taiwan embeds its NSP+ initiatives within credible local institutions.

A concrete example is the Yushan Forum's focus on disaster prevention cooperation, which convened stakeholders from Indonesia, Japan, and the Philippines to exchange models for resilient communities, intelligent disaster prevention, and effective relief mechanisms. For Indonesia, such exchanges carry clear economic value: mitigating disaster risks helps stabilize investment climates and strengthens regional resilience. This demonstrates that Track II diplomacy, as practiced by TAEF, generates not only dialogue but also practical, cross-sectoral benefits aligned with Indonesia's development priorities (Alan H. Yang & Ding-Liang Chen, 2019).

In an era of "post-truth" skepticism, however, the durability of the Think Tank Corridor depends on transparency and co-creation. Clear disclosure of funding sources, rigorous evidence-based outputs, and collaborative agenda-setting with Indonesian counterparts will be essential to ensure the initiative is perceived as a genuine partnership rather than a form of patronage.

The Strategic Role of TAEF under NSP+

Surveys by TAEF in Vietnam, Thailand, Indonesia, Singapore, and Malaysia consistently reflect favorable perceptions of Taiwan and its business engagement under NSP (Yang, 2024). These perceptions are further strengthened by TAEF-facilitated citizen exchanges and cultural programs. TAEF has expanded the Yushan Forum into a crucial platform for international dialogue across the Indo-Pacific region. AEF advances its mission through five core action programs: youth leadership, think tank and policy cooperation, civil society connectivity, regional resilience, and arts and cultural exchanges. To strengthen regional partnerships, TAEF has signed bilateral cooperation with several institutions, including IDE-JETRO from Japan; the Observer Research Foundation (ORF) and the National Maritime Foundation from India; and Pijar Foundation and The Habibie Center from Indonesia. Collaboration with these think tanks involves MoU-based partnerships, regional policy dialogues, joint research and publication series, and the compilation of news and commentary on the NSP for relevant government departments (TAEF, 2025).

Over the past years, TAEF has promoted an array of activities, conferences, forums, youth camps, and art seasons and exhibitions. In addition to its activities, TAEF has published strategic reports on Taiwan's bilateral relations with India, Australia, and Southeast Asian countries, as well as its alignment with the US Indo-Pacific strategy and the global response to COVID-19 (TAEF, 2025b).

These outputs reflect TAEF's role in multiple TAN categories:

- Information politics: producing and disseminating policy briefs and reports.
- Symbolic politics: projecting Taiwan's image as a democratic, peace-promoting actor.
- Leverage politics: cultivating partnerships with regional civil society organizations and think tanks to enhance Taiwan's influence in regional policy debates.

Policy Implications and Future Trajectory of NSP+

The analysis of NSP+ and the role of TAEF highlights several important policy implications. First, there is a need to institutionalize cross-sectoral collaboration by strengthening the integration between state and non-state actors. While platforms like TAEF demonstrate the potential for hybrid cooperation, this approach could be expanded through structured partnerships among think tanks, civil society organizations, sub-national governments, and private sector actors. Such collaboration would enhance the legitimacy, inclusiveness, and

sustainability of Taiwan's engagement across the Indo-Pacific.

The Yushan Forum, one of Taiwan's flagship platforms for international dialogue, illustrates both opportunities and limitations. At present, the forum functions primarily as an annual high-level conference, focused on speeches and symbolic exchanges, but it lacks mechanisms for systematic follow-up. Introducing pilot projects could address this gap by transforming the forum from a symbolic event into a more action-oriented platform (Kimberly Kempf-Leonard, 2025). Pilot initiatives provide proof of concept by delivering measurable outcomes—such as cooperation in disaster resilience or digital economy development—that can later be scaled across the region. For example, a successful initiative in Indonesia could be adapted for use in the Philippines or Vietnam, thereby strengthening the forum's credibility as a venue that links dialogue with tangible results.

The creation of thematic working groups (TWGs) would also enhance the forum's effectiveness. Unlike broad plenary sessions, TWGs allow for sustained engagement on priority themes such as digital economy, climate adaptation, and labor mobility. Their outputs—white papers, policy briefs, and progress reports—would bridge the gap between Track II deliberations and Track I policymaking (Wolfe, 2021). Embedding such continuity into the Yushan Forum's agenda would expand its legitimacy and ensure its relevance beyond the annual meeting, gradually positioning it as a platform with cumulative policy impact.

Second, NSP+ effectiveness should be evaluated through recalibrated metrics. Instead of relying mainly on quantitative indicators—such as the number of agreements signed or events hosted—Taiwanese policymakers should place greater emphasis on qualitative measures. These include the depth of policy influence, the level of mutual trust built, and the long-term sustainability of cooperation. A shift in evaluation criteria would allow for a more nuanced understanding of NSP+ success in fostering transnational linkages that are meaningful rather than merely symbolic.

Conclusion

Taiwan's NSP+ represents more than an extension of its NSP—it reflects a strategic adaptation of diplomacy to the realities of limited formal recognition. By embedding its outreach in TANs, Taiwan has effectively combined state sponsorship with civil society agility to advance regional engagement. The TAEF exemplifies this approach, functioning simultaneously as a knowledge broker, normative entrepreneur, and Track II diplomacy within the Indo-Pacific.

This study's introduction of the concept “potted-state NGOs” captures the hybrid character of institutions like TAEF. Such organizations are rooted in state-defined agendas yet transplanted into civil society ecosystems, enabling Taiwan to cultivate trust-based partnerships, policy influence, and norm diffusion without the constraints of conventional state-to-state channels. The Global Hakka Studies Alliance case illustrates how these hybrids mobilize diaspora networks and cross-border coalitions to extend Taiwan's soft power. Looking forward, NSP+ holds the potential to evolve into a normative leadership model for the Indo-Pacific. Its future effectiveness will depend on deepening multi-level collaborations, enhancing transparency in hybrid institutions, and developing qualitative measures of policy influence and societal trust. For other diplomatically constrained actors, Taiwan's experience offers a blueprint for leveraging hybrid civil society instruments to navigate structural

limitations and contribute to inclusive, values-driven regional governance.

By embedding decision-making processes in iterative input–output loops that connect think tanks, policymakers, and regional stakeholders, Taiwan demonstrates how diplomatically constrained actors can institutionalize hybrid forms of governance. For Indonesia, participation in platforms like the Yushan Forum not only diversifies foreign policy partnerships but also yields practical lessons in integrating think tank expertise into parliamentary and ministerial decision-making.

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2

**Enhancing Indonesia-Taiwan Ties
through Socio-Cultural Cooperation
under the New Southbound Policy**

The Effectiveness of Tourism Promotion through Social Media: Celebrities vs Influencers A Case Study of Mikha Tambayong's Role as Taiwan Tourism Ambassador in Indonesia

Asmi Ramiyati¹

ABSTRACT

Tourism has become a popular activity for people from various social groups today. This is due to the perception of travel as a means for refreshing daily routines, self-actualization, and supporting mental health. Online media has emerged as an effective platform for disseminating tourism-related promotions. The growing demand for rapid, dynamic tourism information has heightened the need to assess promotional effectiveness. This study examines the relative effectiveness of celebrities and influencers in promoting tourism, with specific reference to Indonesia–Taiwan relations under the New Southbound Policy+ (NSP+). Employing a digital ethnography approach, the research focuses on Instagram and TikTok. The findings argue that influencers outperform celebrities in delivering accurate, engaging tourism content by combining informative narratives with visually appealing photo and video materials. Moreover, their ability to build interactive relationships with their audiences significantly enhances the impact of tourism promotion.

Keywords: New Southbound Policy+ (NSP+); Tourism, Digital ethnography, Instagram, TikTok

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Introduction

Tourism is one of the key sectors intricately linked with various crucial aspects of a country, including the economy, education, socio-cultural exchange, as well as health and aesthetics (Sun et al., 2025; Ekasani et al., 2020; Jian et al., 2024; Taufik & Sulistiadi, 2018). Given its multifaceted benefits, tourism must be managed effectively and strategically to serve the interests of the broader public. The utilization of social media has become a fundamental tool in the globalization era, reshaping how tourists search for, discover, evaluate, trust, and ultimately decide on travel destinations (Murtaza et al., 2024). Among the most widely used platforms for tourism promotion are Instagram and TikTok (Wengel et al., 2022; Melati et al., 2022). A noteworthy study by Truyols (2025) found that people from around the world consistently share and discuss their travel experiences on social media, with 74 percent of travelers posting about their journeys online. From an industry standpoint, social media emerged as a strategic operational tool during the pandemic, with usage increasing by up to 72 percent. In terms of platform engagement in the tourism sector, TikTok contributes 8.74 percent, Instagram 1.41 percent, Facebook 0.27 percent, and Twitter just 0.04 percent.

In Indonesia, outbound tourism has become an increasingly popular trend. According to the 2025 report by the Badan Pusat Statistik (BPS), the number of Indonesians traveling abroad rose significantly from 7.5 million to 8.94 million. The top international destinations remain within the ASEAN region—Malaysia, Singapore, and Thailand (Tirta, 2025). Traveloka's CEO also reported that South Korea ranks as the top international destination among Indonesian travelers, followed by Japan, China, Turkey, and Macau (CNN Indonesia, 2024). The popularity of South Korea, for instance, is inseparable from the global spread of Korean popular culture like music, drama, and film (Anis, 2022). Japan, meanwhile, is highly favored for its unique natural beauty, particularly during cherry blossom season, and for its strong cultural identity. The rising popularity of matcha and other cultural trends has also contributed to Japan's appeal (CNN Indonesia, 2024). These countries have demonstrated effective strategies in promoting tourism to the Indonesian market.

Taiwan is a relatively new player seeking to expand its tourism presence in Indonesia. This study aims to explore and propose more effective marketing strategies for Taiwan's tourism sector within the Indonesian context. As background, Taiwan's political and economic relations with Indonesia—particularly through the “New Southbound Policy+” (NSP+)—will be outlined to provide a clearer understanding of the framework in which these tourism efforts are positioned. According to the official ROC Taiwan website, the New Southbound Policy+ is an economic and trade strategy initiated by President Tsai Ing-wen (2016–2024) aimed at redefining Taiwan's role in Asia. The policy seeks to enhance partnerships with ASEAN, South Asia, Australia, and New Zealand through mutual trust and community-building. Among the 18 partner countries in the NSP+, Indonesia is one of the eight priority nations, based on the significant presence of Southeast Asian nationals in Taiwan, including migrant workers, students, and those married to Taiwanese citizens (Anwar, 2025).

One initiative under this policy is the development of Taiwan's tourism industry for Indonesian travelers. This includes the launch of the *Guanhong Project*, which offers an integrated online application system for Indonesian citizens to simplify the visa and travel process via travel agents or individual applications. Additionally, the Taiwanese government is actively promoting halal Muslim travel to accommodate Indonesia's predominantly Muslim population (Alam et al., 2025). A notable step in this direction is the appointment of Mikha Tambayong, a well-known Indonesian actress, as the first Taiwan Tourism

Ambassador to Indonesia. Since February 2025, she has been tasked with introducing Taiwan as a priority destination for Indonesian travelers (Harianty, 2025).

Mikha Tambayong began her career at age 14 and is known for starring in iconic television dramas such as *Kepompong* and *Nada Cinta* (Profil Tokoh, 2024). On social media, (As of July 31, 2025) she has 7.1 million followers on Instagram and 225.5 thousand on TikTok. Mikha's professional persona embodies the image of a thriving young woman, both in her artistic pursuits and her business ventures. She holds a Master of Management (MM) degree from Harvard Business School. She has also served as an Expert Staff for Public Communications to the Minister of Youth and Sports (Menpora) since 2023 (Putri, 2023; Zulfikar, 2021). Since her appointment, she has uploaded eight Instagram posts related to Taiwan but has yet to post any Taiwan-related content on TikTok. Interaction within the comments section on Instagram remains largely one-sided, with followers mostly expressing their desire to meet her in person, rather than engaging with the tourism content. This dynamic—of celebrity and fan—has obscured the original purpose of promoting Taiwan's tourism. Furthermore, most of her content consists of static images with minimal explanation or context about the destinations featured (Tambayong on Instagram, 2025).

Based on these observations, this paper proposes a reassessment of the criteria used to select tourism ambassadors. Previous studies have shown that influencers tend to be more effective in driving product engagement and purchase decisions than traditional celebrities (Susilawati & Solehatun, 2023; Hudi & Windasari, 2023). This research adopts a digital ethnography approach on TikTok and Instagram to compare the dynamics between influencers and Mikha Tambayong in disseminating information about Taiwan to Indonesian audiences. This method is chosen due to the close integration of these platforms in everyday social life. Digital ethnography emphasizes how social life is organized, presented, and performed on social media—revealing the “spectacularization” of everyday experiences (Abidin & Seta, 2020).

Promotion of Taiwan Tourism in Indonesia and Social Media

Since early 2025, the Taiwan Tourism Administration has actively promoted Taiwan's tourism in Indonesia, focusing on four key thematic strategies: “Nature, Cuisine, Romance, and Shopping.” This initiative constitutes a derivative program of the New Southbound Policy+ between Taiwan and Indonesia (Nugraha, 2025). The dissemination of awareness and the flow of information regarding Taiwan's tourism on TikTok and Instagram serve as foundational pillars in attracting interest from Indonesian travelers. These two platforms are the primary sources consulted when individuals begin searching for information about potential travel destinations (Gabriel & Park, 2025). The type and quality of content produced form the basis for sustaining interest and driving the decision of travel plans to Taiwan (Matusin et al., 2025). The individual selected to disseminate this tourism information plays a critical role. Celebrities and influencers carry distinct personas and reach, shaped by the characteristics they project to their respective audiences. According to the Indonesian Dictionary (KBBI), a “celebrity” is defined as an artist or performer—such as a singer, actor, painter, or stage performer—recognized for their expertise in the arts.

An “influencer,” on the other hand, is an individual with substantial influence on social media, typically measured by their follower count and their ability to shape audience opinions and behavior (Prayudi & Oktapiani, 2023; Sinolungan & Chan, 2025). Influencers can be divided into four categories: nano, micro, macro, and mega. Nano influencers have

1,000–10,000 followers. Micro influencers have 10,000–100,000 followers. Next is the macro influencer, who has 100,000 to one million followers. Mega influencers have more than one million followers. Research reveals that nano and macro influencers are more effective at promoting products or brands to audiences (Sanjaya et al, 2025; Alessandrina, 2024; Juniarti, 2025). This also makes people trust the products they promote because they know almost all of their followers. In addition, the cognitive aspects of their personal branding communication make their followers feel close and flexible in their interactions (Ramadhani and Isnawati, 2022; Binandari and Muksin, 2024).

The following table presents a comparison of content types shared by Mikha Tambayong—an actress and Taiwan’s Tourism Ambassador to Indonesia—and selected influencers on TikTok and Instagram.

Table 2.1 Content Comparison: Celebrity vs. Influencer on Instagram and TikTok

	Celebrity	Influencer
Instagram	 Source: @mikhatambayong on Instagram	 Source: @nekatpergisolo on Instagram
	 Source: @mikhatambayong on Instagram	 Source: @sigit_sugiyono on Instagram
	 Source: @mikhatambayong on Instagram	 Source: @ikahuang on Instagram
TikTok		 Source: @hungryasfudge on TikTok
		 Source: @silviegustinah on TikTok
		 Source: @rismarusdyantoro on TikTok

In her role as both an actress and Taiwan's tourism ambassador to Indonesia, Mikha Tambayong has shared several moments from her visit to Taiwan via her Instagram account. In the first featured post, she is seen wearing traditional Taiwanese attire while engaging in cultural activities with locals. In the second post, she appears in a pink dress attending a promotional event titled "*Saatnya Berkunjung ke Taiwan*" ("Time to Visit Taiwan"). The third post features her sampling street food at Wushang Night Market. However, Mikha remains largely inactive on TikTok and has yet to share any content related to Taiwan's tourism on that platform.

By contrast, tourism influencers on Instagram have consistently provided a wider range of informative content about Taiwan. The first influencer, @Nekatpergisolo (25.1k followers), shared a video showcasing the scenic coastline of Orchid Island. The second, @sigitsugiyono (20.3k followers), offered information on travel opportunities to Taiwan through the "Taiwan Lucky Draw" program, which includes a travel stipend. The third, @ikahuang (12.5k followers), provided comprehensive guidance on travel preparation—ranging from necessary travel documents to instructions on purchasing transportation tickets within Taiwan. These findings indicate that influencers offer more substantive and targeted promotional content than Mikha Tambayong. Influencer content—on both Instagram and TikTok—is more clearly aligned with tourism promotion.

On Instagram, influencers typically use video content with voiceovers and informative carousels of up to 10 slides. On TikTok, @hungryyosua (3.1k followers), @silvieagustinah (1.4k followers), and @rismarusryantoro (26.9k followers) shows the content is more diverse but mostly video-based, including monologues, scenic footage with voiceovers, and tourist-site footage with overlaid text. Occasionally, influencers also appear on screen to showcase themselves participating in travel-related activities. These visually compelling, communicative, and professionally produced formats have proven to increase audience engagement and reinforce brand identity (Shafa & Pranata, 2025).

In addition to content quality, the nature of audience interaction is a vital factor. Comments and dialogue within posts can enhance the perceived value and credibility of promotional material (Islami et al., 2024). Active engagement in comment sections can spark dynamic conversations and serve as extensions of the promotional message—functioning as contributors, supporters, or critics of the content (Prajarto, 2018). In Mikha Tambayong's case, audience interaction is predominantly one-sided and lacks responsiveness. Comments tend to focus on her appearance or express a desire to meet her, thereby overshadowing the intended purpose of promoting Taiwan as a tourist destination.

Conversely, research shows that engagement between influencers and their audiences on social media significantly impacts consumer interest and behavior. This interaction fosters a sense of personal connection and trust (Alfiannor, 2024). The perceived relatability of influencers—who are often viewed as "ordinary people"—enhances this connection. Crystal Abidin (2016) outlines five key pillars of influencer effectiveness: accessibility (how easily followers can connect with the influencer both digitally and physically), trust (how credible and convincing their lifestyle appears), authenticity (the perceived genuineness of their persona), *emulatability* (how easily followers can imitate their lifestyle), and intimacy (the closeness followers feel with the influencer). These characteristics make influencers more approachable and trustworthy, particularly for middle-income audiences. For such groups, travel—such as visiting Taiwan—is framed not as a luxury, but as an attainable lifestyle aspiration.

Moreover, aligning the ambassador figure with the appropriate target audience is critical. Travel-related discourse is highly associated with Generation Z (Gen Z, born between the mid-1990s and the early 2010s), who often describe travel as a form of “healing” (Wulandini, 2025). This generation is widely recognized for its strong interest in tourism and regards travel as a primary psychological need for relieving stress from academic or professional obligations (Haratikka & Silitonga, 2023). Gen Z has also been dubbed “digital tourists” due to their heavy reliance on technology, spending between 6 to 16 hours per day on digital devices and social media (Setiawan et al., 2018). This makes them a highly specific and promising demographic for promoting Taiwan tourism in Indonesia. Research confirms that travel influencers who apply interactive, engaging, authentic strategies—combined with consistent engagement—can effectively influence Gen Z’s travel behavior (Moni et al., 2025).

Conclusion

Tourism marketing through social media is a strategic approach to increasing visitor numbers. This study finds that influencers are more effective than celebrities in promoting destinations, as they produce content that is both informative and visually engaging. Using the case of Mikha Tambayong—an actress and Taiwan’s tourism ambassador in Indonesia—it becomes evident that celebrity-driven promotions still face several limitations. In contrast, influencers on Instagram and TikTok demonstrate a distinct capacity to produce precise, compelling travel content while cultivating high levels of audience engagement. In the context of the tourism sector within the New Southbound Policy+ framework between Taiwan and Indonesia, this capability offers substantial potential for mutually beneficial outcomes. Their interactive communication approach serves to strengthen consumer trust and reinforce brand credibility. Ultimately, aligning promotional efforts with the right audience is essential. Gen Z, with their strong interest in travel and high social media activity, represents an ideal target. When combined with the reach and relatability of influencers, this group forms a powerful force for driving tourism interest particularly in the case of Taiwan’s promotion in Indonesia.

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Shared Tongues, Shared Tomorrows: Rethinking Taiwan–Indonesia Cultural Ties Under The New Southbound Policy+

Rafida Mumtaz¹

ABSTRACT

The New Southbound Policy+ (NSP+), Taiwan's principal foreign policy initiative, seeks to diversify partnerships and enhance people-centered connections with Southeast Asia, South Asia, and Oceania. Within this framework, Indonesia occupies a particularly strategic position, being not only the largest economy and democracy within ASEAN but also a cultural hub with profound historical and linguistic connections to Taiwan. Despite the prevailing emphasis on trade and investment, less attention has been paid to the cultural and linguistic continuities that link these two societies. This paper explores how cultural and linguistic ties between Indonesia and Taiwan, particularly through shared Austronesian ancestry and diasporic interactions, can serve as a foundation for more inclusive and sustainable cooperation under NSP+. Employing a literature review, this study synthesizes insights from linguistic anthropology, diaspora studies, and cultural diplomacy to map two key pathways: the Austronesian linguistic kinship shared by both parties and Taiwan's cultural presence within Indonesian society, particularly among Chinese-Indonesian communities. By reorienting NSP+ through the lens of mutual heritage and identity, this paper proposes a rethinking of cultural diplomacy that transcends economic interests and opens new avenues for soft power, intercultural dialogue, and people-to-people engagement between Indonesia and Taiwan.

Keywords: Austronesian language, linguistic anthropology, New Southbound Policy+, Taiwan-Indonesia culture.

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Introduction

In 2016, Taiwan introduced the New Southbound Policy to promote global cooperation, ensure international peace, and contribute to world harmony. The policy prioritizes cooperation in trade and economic development, emphasizing a phased implementation approach. The focus is particularly relevant as ASEAN, the world's third largest market, is a fast growing and promising region. Its trade increased by nearly USD one trillion between 2007 and 2014, with the largest trade partner comprising ASEAN members. ASEAN attracted USD 136 billion in FDI in 2014, accounting for eleven per cent of global FDI inflows (Neszmélyi & Kozár, 2018).

In light of these developments, Taiwan proceeded to augment and refine the NSP concept in 2024, subsequently developing the NSP+ model. This new model represents a more substantial implementation of the objectives established by the previous model. NSP+ would continue with the “corridor” concept, transforming previously isolated cooperation into a diverse, networked approach. Moreover, it highlights the ongoing collaboration between Taiwan's research institutions and other nations within the “Four-Dimensional Diplomacy” strategy, encompassing the domains of diplomacy, intelligence, military, and economy. This approach aligns with the Ministry of Foreign Affairs' “comprehensive diplomacy” pillars of democracy, peace, and prosperity. This necessitates the ongoing implementation of public diplomacy through the efforts of think tanks and academic institutions to disseminate Taiwan's experiences, thereby fostering mutual prosperity and development in the region.

The goals of the NSP+ extend beyond economic ties to encompass talent cultivation and the strengthening of regional connectivity through resource exchange and people-to-people collaboration. Taiwan and Indonesia, in particular, have fostered increasingly positive relations under the policy, especially in these fields. Neoliberal scholars, on the other hand, view the NSP as Taiwan's soft power diplomacy (Lee & Chan, 2023; Rasool & Ruggiero, 2022) to promote cooperation with countries in the region in the fields of education (Effendi, 2023) and migrant workforce (Maksum, 2023).

Within this broader soft diplomacy context, Taiwan's internal socio-cultural landscape also offers a unique foundation for soft diplomacy. Taiwan is widely recognized as a multiethnic, multilingual, and multicultural society, “a phenomenon which has been emerging alongside the democratization and pluralization of the island since the 1980s” (Damm, 2012). Of particular importance is Taiwan's Indigenous heritage. The value of Formosan languages lies not only in their linguistic diversity but also in their foundational status within the Austronesian language family. Indeed, Taiwan is widely recognized by linguists and archaeologists as the homeland from which Austronesian peoples and languages dispersed across Southeast Asia, Oceania, and even Madagascar, a phenomenon often referred to as the “Out of Taiwan” hypothesis (Bellwood, 1997; Blust, 1984).

Notably, this shared Austronesian origin deeply resonates with Indonesia, whose diverse ethnolinguistic landscape is predominantly Austronesian. This profound linguistic and cultural ancestry provides a compelling, yet underexplored, basis for cultural diplomacy, offering a powerful avenue to strengthen bilateral ties between Taiwan and Indonesia. This article thus argues that by foregrounding this historical connection, which can be interpreted as a form of “ancestor recall” in modern diplomacy, the New Southbound Policy Plus (NSP+) can foster more inclusive and sustainable people-to-people cooperation that transcends traditional economic interests.

Historical Ties Between Taiwan and Indonesia

Taiwan and Indonesia have a long shared history; the ancestors of the Austronesian people are likely from Taiwan. This connection should be strengthened with the NSP+ perspective, considering the shared culture and ancestry.

The “Out of Taiwan” hypothesis posits that the origins of the Austronesian peoples and their approximately 500 languages, spanning across Oceania, can be traced back to Taiwan. This theory, initially proposed as a language or farming dispersal hypothesis, was solidified with linguistic observations indicating the development of Austronesian languages in Taiwan (R. A. Blust, 1999). Extensive linguistic evidence supports Taiwan as the Austronesian homeland, with most Austronesianists agreeing that Proto-Austronesian was spoken there around 5,500 years ago (Bellwood, 1985; Blust, 1995). From this linguistic hub, Proto-Austronesian diversified into numerous major subgroups. While the majority of these subgroups remained in Taiwan, one significant branch, Proto-Malayo-Polynesian (MP), subsequently migrated out of the island (Blust, 1977, 1978).

From this ancestral homeland, Neolithic migrants began their extensive dispersal. They first crossed the Batanes Strait into Luzon, northern Philippines, between 4,500–3,500 years Before Present (BP). From the Philippines, the migration branched into several directions. One significant wave moved southwestward into Borneo, Sulawesi, and subsequently towards Java, Sumatra, and Peninsular Malaysia between 3,500–2,500 years ago (Klamer, 2019). Concurrently, another migration of MP-speaking groups advanced southeast from the northern Philippines into the Moluccas and Lesser Sundas, reaching the Timor area around 3,500 years ago (Pawley, 2005). Further eastward movements of MP-speaking peoples, occurring between 4,000–3,500 years ago, proceeded via Halmahera in the North Moluccas, skirting the northern coasts of New Guinea, until they arrived at the Bismarck Archipelago. This eastward expansion culminated in the emergence of the distinctive Lapita Cultural Complex around 3,300 BP (Bellwood, 1997, 2005; Diamond, 2001; Posth et al., 2018).

The consensus among linguists regarding Taiwan as the Proto-Austronesian homeland is robust (Blust, 1999), primarily because the reconstructed Proto-Austronesian vocabulary for flora and fauna places the homeland west of the Wallace Line, and Taiwan exhibits the highest concentration of primary Austronesian subgroups. This Taiwanese linguistic homeland model has received further strong support in recent years. Notably, Ross (2009) demonstrated how Malayo-Polynesian is effectively nested within the Formosan language tree. This linguistic evidence, combined with archaeological findings, has led to the widely accepted “Out of Taiwan” model (Bellwood, 1997; Hung et al., 2011) for the spread of farming, specifically rice agriculture, and distinctive red-slipped pottery. This demic diffusion began around 4,000 years ago (4 ka) across Island Southeast Asia (ISEA), eventually culminating in the expansion of Austronesian Oceanic speakers into the Pacific within the last 3,000 years (3 ka) (Bellwood, 1997; Spriggs M, 2003, 2007).

The Austronesian language family is remarkably extensive, encompassing over a thousand indigenous languages spoken across a vast area stretching from west to east in the Southern Hemisphere (Blust, 2013). This includes significant parts of Southeast Asia, such as Madagascar, Indonesia, sections of Vietnam and Myanmar, the Malay Archipelago, the Philippines, and Taiwan. Further eastward, Austronesian languages dominate most of the Pacific, including the islands of Melanesia (e.g., coastal New Guinea, the Solomons, Vanuatu), Micronesia (e.g., the Marianas, Palau, the Marshalls), and Polynesia (e.g., Tonga,

Samoa, Hawaii, Easter Island, and New Zealand). While Papuan languages are dominant in much of New Guinea and Australian languages in Australia, the sheer geographical breadth of Austronesian speakers underscores the monumental scale of this ancient migration. Within this vast Austronesian family, Taiwan holds a unique position due to the exceptional diversity of its indigenous languages, which represent the deepest divergences within the family. Historically, the Taiwanese government's recognition of these indigenous languages has evolved. Currently, the national government officially recognizes sixteen distinct indigenous languages, with an additional three recognized by local governments (e.g., Amis, Atayal, Bunun, Paiwan, Tsou). The sheer number and unique linguistic characteristics of these Formosan languages underscore their critical role in validating Taiwan as the Austronesian homeland (Li et al., 2024).

The compelling evidence for the “Out of Taiwan” dispersal provides more than just a historical account; it offers a profound narrative that can inform contemporary diplomacy. From this perspective, the NSP+ can be interpreted as a modern “ancestor recall,” a strategic move to re-engage with nations, particularly Indonesia, through the recognition of their deep-seated Austronesian heritage. This section will explore how this interpretative lens can transform NSP+ initiatives, advocating for a renewed emphasis on shared socio-cultural and linguistic roots within sectors such as tourism and education to foster more inclusive and lasting connections.

Cultivating Ancestral Ties Through Cultural Heritage Tourism

Current tourism initiatives largely focus on conventional mass tourism, emphasizing popular destinations and commercial activities. Nevertheless, following the establishment of NSP, a novel tourism alternative has emerged, one that has the potential to appeal to Southeast Asian populations, particularly those of the Islamic faith, through the medium of halal tourism (Wardhani et al., 2021). While beneficial for economic exchange, this approach often overlooks the profound potential of cultural heritage tourism to foster deeper people-to-people bonds, particularly through shared Austronesian roots. By integrating the “Out of Taiwan” narrative into tourism strategies, both Taiwan and Indonesia can unlock new avenues for meaningful engagement that resonate on a deeper, ancestral level.

Taiwan, as the recognized homeland of Austronesian peoples, possesses a rich tapestry of indigenous cultures, languages, and historical sites. Visitors from Indonesia, whose own diverse ethnolinguistic landscape is predominantly Austronesian, could be drawn to experiences that highlight these shared origins. This includes visiting indigenous villages in Taiwan (e.g., Alishan, Wulai) to witness traditional ceremonies, participate in cultural workshops, or learn about indigenous craftsmanship. Conversely, Taiwan's tourists could explore Indonesia's rich Austronesian heritage, such as engaging with Dayak communities in Borneo, the Baduy in West Java, or visiting ancestral sites and museums that celebrate their indigenous heritage across the archipelago.

Developing this niche of Austronesian heritage tourism requires a collaborative approach. This could involve:

- a. Jointly designing historical and cultural tourism packages that connect significant Austronesian sites and cultural experiences in both regions.
- b. Capacity-building programs for indigenous communities in both Taiwan and Indonesia to develop sustainable tourism practices that genuinely showcase and preserve their heritage, rather than merely commodifying it.
- c. Promotional campaigns that highlight the shared ancestral journey, moving beyond

generic “visit Taiwan or Indonesia” messages to an appeal based on shared identity and discovery of roots.

- d. Facilitating direct exchanges between indigenous artists, performers, and cultural practitioners, fostering living cultural diplomacy that extends beyond formal governmental channels.

By shifting the tourism focus to shared heritage, tourism has the potential to transcend economic transactions and foster a sense of mutual discovery and shared identity. In essence, it functions as a modern pilgrimage that reinforces ancient ties.

Strengthening Bonds Through Linguistic and Educational Collaboration

Education has historically been a fundamental component of NSP, with a primary emphasis on academic exchanges, vocational training, and the instruction of the Mandarin language. The advent of NSP+ has precipitated a multifaceted educational undertaking, encompassing not solely the academic sphere but also the realm of academic discourse. This initiative has been undertaken by a consortium of intellectuals, whose collective objective is to explore and advance this subject in a nuanced and systematic manner. While this focus is valuable, it can be expanded to strategically leverage the linguistic kinship between Austronesian languages in Taiwan and those in Indonesia. This would transform educational cooperation into a powerful tool for “ancestor recall.”

Given Taiwan’s position as the origin point of the Austronesian language family, its indigenous languages (Formosan languages) are invaluable for understanding the broader Austronesian linguistic landscape, including those in Indonesia. Therefore, NSP+ can be implemented through educational think tanks and youth research programs through the following actions:

- a. Collaborative research programs between universities and linguistic institutes in Taiwan and Indonesia focusing on comparative Austronesian linguistics, historical phonology, and the documentation and revitalization of endangered Austronesian languages in both regions. This could involve joint field research, data sharing, and co-publication.
- b. Student and faculty exchange programs specifically designed for linguistics, anthropology, and indigenous studies. Despite the initiation of the language exchange program by the Huanyu Enrichment Scholarship, its curriculum is exclusively dedicated to the study of Mandarin, excluding indigenous languages. Therefore, this indigenous language enrichment program exchange remains noteworthy for students and researchers of linguistics and culture. Indonesian students could specialize in Formosan languages, while Taiwanese students could delve into the vast diversity of Indonesian Austronesian languages.
- c. Development of curriculum materials and teaching methodologies for Austronesian languages, potentially creating shared digital archives or online learning platforms that celebrate linguistic diversity and provide resources for language learners and researchers across the region.
- d. Support for indigenous language education initiatives in both countries. For example, Taiwan could offer expertise in language revitalization efforts to indigenous communities in Indonesia, and *vice versa*, drawing on best practices and shared challenges.
1. Beyond formal linguistics, educational collaboration can also extend to cultural studies and historical research that explore the “Out of Taiwan” migration and its long-term impacts on the socio-cultural fabric of both societies. This could lead to a deeper appreciation of shared histories, mythologies, and traditional knowledge systems, reinforcing the idea of a common ancestral thread.

By investing in these areas, NSP+ moves beyond merely transferring knowledge or skills. It facilitates a deeper understanding of shared origins, fosters academic and cultural empathy, and cultivates a new generation of scholars and practitioners who are keenly aware of the enduring linguistic and cultural links between Taiwan and Indonesia. This educational emphasis on shared roots truly embodies the spirit of an “ancestor recall” in modern international relations.

Conclusion

This article posits a strategy for Taiwan’s New Southbound Policy Plus (NSP+), asserting that the efficacy of this strategy, particularly in relation to Indonesia, is substantially augmented by the integration of their shared historical roots. By examining the “Out of Taiwan” hypothesis, we establish Taiwan as the ancient cradle from which Austronesian peoples and languages dispersed across Island Southeast Asia. This deep historical narrative is not a mere past record; it’s a potent, often overlooked, ancestral thread binding these contemporary nations.

From this perspective, the NSP+ transcends conventional economic or geopolitical framing, becoming a modern “ancestor recall.” This transformative lens allows Taiwan to assert its historical role and enables NSP+ to cultivate a more inclusive and resonant cultural diplomacy. The implications are profoundly applicable across key sectors. In tourism, a pivot to Austronesian cultural heritage tourism offers authentic, meaningful experiences. Jointly developed initiatives, like curated ancestral routes and cultural exchanges, foster shared identity and belonging. In education, targeted investment in comparative Austronesian linguistic and cultural studies can forge robust academic collaborations, nurturing scholars deeply cognizant of their interconnected histories.

In sum, this study underscores a critical paradigm shift: effective soft diplomacy in the Asia-Pacific can draw immense strength from acknowledging and leveraging deep-seated identity bonds. By operationalizing shared Austronesian heritage within the NSP+, Taiwan and Indonesia have a unique opportunity not only to fortify bilateral relations but also to build cultural ties grounded in empathy, reciprocal appreciation, and the collaborative rediscovery of ancestral root. This “ancestor recall” offers a robust blueprint for a more cohesive and truly shared tomorrows, where “shared tongues” are unequivocally translated into “shared tomorrows.”

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Mainstreaming Inclusive Gender Perspectives in Disaster Resilience: Opportunities for Indonesia–Taiwan Cooperation under the New Southbound Policy+ Framework

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ABSTRACT

Critical feminists argue that women are often seen as the main vulnerable group in disaster resilience, while men are viewed as having full agency, especially as household heads and breadwinners. This view ignores the complex vulnerabilities and psychosocial experiences of men post-disaster, facing significant social pressures and risks. Since Indonesia and Taiwan are geographically disaster-prone, these gendered perspectives influence disaster management policies. Taiwan's New Southbound Policy+ (NSP+) fosters bilateral cooperation on disaster resilience using inclusive gender approaches. This study examines how NSP+ can improve disaster mitigation and adaptation by integrating the experiences of women, men, and other vulnerable groups. The research employs a literature review and policy analysis of disaster programs in both countries, using a critical gender lens. The author argues that integrating inclusive gender perspectives can enhance the effectiveness of disaster resilience programs and expand Taiwan's humanitarian diplomacy in Southeast Asia. Cooperation through NSP+ has the potential to foster technology exchange, institutional capacity building, and the development of community empowerment programs that consider gender diversity and intersectionality. This approach challenges traditional binaries of vulnerability and agency in disaster policy and promotes more inclusive development and sustainable transnational solidarity.

Keywords: gender mainstreaming, disaster, NSP+, inclusive, development

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Introduction

Indonesia and Taiwan are geographically prone to natural disasters, including earthquakes, floods, and typhoons, making the development of disaster resilience a key strategic focus (Yunus, 2023; Lee et al., 2022). However, current resilience strategies remain largely binary and fail to address the complexity of gender-based experiences. Women are often seen as the most vulnerable group due to limited access to resources and protection during and after disasters, while men are more commonly depicted as having full agency. Yet, gendered experiences are very diverse, influenced by factors such as age, social class, geographic location, and disability (Lee et al., 2022). Although Taiwan is recognized for its relatively high awareness of gender issues, further research is still needed to strengthen the role of gender minority groups in creating resilient and inclusive communities.

This article examines how NSP+ can improve disaster resilience by including men's experiences in gender mainstreaming. While studies in Taiwan (Lee et al., 2022) and Indonesia (Oktari et al., 2021) focus on gender mainstreaming, they mainly highlight women's vulnerability, neglecting men's post-disaster experiences. Men's roles as breadwinners face psychosocial stress, economic loss, crises of masculinity, and exclusion from support programs designed for "female victims." This exposes a gap where gender mainstreaming oversimplifies power dynamics. Despite promoting Taiwan–Indonesia cooperation under NSP+, research on integrating men's post-disaster experiences into intersectional disaster strategies is limited. This article explores this issue within Indonesia–Taiwan relations. How do post-disaster events affect men's psychosocial and economic conditions in Indonesia and Taiwan within traditional gender roles? To what extent do policies and programs in both parties address men's rarely visible vulnerabilities? How can NSP+ serve as a channel for humanitarian diplomacy to develop a cross-border disaster response sensitive to men's needs? What are the challenges and opportunities of integrating men's vulnerabilities into gender policies and disaster resilience programs in Indonesia–Taiwan cooperation?

The author argues that integrating inclusive gender perspectives can enhance the effectiveness of disaster resilience programs and expand Taiwan's humanitarian diplomacy in Southeast Asia. Building cooperation based on solidarity and gender justice within the NSP+ framework will strengthen community resilience and showcase Taiwan's significant contribution to more progressive humanitarian diplomacy in Southeast Asia. However, this article focuses on men as disaster victims, which might provoke debate because refugees in the Global South are often seen as passive and feminized, gender work is viewed as "helping women," and the experiences and vulnerabilities of refugee men are frequently neglected due to assumptions about masculinity and agency. (Turner, 2019). Yet research shows that men also experience substantial vulnerabilities, such as social pressure to "stay strong," job loss, identity crises as heads of households, and unseen psychological distress (Le Masson, 2022; Hilhorst et al., 2018).

Using gender-critical policy analysis and comparative literature studies on post-disaster policies in both parties, this article explores how narrow gender perspectives influence existing policy narratives, assumptions, and strategies. Critical feminist research has long challenged the dichotomy of "vulnerable women" versus "strong men" in disaster and humanitarian discourse, which frequently depicts women and children as universal symbols of victims while neglecting men's vulnerabilities and forms of agency that do not conform to mainstream narratives. (Enloe, 1993; Carpenter, 2003). To counter this bias, adopting

an intersectional approach is essential to understanding how vulnerabilities are shaped by intersecting social categories such as gender, age, class, disability, and geographic location (Crenshaw, 1991; Hankivsky, 2012; Gaillard et al., 2017). This approach allows for a more complete understanding of the experiences of disaster-affected groups that are frequently marginalized in policy development.

In advancing the arguments, this article makes two key contributions. First, it redefines gender-based vulnerability in disaster resilience policies, highlighting that men can face specific post-disaster vulnerabilities. This promotes an intersectional approach in designing interventions like livelihood recovery and mental health support. Second, it shows NSP+'s potential as a channel for inclusive gender-based humanitarian diplomacy. By focusing on cross-gender experiences in Indonesia–Taiwan cooperation, NSP+ can improve knowledge transfer, develop gender-responsive disaster policies, and affirm both parties' roles in regional social justice.

The article has three parts: the first outlines Taiwan–Indonesia disaster resilience relations under NSP+, highlighting gaps and gender opportunities; the second analyzes post-disaster policies in Indonesia and Taiwan on gender and men's experiences through document and intersectional analysis; the last explores NSP+ cooperation opportunities, like technology exchange, capacity building, and gender inclusion.

Contextual Background: Gender-Inclusive Disaster Resilience Cooperation between Indonesia and Taiwan under NSP+

Within Taiwan's NSP+ framework, disaster resilience is a key part of bilateral cooperation with Southeast Asian countries like Indonesia. The Taiwan-Asia Exchange Foundation (TAEF), with Taiwan's National Fire Agency Training Center in Nantou, has organized capacity-building programs to boost emergency response and disaster preparedness. Indonesian participants, including civil defense officers and NGO representatives, attend intensive training on firefighting, early warning systems (EWS), and community-based disaster risk reduction. These efforts aim to share Taiwan's expertise and promote people-centered disaster management internationally (TAEF, 2025).

Despite progress, a key gap exists in integrating gender perspectives into bilateral cooperation. NSP+ curricula focus on technical skills like drone surveillance, evacuation, and hazard mapping but overlook gender-specific needs, vulnerabilities, and capacities. Efforts to include women and youth in disaster education are limited to addressing male vulnerability and psychosocial impacts faced by men after disasters. Research shows post-disaster settings often increase male risks such as economic insecurity, role displacement, and mental health issues, worsened by social norms of masculinity that may prevent men from seeking help or community engagement (Bradshaw & Fordham, 2013; UNDRR, 2023).

This gap highlights the need for an intersectional, gender-transformative approach in NSP+ programs. The NSP+ framework can do more than transfer technology; it can foster inclusive knowledge exchange that considers all disaster vulnerabilities. Therefore, the partnership can enhance gender-inclusive disaster resilience, leading to fairer and more effective management and positioning NSP+ as a regional model for gender-responsive diplomacy amid rising risks.

Men, Masculinity, and Gender Justice in Disaster Response

Although disaster discourses increasingly recognize the importance of gender-responsive approaches, the post-disaster experiences of men often remain overlooked in official policies and humanitarian interventions (Suerbaum, 2018). In many disaster management frameworks, men are frequently assumed to be strong, resilient, and ever-ready actors. However, Allsopp (2017) argues for a more in-depth intersectional approach to understanding masculinity in displacement contexts, one that considers the gender-specific experiences of boys and men. This approach must go beyond the binary of victim or perpetrator, acknowledging that men can simultaneously occupy positions of vulnerability and agency during crises. Intersectionality enables a deeper understanding of how men experience layered impacts of disaster, shaped by class, employment status, age, and family roles.

In Indonesia, for example, the highly stressful post-disaster conditions following the Palu-Donggala earthquake led to a rise in domestic violence against women, including physical and sexual abuse. These acts often stemmed from male frustration over unemployment, economic pressure from dependents, and limited autonomy living with in-laws, leading women in some cases to seek divorce as resistance against men not fulfilling their provider and protector roles (Syafirati, 2023). This tension contributed to increased instances of intimate partner violence, in which men displaced their trauma-induced stress into aggression, in an attempt to regain a lost sense of control.

Vulnerabilities and male agency highlight the need to expand disaster policy beyond focusing mainly on women and children to include masculinity's complexities. The United Nations Population Fund and UN Women Indonesia (2023) emphasize integrating gender-based violence prevention across disaster phases, providing frameworks for vulnerable groups aligned with BNPB's Regulation No. 13/2014 and gender commitments. However, interventions for men, especially those challenged by disrupted traditional roles, are often missing. This gap is significant, as seen in Palu, where economic hardship and social role loss increased domestic violence risks (Mangkau, 2024). An inclusive gender approach is crucial for social resilience and safe recovery.

A similar pattern emerged in Taiwan after the 1999 Chi-Chi earthquake. Lin et al. (2002) observed that many elderly men lost homes and financial security, suffering severe depression, but were overlooked by recovery programs that mainly targeted women and children. This indicates that, despite Taiwan's progressive gender policies, post-disaster responses have yet to address men's vulnerabilities and agency. Men may face exclusion from recovery due to societal expectations tied to traditional masculine roles. Therefore, reviewing disaster policies is crucial to improve women's representation and challenge gender norms restricting all individuals from expressing their needs and accessing support. Intersectional approaches can dismantle binary views of women as victims and men as saviors, recognizing agency and vulnerability as part of a broader spectrum (Gaillard et al., 2017). Only by acknowledging this complexity can disaster policies become truly transformative.

Despite Taiwan's relatively advanced gender policy framework, studies on women's roles in Community-Based Disaster Risk Management (CBDRM) by Lee et al. (2022) reveal that gender inclusion at the community level often remains symbolic. This highlights the need to move beyond symbolic participation and adopt an intersectional approach that acknowledges the diverse forms of agency and vulnerability experienced by all genders in

disaster governance. Nonetheless, Taiwan has made significant progress in improving gender understanding, including through intersectional thinking. For example, the Gender Equity Education Act (2004) and institutions such as the Awakening Foundation provide structural support for gender awareness, including in disaster contexts (Lee et al., 2022). After Typhoon Morakot in 2009, the government started implementing evacuation and shelter safety training programs that addressed the needs of women, children, and persons with disabilities (Taipei Times, 2019). However, intersectional analyses of male vulnerability and agency in post-disaster situations remain limited. Using NSP+ broadens gender frameworks to include emotional roles and social structures affecting men in recovery, showcasing Indonesia–Taiwan cooperation as a gender-just humanitarian diplomacy model.

Filling the Gender Gap in Disaster Resilience: The Potential of NSP+ in Indonesia–Taiwan Relations

In Indonesia-Taiwan cooperation, NSP+ presents a chance to boost disaster resilience through technology and gender awareness. Collaborations like sharing disaster management tech, especially participatory approaches like developing Early Warning Systems (EWS), strengthen community response by combining technical tools with social capacity. When designed inclusively, gender-transformative EWS address gender-differentiated impacts and actively tailor their activities to reach marginalized groups, considering the diverse experiences, vulnerabilities, and capacities of various gender groups in specific settings (Brown et al., 2019a).

In Indonesia, programs like *Desa Tangguh Bencana* (Destana) involve women's groups but are limited and not yet part of national policy. In contrast, Taiwan's organizations, such as the Taiwan Gender Equity Education Association (TGEEA), use intersectional, community-focused approaches that could be valuable models for Indonesia. Gaillard and Mercer (2013) emphasized that the success of early warning systems mainly depends on social inclusiveness and the cooperation between local knowledge and modern technology. Gender-sensitive training is essential to ensure fair access to disaster-related knowledge. UN Women has also warned that disaster policies and response systems that ignore gender diversity risk exacerbating the vulnerabilities of certain groups (Brown et al., 2019b). NSP+, grounded in principles of cross-national solidarity, can thus be leveraged not only for infrastructure transfers but also to strengthen socially just and participatory approaches.

Furthermore, NSP+ cooperation needs concrete strategies for gender-inclusive disaster resilience, like integrating gender budgeting into all stages of transnational projects. Gender budgeting ensures budget allocations address diverse gender and social needs, promoting transparency and equity through training, infrastructure, and civil society organizations (CSOs) funding. It challenges gender-neutral approaches that overlook marginalized groups, with UN Women stressing its role in closing post-disaster service gaps (Joshi, 2024). In Indonesia, the government has begun gender budget tagging at the national level but has not expanded it internationally. Meanwhile, Taiwan has used gender mainstreaming tools since 2006 (Peng, 2015a; Peng et al., 2015b as Cited in Chang, 2018, p. 345), making it a strategic partner for sharing best practices. NSP+ provides a platform to advance gender budgeting and inclusive development.

Additionally, using a Gender-Sensitive Risk Assessment (GSRA) approach, capacity building through cross-national training is vital for fairer disaster responses. GSRA helps professionals from government or local communities understand how social identities

like gender, age, disability, and class affect risk exposure and management. Training may include designing evacuation routes for pregnant women and the elderly or decision-making simulations featuring women as key actors. UNDRR (2022) states that GSRA in disaster education promotes inclusive, sustainable mitigation, and Bradshaw and Fordham (2014) show gender-focused training accelerates recovery in disaster-prone regions.

In Indonesia–Taiwan cooperation, two-way training exchanges within the NSP+ framework would promote mutual learning. With its advanced technical skills in disaster mitigation and response, Taiwan can share its expertise, while Indonesia offers complex social and geographic conditions that provide rich contextual learning. This collaboration could strengthen cross-cultural understanding of gender-related risks and foster international solidarity in tackling structural injustice in disaster management.

Another strategic step is developing intersectionality-based guidelines to address social vulnerability in disasters. These guidelines should be created participatorily and contextually with representatives of marginalized groups. Intersectionality shows how social identities such as gender, ethnicity, class, age, disability, and sexual orientation intersect and intensify exclusion during crises. The guidelines could include equitable aid, inclusive communication, and empowering marginalized communities in planning. Crenshaw (1991) emphasized that policies focusing only on one aspect of identity risk failing to reach those facing multiple layers of oppression. Fothergill and Peek (2004) also show that poor women and people with disabilities are often overlooked in generic, non-contextual disaster standard operating procedures (SOPs). In this regard, NSP+ offers a collaborative framework for creating fairer, more inclusive operational guidelines that reflect diverse experiences. With socially diverse landscapes, Indonesia and Taiwan find such guidelines highly relevant, positioning Taiwan as a potential leader in regional humanitarian diplomacy rooted in social justice.

This analysis demonstrates that NSP+ can serve as a strategic and innovative channel for bilateral cooperation in creating gender-inclusive disaster resilience. Through technological exchanges such as EWS, cross-national intersectional training, and collaboration among CSOs, academics, and governments, NSP+ can broaden the scope of solidarity-based diplomacy and social justice. By positioning gender not as a supplementary variable but as a central analytical lens in policy and program design, Indonesia–Taiwan cooperation can offer an alternative development model that is more attentive to multidimensional vulnerabilities.

Conclusion

This article examines the NSP+ framework to open new opportunities for collaboration between Taiwan and Indonesia. It focuses on gender mainstreaming in disaster resilience. It highlights the need to redefine gender-based vulnerability in disaster resilience policies, emphasizing that men can also face specific forms of post-disaster vulnerability in social, economic, and psychological terms. This approach advocates for an intersectional perspective in designing post-disaster actions, including livelihood recovery and mental health support. This way, NSP+ can foster more inclusive bilateral cooperation in disaster resilience.

This article emphasizes that fostering solidarity-based and gender-equitable collaboration within the NSP+ framework will bolster community resilience and enhance Taiwan's contributions to progressive humanitarian diplomacy in Southeast Asia. Recognizing masculinity and male agency in disaster resilience creates new opportunities for NSP+ to

promote inclusive cooperation in disaster preparedness and response. By incorporating gender and intersectional approaches, Indonesia–Taiwan collaboration via NSP+ can develop a more equitable, effective, and sustainable disaster response model. Furthermore, recommendations on gender budgeting, GSRA training, and intersectional operational guidelines support socially just disaster resilience and align NSP+ efforts with international standards on sustainable development and gender equality.

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Strengthening Bilateral Cooperation to Support Transnational Parenting: The Case of Indonesian Female Migrant Workers in Taiwan

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ABSTRACT

The increasing number of Indonesian female migrant workers in Taiwan has led to a growing phenomenon of transnational parenting mothers who care for their children remotely while working abroad. This paper highlights the urgent need for a bilateral agreement between Indonesia and Taiwan to provide systematic support for these women, particularly regarding their rights to maintain family bonds and emotional well-being while employed overseas. This study employs a qualitative literature review method by examining academic journals, policy papers, and NGO reports related to labor migration, gender, and Indonesia-Taiwan cooperation. It critically analyzes how existing frameworks fail to address the emotional and social burdens faced by transnational mothers and their children. The research also explores best practices from other labor-sending countries to formulate actionable policy recommendations. Ultimately, this paper contributes to the broader discourse on people-to-people exchanges under the New Southbound Policy+ by shedding light on a frequently overlooked human dimension: cross-border family care and protection.

Keywords: Transnational Parenting, Indonesian Migrant Workers, Indonesia- Taiwan Relations, Bilateral Cooperation, New Southbound Policy+

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Introduction

Global labor migration is increasingly feminized, with many women from developing countries, including Indonesia, working abroad in domestic and care sectors (Deng et al., 2020a). Taiwan is a key destination, hosting a growing number of Indonesian female migrant workers who support both Taiwan's care economy and Indonesia's remittance income (Komarudin et al., 2023a). However, this migration often separates mothers from their children, leading to the rise of transnational parenting (Larrinaga-Bidegain et al., 2024). This trend underscores the need for policy frameworks that address not only labor rights but also the social costs of family separation (Nomaguchi & Milkie, 2020).

Transnational parenting refers to the practice of raising children across borders, often due to labor migration (Barglowski, 2023). For Indonesian female migrant workers in Taiwan, maintaining maternal roles from a distance poses emotional and psychological challenges, both for themselves and their children (Gouw et al., 2025). Communication barriers, feelings of guilt, and limited involvement in daily caregiving are common struggles (Sever & Tiryaki, 2025). Despite their economic contributions, these mothers often face social stigma and lack adequate support systems to sustain meaningful family bonds (Lim et al., 2022).

Current migration policies between Indonesia and Taiwan mainly focus on labor placement and protection at the workplace, often overlooking the familial and emotional needs of migrant mothers (Komarudin et al., 2023b). There is no clear mechanism to support their parenting rights or facilitate sustained contact with their children (Nakache, 2018). This policy gap reflects a broader neglect of gendered dimensions in migration governance, where the care responsibilities of women are sidelined in favor of economic interests (Hennebry & Petrozziello, 2019).

A comprehensive bilateral agreement between Indonesia and Taiwan is urgently needed to address the specific needs of transnational mothers (Andiani & Juned, 2024). Beyond labor contracts, such an agreement should include provisions that support family cohesion, mental health, and parenting rights (McLaughlin et al., 2018). Strengthening this cooperation would signal a commitment to more humane and gender sensitive labor governance that values both economic and emotional well being (Werhane et al., 2020).

Taiwan's New Southbound Policy+ aims to deepen people to people ties with Southeast Asian countries, including Indonesia (Jamil, 2024). However, the experiences of transnational families, particularly mothers and children, remain underrepresented in this agenda (Hsia, 2023a). Addressing transnational parenting within this policy framework would enhance its human centered approach and align it with the real life needs of migrant communities (Kim et al., 2020).

Existing literature on labor migration often centers on economic contributions, worker exploitation, or legal status, with limited focus on the emotional and caregiving dimensions of transnational motherhood (Donato & Massey, 2016; Mosley & Singer, 2015; Piper & Withers, 2018). Studies rarely explore how policy frameworks can support parenting roles across borders. This gap highlights the need for more nuanced research that integrates gender, family, and migration policy perspectives.

To examine these issues, this study employs a qualitative literature review approach. It draws upon academic journals, policy papers, and NGO reports related to labor migration,

gender, and Indonesia–Taiwan bilateral cooperation. By critically analyzing existing policy frameworks and synthesizing insights from previous research, this paper identifies the key gaps in supporting transnational parenting and explores feasible policy interventions. This methodological approach enables a deeper understanding of the sociopolitical dimensions of caregiving across borders, particularly in the context of female migration. This paper aims to examine how current Indonesia-Taiwan migration frameworks address (or neglect) the rights of transnational mothers and to propose policy recommendations based on comparative best practices. By focusing on the overlooked dimension of cross-border caregiving, this study contributes to the discourse on gender sensitive migration governance and supports the development of more inclusive bilateral cooperation.

Transnational Parenting and the Realities of Female Labor Migration

The rise of transnational parenting is a direct consequence of increased female labor migration, particularly from countries like Indonesia to destinations such as Taiwan (Khoo & Yeoh, 2017). Indonesian women working abroad, especially in the domestic and care sectors, often leave their children in the care of extended families or guardians back home (Irawaty, 2022). While their labor contributes significantly to both the host country's care economy and Indonesia's remittance income, the emotional toll on migrant mothers and their children is substantial (Fatimah & Kofol, 2023). These mothers must manage maternal responsibilities across borders, nurturing, monitoring, and emotionally supporting their children from afar, often through limited means of communication (Irawaty, 2021).

In many cases, these women experience deep feelings of guilt, anxiety, and powerlessness, particularly when unable to participate in everyday caregiving decisions or respond to their children's immediate needs (Ülgüt et al., 2023). On the other hand, children may suffer from emotional neglect, behavioral issues, or difficulties forming secure attachments (Riggs, 2019). These psychological and relational effects are rarely acknowledged in migration policy frameworks, which tend to prioritize economic outputs over familial well-being (Czaika & Reinprecht, 2022). Transnational parenting, therefore, highlights a critical tension between labor mobility and family integrity a tension that requires serious policy attention, especially in bilateral labor arrangements (Baldassar et al., 2024).

Policy Gaps in Supporting Migrant Mothers' Parental Roles

Despite the significant presence of Indonesian female migrant workers in Taiwan, current migration policies between the two remain largely focused on labor placement, contract regulation, and protection within the workplace (Guritno & Aryo, 2025). These frameworks often ignore the complex social realities faced by migrant mothers, particularly their role in maintaining transnational family bonds (Moskal, 2015). There are no explicit mechanisms or legal protections that acknowledge a mother's right to parent from afar, nor are there institutionalized supports to facilitate consistent emotional contact with their children (Gusman, 2024).

This policy gap reflects a broader structural oversight: the invisibility of care responsibilities in migration governance. For example, the inclusion of subsidized digital communication platforms and cross-border psychosocial support programs in bilateral agreements as proposed in Taiwan–Indonesia cooperation dialogues could help institutionalize support for transnational parenting and acknowledge the caregiving roles of migrant mothers (Liang, 2023; Waruwu, 2024). Gender neutral labor policies fail to recognize the gendered burdens of care, disproportionately borne by women (Liang, 2018). For migrant mothers, this translates

into double marginalization economically exploited in the workplace and emotionally unsupported in the familial sphere (Dyck, 2018).

As a result, migrant mothers must navigate parenting through informal channels via remittances, social media, or long distance phone calls without structural reinforcement or institutional recognition (Waruwu, 2024). These fragmented efforts rarely substitute for stable, supported family relationships (Wals,1996). A more holistic migration policy must, therefore, go beyond workplace protections and include safeguards that uphold migrant women’s rights to sustain meaningful roles as mothers (Shivakoti et al., 2021).

Structural Neglect of Transnational Motherhood in Bilateral Policies

While Indonesia and Taiwan maintain labor cooperation through formal agreements and regulatory bodies, these frameworks tend to focus on recruitment, contract standards, and worker protections within employment settings (Soulina & Yovani, 2020). However, they fail to acknowledge transnational motherhood as a legitimate social and emotional reality shaped by migration (Juozeliūnienė & Budginaitė, 2018). The caregiving responsibilities of migrant women, particularly the psychological well being of their children and their own maternal identity, are largely excluded from bilateral agendas (Al-Azzeh & Diab, 2025).

Table 1.2 Regulation Corporation

Name of Regulation/ Corporation	Year / Status	Main Focus
MoU between Indonesia and Taiwan on the Placement of Indonesian Migrant Workers	First signed in 1998; updated periodically	Covers recruitment procedures, placement fees, and employer obligations. Primarily focused on domestic workers and caregivers.
Employment Service Act (Taiwan)	1992; amended regularly	Regulates employment of foreign workers, including contract terms, permits, and workplace protections.
Act for the Recruitment and Employment of Foreign Professionals (Taiwan)	2018	Supports skilled foreign labor but excludes domestic workers and caregivers, reinforcing labor segmentation.
Taiwan’s Labor Standards Act	Not fully applicable to domestic workers	Provides general labor protections, but excludes migrant caregivers and household workers from full coverage.
Minister of Manpower Regulation No. 260 of 2015 (Indonesia)	2015	Regulates the placement of migrant workers abroad, emphasizing private agency management and procedural compliance.
Law No. 18 of 2017 on the Protection of Indonesian Migrant Workers (UU PPMI)	2017 (Indonesia)	Aims to strengthen pre-departure training, ensure worker protection, and increase government responsibility in migrant labor governance.

Source:(Junaidi & Khikmah, 2024)

This neglect persists despite the growing relevance of Taiwan’s , which emphasizes people-to-people exchanges and deeper social ties with Southeast Asian countries (Yang, 2018). Practice, the policy has yet to meaningfully engage with the familial dimensions of migration

(Bonjour & Kraler, 2015). The invisibility of transnational parenting within such cooperation signals a narrow interpretation of people to people relations, one that privileges economic participation over social care and family resilience (Pojoe et al., 2017).

Policy Recommendations for Gender Sensitive Bilateral Agreements

Addressing the structural neglect of transnational motherhood requires bilateral agreements between Indonesia and Taiwan that go beyond labor-centric regulations (Platt, 2018). These agreements must recognize migrant women not only as workers but also as caregivers, whose emotional ties and parenting roles transcend borders (Bryceson, 2019). To achieve this, gender sensitive and family-inclusive measures must be systematically embedded within existing migration frameworks (Oluwakemisola Omolola Adeusi et al., 2025).

The following table outlines key policy gaps affecting transnational mothers, their implications, and proposed interventions to bridge those gaps. These recommendations are grounded in both the lived experiences of migrant workers and best practices from other labor-sending countries.

Table 1.3 Policy Gaps and Recommended Interventions

Identified Gap	Implication	Recommended Intervention
No formal support for longdistance parenting	Emotional disconnection between mother and child	Bilateral provision for subsidized digital communication (e.g., scheduled video calls)
Lack of psychosocial assistance for migrant mothers	Increased stress, isolation, and mental health issues	Establish cross-border counseling and parenting support programs
Absence of family-related clauses in bilateral labor agreements	Ignored caregiving responsibilities	Integrate family care protections in labor agreements and MoUs
No structured reunification or special leave scheme	Prolonged separation for years	Create short-term family visit permits or rotational leave systems
Minimal engagement of NGOs and community actors	Gaps in emotional and social support	Form partnerships with NGOs to deliver culturally sensitive family support services

Source: (Nora Chiang & Seckye Ho, 2020;Hsia, 2023b;Chilton & Woda, 2022; Kwak & Wang, 2022; Wang & Lin, 2023).

These recommendations offer concrete, actionable steps that can be adopted in bilateral policymaking to support transnational caregiving roles. Rather than treating migrant women solely as economic agents, such measures would reflect their holistic identities and lived realities. Collaborative action between state actors, NGOs, and community networks is essential to operationalize these interventions and build a migration governance model that is both equitable and humane.

Reframing People to People Cooperation through Transnational Family Support

Taiwan's NSP+ aspires to deepen people-to-people ties with Southeast Asian countries through cultural, educational, and social engagement (Yang & Chiang, 2019). However, the lived realities of transnational families, particularly migrant mothers and their children,

remain largely excluded from its implementation (Erel & Reynolds, 2018). To make people-to-people cooperation truly meaningful, NSP+ must move beyond symbolic rhetoric and incorporate family-oriented support mechanisms that reflect the emotional and caregiving dimensions of migration (Bauböck, 2018; Nyoman Ratih Kabinawa, 2023). By recognizing migrant workers not only as economic contributors but also as caregivers and cultural intermediaries, Taiwan can promote more empathetic bilateral relations with countries like Indonesia. Such efforts would enhance regional solidarity while affirming Taiwan's commitment to socially responsible migration governance.

Toward an Inclusive and Human Centered Migration Governance

The case of Indonesian female migrant workers in Taiwan underscores the need to fundamentally rethink migration governance through a more inclusive and human-centered approach (Nafis, 2024). The structural design of labor migration governance still marginalizes the social contributions of migrant mothers, focusing instead on their workforce value. (Bove & Elia, 2017). A transformative approach is therefore necessary, one that integrates the realities of transnational caregiving into migration discourse to bridge the gap between labor mobility and family cohesion (Chen, 2022).

Such a shift demands active collaboration among states, civil society actors, and regional policy platforms (Hulse et al., 2018). Indonesia and Taiwan, for instance, have the potential to take a leading role by establishing bilateral working groups focused on family-oriented migration policies, gender-sensitive protections, and support systems for long-distance caregiving (Alam et al., 2025). While Taiwan is not a formal ASEAN dialogue partner due to diplomatic constraints related to the One China Policy, alternative platforms such as non-governmental forums, academic exchanges, or multilateral labor conferences could still provide meaningful space to incorporate the issue of transnational parenting. These informal or semi-formal avenues can foster new models of cooperation that prioritize emotional and social well-being alongside economic development.

The experience of Indonesian female migrant workers in Taiwan highlights the urgent need to reform migration governance in a way that fully acknowledges both the economic and caregiving dimensions of migrants' lives (Deng et al., 2020b). Current bilateral approaches often overlook the fact that many migrant women continue to carry out familial responsibilities across borders. To ensure fairness and sustainability, migration policies must be reoriented to account for the complex realities of transnational labor and care.

Conclusion

The phenomenon of transnational parenting among Indonesian female migrant workers in Taiwan reveals the limitations of current labor migration frameworks that focus primarily on economic productivity while neglecting the social and emotional dimensions of migration. These women are not only workers but also mothers who continue to carry caregiving responsibilities from afar, often without institutional support. The absence of gender-sensitive and family-inclusive policies in bilateral agreements between Indonesia and Taiwan exacerbates the vulnerability of migrant mothers and their children, leaving them to navigate emotional hardships through informal, fragmented means.

This gap reflects a deeper structural issue in migration governance: the persistent failure to recognize care as a critical transnational concern. While policies like Taiwan's NSP+ emphasize people-to-people ties, they have yet to meaningfully engage with the lived

realities of migrant families. Addressing transnational motherhood is not merely a welfare issue it is a matter of justice, identity, and relational integrity. Recognizing these caregiving roles is essential to building migration systems that are humane, equitable, and sustainable. To move forward, both parties must integrate transnational parenting into bilateral agreements by ensuring access to regular communication, cross-border psychosocial services, and temporary family reunification schemes. Policymakers should also collaborate with NGOs and community organizations to provide parenting support and culturally sensitive counseling. By acknowledging and supporting migrant women as both workers and mothers, Indonesia and Taiwan can lead the way in establishing a truly inclusive model of migration governance.

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3

**Indonesia-Taiwan: Advancing
Sustainability and Innovation
through the NSP+**

Smart Electrification and Sustainable Industry: Advancing Indonesia–Taiwan Cooperation for Energy Innovation

Moh. Wahyu Syafi'ul Mubarak¹

ABSTRACT

Indonesia's industrial energy transition remains challenged by grid constraints, rising electricity demand, and limited adoption of intelligent demand-side management. In this context, Taiwan's strengths in control systems, semiconductors, and industrial Internet of Things (IoT) offer strategic value for bilateral collaboration, especially under the New Southbound Policy+. This study investigates how such cooperation can enable smart electrification in the Industropolis Batang Special Economic Zone (SEZ), a newly designated SEZ in Central Java that reflects Indonesia's broader ambitions for export-oriented, innovation-driven industrial growth. Using the HOMER Grid tool, three energy system scenarios are simulated. Baseline (grid-only), domestic (local PV integration), and Taiwan partnership (hybrid with smart controller) to evaluate the techno-economic feasibility of integrating solar PV, battery storage, and advanced energy controllers. Results show that the Taiwan partnership scenario, supported by concessional financing and (Artificial Intelligence of Things) AIoT- based control systems, achieves the highest renewable fraction (57.9 percent) and the lowest levelized cost of energy, while reducing carbon emissions by over 52.26 percent compared to the baseline. These findings suggest that strategic technology transfer and co-development with Taiwan can unlock scalable smart energy infrastructure for Indonesia's industrial zones. The paper offers policy-relevant insights on de-risking investment, enhancing digital energy capabilities, and transitioning from symbolic bilateral ties to functional energy innovation partnerships.

Keywords: Smart electrification, Indonesia-Taiwan cooperation, industrial energy systems

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Introduction

Indonesia's rapid industrial growth is placing unprecedented demands on its energy infrastructure. Industrial zones such as the Industropolis Batang Special Economic Zone (SEZ) continue to rely on carbon-intensive and inflexible grid configurations. This observation is consistent with IEEFA's findings that a flexible and reliable smart grid is the critical enabler for higher renewable penetration and demand management in Indonesia (Hamdi et al., 2021). Similarly, the IEA notes that contractual rigidities such as take-or-pay PPAs for coal generators create significant structural obstacles to system flexibility and renewable energy integration (International Energy Agency, 2022). This mismatch between growing industrial energy needs and sustainable energy supply highlights a critical gap in Indonesia's energy transition strategy. As energy demand from industrial sectors continues to rise, achieving both efficiency and decarbonization is no longer optional. It is imperative for long-term competitiveness and climate resilience (Ngwaka et al., 2025).

Efforts to integrate renewable energy sources such as solar photovoltaics (PV) and battery storage have gained traction. However, fragmented deployment and minimal adoption of advanced control technologies have limited their impact. Demand-side management, a foundation of efficient grid operation, is still nascent in Indonesia's industrial landscape. Without intelligent systems that can dynamically manage electricity load and generation in real time, energy inefficiencies persist, operational costs increase, and the country's climate goals remain out of reach (Deb et al., 2022; Pranckevičius et al., 2025).

This is where Taiwan's capabilities offer promising complementarities. Taiwan is a global leader in semiconductor and smart grid technologies and has developed highly efficient energy management systems for industrial parks (Liu et al., 2025; Bui, 2024). The New Southbound Policy (NSP), launched in 2016, marked a strategic shift in Taiwan's economic diplomacy to deepen ties with Southeast Asia and reduce reliance on China (Chung, 2023). In 2023, the policy evolved into the New Southbound Policy Plus (NSP+), with an enhanced emphasis on critical sectors such as climate resilience, digital infrastructure, and sustainable energy collaboration (TAEF, 2023). This expanded policy direction opens new avenues for bilateral cooperation with countries like Indonesia. Taiwan's experience with AIoT (Artificial Intelligence of Things) enabled energy systems can equip Indonesian industrial zones with the tools needed to modernize and optimize electricity usage.

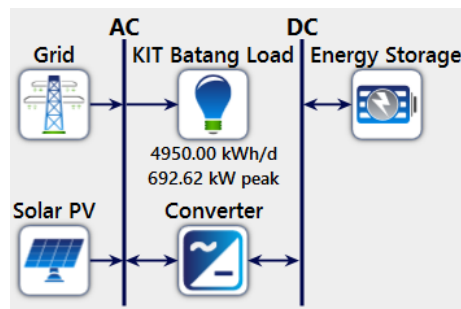
This study explores the feasibility and value of such cooperation through a scenario-based analysis of smart electrification in an Indonesian industrial setting. Using the HOMER Grid simulation platform, three scenarios have been evaluated: a baseline grid-only model, a domestic renewable integration setup, and an advanced smart system incorporating AIoT control reflective of Taiwanese technological capabilities. Each scenario is assessed on technical and economic grounds to determine the most promising pathway toward sustainable industrial energy use.

Methodology

This study uses a scenario-based techno-economic analysis to evaluate the role of smart electrification strategies in improving energy performance in an Indonesian industrial context. The modeling approach utilizes the HOMER Grid software, a widely adopted tool for optimizing distributed energy systems, particularly where grid-connected and hybrid solutions are under consideration. HOMER Grid enables simulation of various technology configurations, including solar photovoltaics (PV), battery storage, and intelligent controllers under different pricing, tariff, and operational constraints.

The simulations are designed to compare how different energy system setups impact economic performance, grid dependency, and overall system efficiency. Each scenario assumes the same industrial load profile and energy demand, but applies a different configuration of technology and investment assumptions. Figure 1 shows the electricity system that is modeled in this study. The model calculates key indicators such as net present cost (NPC), levelized cost of electricity (LCOE), internal rate of return (IRR), and discounted payback period for each scenario.

Figure 3.1 System configuration in the model



Source: author's own creation.

To explore viable energy solutions for Indonesia's industrial zones, this study compares three distinct scenarios: Baseline, Domestic Technology, and Taiwan Partnership. Each model uses a consistent demand profile, system constraints, and environmental conditions to ensure comparability in terms of technical feasibility and economic performance.

- **Baseline:** This configuration represents the current status quo, where all electricity demand is met by the national grid without any renewable energy integration or on-site energy management systems. It reflects a grid-dependent industrial setup typical of many existing industrial parks in Indonesia.
- **Domestic Technology:** This scenario introduces locally sourced solar PV and battery storage systems, controlled by standard, rule-based controllers. While the system offers a step toward cleaner and more reliable energy, its functionality is limited to basic dispatch logic (e.g., state-of-charge triggers), with no real-time optimization or forecasting.
- **Taiwan Partnership:** Building on the domestic model, this scenario integrates more advanced components, particularly AIoT-based controllers that enable predictive dispatch, intelligent load shifting, and dynamic coordination between energy sources. These technologies reflect Taiwan's strength in industrial automation and energy digitalization, and are modeled to test whether their added cost is justified by improved operational and economic outcomes.

Each scenario is evaluated under HOMER Grid using consistent financial and technical assumptions, but with differentiated discount rates to reflect the nature of capital access in each investment pathway. For the Baseline and Domestic Technology scenarios, a 10 percent real discount rate is used, reflecting typical hurdle rates for private or state-owned energy infrastructure in Indonesia where concessional or blended finance is often limited (Mudofir et al., 2025).

The Taiwan Partnership scenario applies a 6 percent discount rate, based on the potential availability of preferential financing through joint-ventures or climate-aligned funding schemes under the NSP+. This lower rate reflects financing patterns observed in international technology transfer and blended finance initiatives (Duffield et al., 2019).

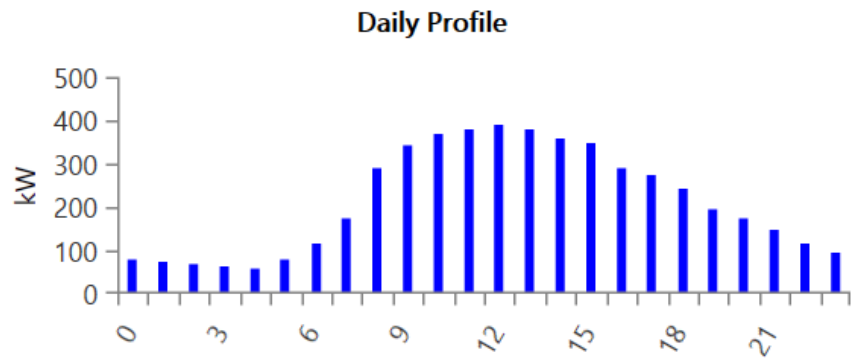
However, it is recognized that such concessional terms may not be universally or consistently available at scale. In this study, the application of a differentiated discount rate should be interpreted as a proxy to reflect the potential financing landscape associated with international partnerships, rather than a guaranteed investment condition. The primary objective is to explore the relative benefits of different system upgrade pathways including advanced control technologies, renewable integration, and demand-side optimization. As such, the financing structure serves as a pre-feasibility input to guide future cost-benefit analysis and scenario refinement. Future studies are encouraged to test uniform discount rates and conduct risk-adjusted comparisons to further validate investment viability under varied capital conditions.

Industropolis Batang Special Economic Zone (SEZ)

Industropolis Batang Special Economic Zone (SEZ) was selected as the pilot location for this study due to its strategic role in Indonesia’s industrial development agenda. Located in Central Java, Industropolis Batang SEZ is one of the country’s flagship national priority projects, envisioned as a key hub for attracting foreign direct investment and accelerating the growth of manufacturing, electronics, and automotive sectors. Its modern infrastructure, SEZ status, and alignment with Indonesia’s downstream industrialization strategy make it a compelling pilot model for smart electrification modeling (The Jakarta Post, 2025).

The energy demand in the Industropolis Batang SEZ reflects the complexity of a growing industrial ecosystem. Rather than a single facility, the area comprises multiple factories and supporting infrastructure, leading to a composite load profile with significant variation across time. Daily demand tends to peak during working hours, driven by industrial operations, cooling systems, and machinery use. A typical weekday load curve reveals clear spikes between 8:00 AM and 6:00 PM, with relatively lower baseload consumption overnight. On weekends, the demand is slightly lower but still substantial in facilities operating on continuous shifts. The daily load profile can be seen in Figure 2.

Figure 3.2 Daily profile of Industropolis Batang SEZ

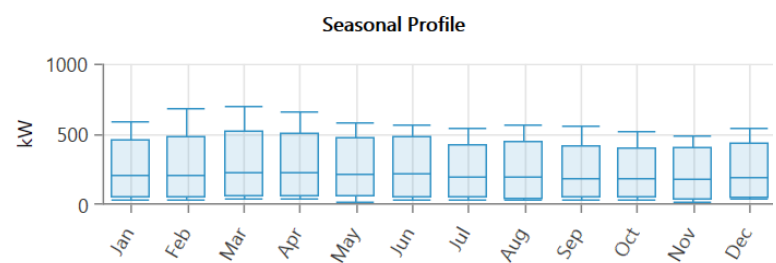


Source: author’s own creation.

Seasonal and annual variations are also evident, driven by climate-related cooling needs and production cycles. The site experiences relatively high electricity usage in the hotter months due to increased Heating, Ventilation, and Air Conditioning (HVAC) load. By analyzing the hourly load data across the year (8,760 hours), the simulation captures not only the base demand but also critical periods of peak load that strain the grid.

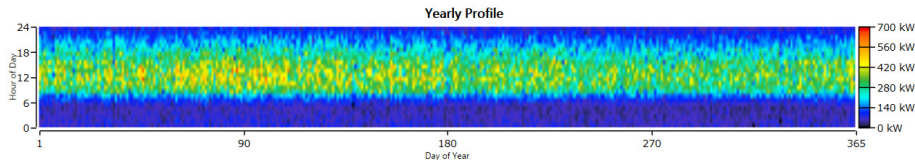
These profiles inform the HOMER Grid modeling inputs and ensure that system design is responsive to real-world industrial behavior. The profiles of daily, seasonal, and annual are used to assess the effectiveness of solar generation, battery storage dispatch, and smart controller strategies in managing variability while improving economic performance. Figure 3 and 4 shows the seasonal and yearly profile of Industropolis Batang SEZ.

Figure 3.3 Seasonal profile of Industropolis Batang SEZ



Source: author’s own creation.

Figure 3.4 Yearly profile of Industropolis Batang SEZ.



Source: author’s own creation.

Results & Discussion

System Performance

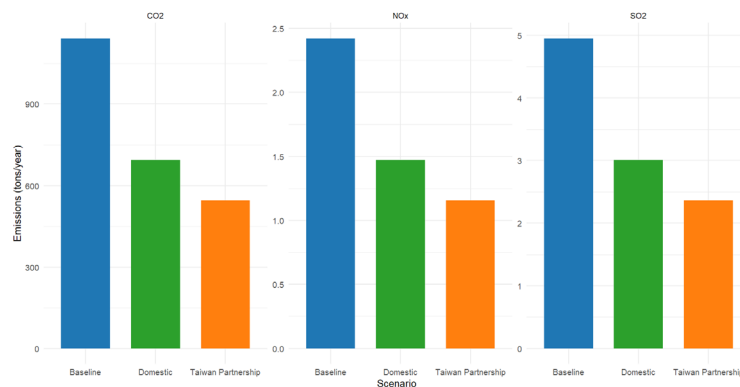
The comparative analysis across the baseline, domestic technology, and Taiwan partnership scenarios reveals a clear progression in energy performance and environmental benefits as smarter and more integrated solutions are introduced.

In the baseline case, the industrial area remains fully dependent on the grid, purchasing approximately 1.8 million kWh/year of electricity and producing zero on-site renewable energy. Consequently, CO₂ emissions reach 1.14 million kg/year, with sulfur dioxide and nitrogen oxide levels at 4,950 kg and 2,421 kg, respectively. This underscores the high carbon intensity of grid-supplied electricity in Indonesia.

With the adoption of domestic solar PV and limited storage (491 kW PV and 7 kWh battery), grid purchases drop by nearly 39 percent, and the renewable fraction rises to 40.2 percent. Emissions decline substantially to 693,947 kg CO₂/year, reflecting the role of solar integration despite the minimal contribution from battery storage. Such condition reduces carbon emissions by over 39.13 percent compared to the baseline.

In the Taiwan Partnership scenario, the system performance improves further: grid purchases fall to 862,505 kWh/year, and renewables contribute nearly 58 percent of the total electricity. Even with a smaller battery capacity (2 kWh), the enhanced controller and system coordination likely optimize dispatch more effectively. CO₂ emissions drop to 545,103 kg/year, representing a 52.26 percent reduction from baseline. This suggests that strategic technology cooperation, particularly in control and system design can yield disproportionately high environmental gains. Figure 5 shows the annual emissions comparison across scenarios.

Figure 3.5 Annual emissions comparison across scenarios.



Source: author's own creation.

Although autonomy levels remain relatively low across all scenarios (less than one hour), the significant reductions in emissions and grid dependency validate the role of renewable integration as a transitional, cost-effective step toward smarter electrification.

Techno-Economic Performance

The techno-economic assessment reveals clear differences among the three scenarios in terms of cost structures, investment attractiveness, and operational efficiency. The Taiwan Partnership scenario leads with the highest present worth at USD699,643, which is more than three times that of the Domestic (183,109 USD) and Baseline (137,468 USD) scenarios. This is primarily driven by substantial reductions in operational costs, despite higher capital investment.

The return on investment (ROI) and internal rate of return (IRR) are also notably better in the Taiwan scenario, reaching 16 percent and 19 percent respectively, compared to only 10.1 percent ROI and 13.5 percent IRR under the Baseline condition. In practical terms, the Taiwan Partnership system pays itself back in just over 5 years, while the Baseline scenario stretches beyond 7 years for simple payback and nearly 13 years for discounted payback.

Further insights are obtained by comparing net present cost (NPC) and levelized cost of energy (LCOE). Although the Taiwan Partnership shows a slightly higher NPC than the Domestic setup (USD 1.61 million vs. USD 1.46 million), it significantly outperforms in terms of cost-efficiency with the lowest LCOE of USD 0.0697/kWh.

The Baseline scenario maintains the highest LCOE at USD 0.10/kWh, reaffirming the cost-saving potential of integrating smart controllers and higher-efficiency PV inverters. Additionally, operating costs in the Taiwan Partnership are drastically lower (just USD 89,632/year) compared to USD 114,115/year for Domestic and a steep USD 1.64 million/year under the conventional grid-only Baseline. Table 1 shows the economic metric comparison between scenarios.

Table 3.1 Economic Performance across scenarios.

Metrics	Scenarios		
	Baseline	Domestic	Taiwan Partnership
NPC (USD)	1,639,994	1,456,886	1,609,989
LCOE (USD/kWh)	0.1	0.08883	0.06971
Present Worth (USD)	137,468	183,109	699,643
Operational Cost (USD)	1,639,994.21	114,114,7	89,632.87

Source: author's own creation.

Overall, the Taiwan Partnership scenario emerges as the most economically viable in the long run. The use of advanced AIoT controllers and more efficient solar-plus-storage configurations minimizes reliance on expensive grid electricity and reduces lifetime energy expenditures. These results not only justify the capital-intensive approach of high-tech integration but also offer compelling evidence for public-private cooperation in smart industrial energy systems.

Smart Controller & Demand Side Management

Demand-side management (DSM) is crucial in achieving smarter and more sustainable electrification, particularly within energy-intensive industrial zones. In this study, the integration of smart controllers, especially those leveraging AIoT capabilities has shown a measurable impact on optimizing load balancing and renewable energy dispatch. While the recorded autonomy values were relatively modest (0.0272 hours for the domestic scenario and 0.0076 hours for the Taiwan partnership), they represent the early potential for limited self-sufficiency during brief outages or high-tariff peak periods. More significantly, these values highlight the role of controller intelligence in maintaining load stability through dynamic prioritization.

The most compelling impact of the smart controllers lies in the reduction of grid dependency. From a baseline grid energy purchase of 1,806,750 kWh/year, the domestic and Taiwan scenarios brought this figure down to 1,098,011 kWh/year and 862,505 kWh/year, respectively. This translates into a 39 percent reduction for the domestic system and a 52 percent reduction under the Taiwan partnership, indicating that smart control systems play a vital role in enhancing energy efficiency, not just through generation, but through intelligent demand scheduling and consumption smoothing.

Strategic & Policy Implications

The modeling results offer several strategic insights for Indonesia's industrial electrification agenda, particularly in the context of medium-sized enclaved industrial areas such as the Industropolis Batang SEZ. First and foremost, they affirm that the deployment of smart, hybrid energy systems (integrating solar PV, battery storage, and intelligent controllers) can substantially reduce reliance on the central grid.

The Taiwan partnership scenario, with a renewable energy fraction of nearly 58 percent and grid energy purchase reduced by more than half compared to the baseline, provides a strong case for integrating advanced control technologies into industrial zones. This suggests that Indonesia's pathway to cleaner industrial growth should not depend solely on expanding generation capacity, but must also incorporate demand-side innovation and grid-interactive technologies.

Crucially, the results also highlight the strategic role that technology partnerships, such as those envisioned under Taiwan's NSP+, can play in de-risking investment and accelerating implementation. The improved system performance under the Taiwan partnership was achieved not only through better equipment specifications but also under a more favorable economic assumption (6 percent discount rate) reflecting concessional financing or joint-venture terms. Such partnerships can help offset the perceived risk premium often associated with early adoption of new technologies, particularly in emerging markets. Taiwan's experience and industry footprint in AIoT, semiconductors, and industrial automation provide a valuable springboard for Indonesia to leapfrog from conventional systems to more digitally optimized solutions.

At the same time, the comparison with the domestic scenario suggests that Indonesia already has a foundation upon which to scale. The domestic system, which achieved a 40 percent renewable fraction and notable grid energy reductions using locally priced solar PV and battery technologies, shows that meaningful progress is possible even with current capabilities. The key challenge now lies in enhancing system intelligence. While Indonesia's solar and storage markets are gradually maturing, the sophistication of smart control systems remains limited. This presents a policy opportunity to support the development of local control technologies, potentially through public-private Research and Development programs, integration with local universities, or technology licensing frameworks.

However, despite the compelling benefits shown by the Taiwan partnership scenario, the pathway to implementation is not without hurdles. One of the primary challenges lies in the complexity of technology transfer. Advanced solutions like AIoT-enabled smart controllers and integrated energy management systems require not only capital investment but also institutional readiness, cybersecurity assurance, and skilled human resources to operate and maintain them. Indonesia's industrial electrification efforts have often been slowed by fragmented governance, limited coordination between ministries, and regulatory uncertainties in adopting emerging technologies.

Moreover, geopolitical considerations and procurement policies can make such international partnerships politically sensitive. While Taiwan offers high-quality energy technologies, Indonesia's foreign cooperation frameworks tend to prioritize established partners or countries with strong trade leverage. This model also assumes a favorable investment climate, yet current challenges such as tariff rigidities, risk-averse financing institutions, and underdeveloped grid infrastructure still prevail. Therefore, while the Taiwan-based model offers a high-performing vision, its adoption depends on strategic alignment of policy incentives, local capacity-building, and targeted regulatory reforms to make such innovation scalable across Indonesia's industrial ecosystem.

Conclusion

This study demonstrates that integrating solar PV, battery storage, and an advanced smart system incorporating AIoT control (reflective of Taiwanese technological capabilities) can significantly enhance the energy efficiency and resilience of industrial parks in Indonesia. Using the Industropolis Batang SEZ as a pilot case, the Taiwan partnership scenario outperformed both the baseline and domestic setups by achieving a 52.26 percent reduction in CO₂ emissions compared to baseline, a 1.83 percent cost saving in Net Present Cost, and a renewable fraction of 57.9 percent, compared to just 40.2 percent in the domestic scenario. Furthermore, it reduced grid dependency by 52 percent, underscoring its potential

to alleviate pressure on Indonesia's fossil-based electricity infrastructure. These findings suggest that strategic technology partnerships can offer scalable solutions for industrial decarbonization and energy innovation.

The comparison across three scenarios highlights the importance of both economic mechanisms and technology sophistication in shaping system outcomes. As Indonesia moves toward cleaner industrial development, partnerships like those under the New Southbound Policy+ offer a valuable pathway for accelerating innovation, de-risking investments, and building local capacity for scalable, smart energy systems.

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Strategic Collaboration in the Microalgae Industry: Advancing Indonesia-Taiwan Economic and Sustainable Development under the New Southbound Policy+

Aida Azjuba¹

ABSTRACT

The emerging microalgae industry presents significant potential as a strategic sector to advance Indonesia–Taiwan cooperation under the New Southbound Policy+ (NSP+). Climate change, as one of the defining challenges of the twenty-first century, underscores the urgency of carbon sequestration, and microalgae—including red and green varieties—offer innovative solutions for carbon capture and utilization. Beyond environmental benefits, microalgae possess remarkable biotechnological value through bioactive compounds widely applied in pharmaceuticals, nutraceuticals, and cosmetics. Indonesia’s extensive marine biodiversity and favorable cultivation conditions provide a natural advantage, while Taiwan contributes advanced biotechnological infrastructure, R&D capacity, and industrial expertise. Together, these complementary strengths create a strong foundation for collaboration in research, technology transfer, and commercialization. This study employs a qualitative approach using secondary data analysis, including literature review, reports, and policy documents, to assess the feasibility of joint development in this sector. Findings suggest that Indonesia–Taiwan cooperation in microalgae can promote economic diversification, accelerate green innovation, and advance the United Nations Sustainable Development Goals (SDGs). The industry’s growth could strengthen bilateral relations by enhancing capacity building, enabling technology exchange, and expanding people-to-people connectivity. Ultimately, microalgae may emerge as a new pillar of sustainable cooperation, reinforcing the NSP+ as a platform for regional green development.

Keywords: Microalgae Industry, Indonesia-Taiwan Collaboration, New Southbound Policy+, Sustainable Development, Biotechnology

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Introduction

Tsai Ing-wen, the former president of Taiwan, launched the New Southbound Policy (NSP) in September 2016 to strengthen Taiwan's ties with 18 nations in Southeast Asia, South Asia, and Australasia (Kwek, 2021). Under the current administration of President William Lai, the policy was officially upgraded into the New Southbound Policy Plus (NSP+) in 2025, expanding its strategic scope through new “corridors” such as technology, health, resilience, think tanks, NGOs, and youth programs. The Taiwanese government aims to utilize this policy to promote cooperation in trade, education, science, and culture to position Taiwan as an active and collaborative actor in the Indo-Pacific region (Glaser et al., 2018). To achieve its goals, the initiative prioritizes building strong bilateral relationships using persuasive and non-coercive approaches (Wu, 2021). In response to rising complexities and uncertainties in the regional political environment, Taiwan continues to adapt the policy. By fostering various forms of collaboration, NSP+ enables Taiwan to enhance its regional integration and improve its global competitiveness (Kwek, 2021).

As the Indo-Pacific region gains increasing political and economic significance, regional cooperation becomes essential to ensure that all stakeholders benefit from sustainable development in the long term. The NSP+ aligns with global priorities such as climate action, green innovation, and the expansion of the digital economy (Chen, 2024). Within this context, Taiwan—positioned as a middle-power economy—plays a vital role in advancing the United Nations Sustainable Development Goals (SDGs) by identifying sectors that combine environmental responsibility with economic opportunity. One such sector is the biotechnology-driven use of microalgae, which has drawn growing attention for its dual potential: addressing urgent challenges like carbon sequestration and renewable energy, while also generating high-value products for pharmaceuticals, nutraceuticals, and cosmetics (Cao et al., 2023). By linking these global imperatives with specific industry opportunities, the microalgae sector illustrates how Taiwan can operationalize NSP+ commitments through innovation that is both financially viable and environmentally sustainable.

Microalgae contain a wide range of bioactive compounds applicable to pharmaceuticals, cosmetics, and food products. They also offer promising solutions for carbon capture and biofuel production (Yang et al., 2023). Due to these dual benefits, the industry has gained significant momentum in recent years. The combination of Indonesia's rich marine biodiversity and Taiwan's advanced technological expertise—particularly in biotechnology—creates a strong foundation for a fast-growing green industry (Lee & Jamil, 2023). This synergy enables Indonesia to leverage its natural resources while Taiwan contributes cutting-edge technology, allowing both countries to pursue shared goals for sustainable development.

This paper explores how collaborative research in the microalgae sector—framed within the NSP+—can contribute to sustainable industrial growth while strengthening bilateral relations between Indonesia and Taiwan. By narrowing its focus to a specific area, this study offers an illustrative example of how economic growth can be balanced with environmental preservation in the Indo-Pacific region. The analysis is based on desktop research, involving an extensive review of academic literature, government policy documents, and industry reports to assess the opportunities and challenges of Taiwan–Indonesia collaboration in the microalgae industry.

Analysis

The Strategic Value of the Microalgae Industry

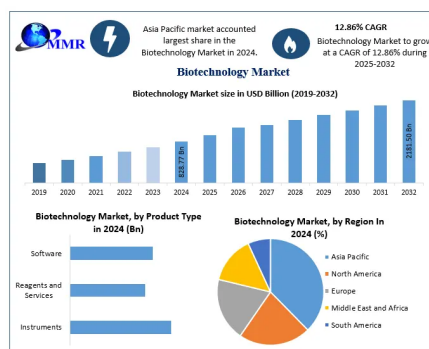
Microalgae are diverse photosynthetic organisms—including green algae (Chlorophyta), red algae (Rhodophyta), and cyanobacteria—that play vital ecological roles and offer significant industrial potential. They produce lipids, proteins, and pigments such as phycobiliproteins and carotenoids, widely used in pharmaceuticals, nutraceuticals, and cosmetics. Resilient and adaptable, microalgae thrive in saline water, wastewater, open ponds, and photobioreactors, making them an environmentally sound resource (Mutanda et al., 2020).

Microalgae absorb CO₂ at rates up to four times higher than trees, converting up to 1.3 kg of CO₂ into 1 kg of biomass—an efficient carbon mitigation tool (Sarwer et al., 2022). Their integration with industrial flue gas capture and wastewater treatment provides dual benefits of emission reduction and water purification (Padhi et al., 2025; Iakovidou et al., 2024).

Beyond environmental contributions, microalgae fuel the bioeconomy through compounds like polyunsaturated fatty acids (PUFAs), antioxidants, and therapeutic pigments, which show potential in treating inflammation, cancer, and infections (Mutanda et al., 2020). Integrated biorefineries now harness microalgae for biofuels, supplements, bioplastics, and green materials, placing them at the core of a circular low-carbon economy (Sarker & Kaparaju, 2024).

The Asia Pacific region dominated the biotechnology market in 2024, with instruments and reagents leading product segments. Projected growth at a 12.86% CAGR through 2032 underscores the urgency for Indonesia and Taiwan to align their biotech capacities (Maximize Market Research, 2024).

Figure 3.6 Global Biotechnology Market (CAGR, Product Type, Regional Distribution)



Source: Maximize Market Research (2024)

Indonesia-Taiwan Complementarity

Taiwan has made significant advancements in biotechnology and innovation, supported by strong university–industry collaboration, substantial public investment in research and development (R&D), and vibrant international partnerships. Within this ecosystem, Taiwan has developed particular expertise in microalgal biotechnology, ranging from genetic engineering and photobioreactor design to the commercialization of bio-based products for pharmaceutical and cosmetic industries (Sarker & Kaparaju, 2024). These capacities resonate with the upgraded New Southbound Policy Plus (NSP+), which emphasizes not only economic exchange but also people-centered cooperation through its six corridors—digital technology and semiconductors, public health, disaster resilience, as well as think

tanks, youth, and NGOs (TAEF, 2024). By embedding biotechnology and green innovation within this framework, Taiwan positions its microalgae sector as both a scientific driver and a platform for advancing regional sustainability. In this way, NSP+ becomes more than a diplomatic initiative; it serves as a practical blueprint for transforming technological expertise into cooperative outcomes with Southeast Asian partners (Chen, 2024).

Indonesia, by contrast, possesses one of the world's most biodiverse marine ecosystems, home to thousands of native algal species with unique biochemical properties suitable for applications in food, energy, and bioactive compounds. Its tropical climate, extensive coastline, and year-round solar exposure provide ideal conditions for cost-efficient, large-scale cultivation—particularly in open-pond systems that require minimal technological input. These natural advantages significantly lower energy consumption typically associated with artificial lighting and temperature control (Jaiswal et al., 2023).

Against this backdrop, NSP+ offers a strategic platform to synergize Taiwan's technological prowess with Indonesia's ecological assets. Key areas for collaboration include joint R&D on high-value microalgae strains for use in biofuels, pharmaceuticals, and cosmetics; technology transfer involving advanced photobioreactor systems and processing techniques; capacity-building initiatives through academic exchanges, internships, and professional training; and green investment models that enable Taiwanese industry players to support pilot algae farms in Indonesia (Glaser et al., 2018; Kwek, 2021).

Taiwan's Microalgae Industry Landscape

Since the late 2010s, Taiwan's Ministry of Economic Affairs (MOEA) and Bureau of Energy have backed microalgae initiatives for carbon capture and high-value product generation. A key case is the Industrial Technology Research Institute (ITRI)–Taiwan Cement Corporation project, which uses industrial CO₂ to cultivate *Haematococcus pluvialis* for astaxanthin (Taipei Times, 2016). This aligns with Taiwan's carbon reduction goals and NSP+ strategy (WRA Taiwan, 2023). Alongside this, the Ministry of Science and Technology (MOST) and ITRI provide research funding, infrastructure, and strategic partnerships to support biotechnology (Chew et al., 2017).

Taiwan has become a global microalgae player through firms like Far East Bio-Tec Co., Ltd. (FEBICO), Synbio Tech, and Algatek Biotech. FEBICO, with 40+ years of experience, exports *Chlorella* and *Spirulina* ingredients and branded products such as Apogen® and Biophyto®, both certified to international organic standards (Far East Bio-Tec, n.d.). Synbio Tech applies microalgae in probiotics and functional foods, while Algatek develops cosmetic and pharmaceutical extracts using sustainable production and advanced purification. These cases show Taiwan's ability to turn R&D into market-ready products.

Commercial outputs include *Chlorella*- and *Spirulina*-based supplements, skincare, and functional foods. Apogen® (from *Spirulina platensis*) is marketed for immune and antiviral benefits, while Biophyto® targets wellness and anti-aging. Astaxanthin production from *H. pluvialis*—developed with Taiwan Cement—demonstrates how cross-sector partnerships strengthen industrial value chains (ITRI, 2023).

R&D leadership comes from ITRI, which created growth agents ITRI-A1 and ITRI-G1 to boost *H. pluvialis* biomass and pigment yields. Universities such as NCKU, NTU, and Academia Sinica have contributed significantly. NCKU's Chemical Engineering department reviewed gene-editing tools (CRISPR/Cas9, TALEN, ZFN) for strain improvement (Ng et al., 2017).

NTU's isolate *Chlorella* sp. NTU-H15 tolerates 40% CO₂ and high temperatures, suitable for carbon capture and dense cultivation (Chang & Yang, 2003). Taiwanese researchers have also developed thermo-tolerant mutants for outdoor photobioreactors.

Taiwan's innovation ecosystem bridges research and commercialization through government R&D grants, export incentives, and incubation programs at ITRI and the National Science and Technology Council (NSTC). Though direct links to Taiwan Tech Arena are limited publicly, similar programs support algae-based startups. Industrial clustering in hubs like Hsinchu Science Park enhances collaboration and accelerates translation of lab work into supplements, cosmeceuticals, and nutraceuticals.

Between 2017 and 2025, Taiwan's microalgae sector has evolved from research-driven to commercially vibrant. Supported by coherent policy, institutional R&D, and private innovation, Taiwan now positions itself as a regional leader in algae-based biotechnology under NSP+, strengthening its role in sustainable Indo-Pacific innovation.

Collaborative Pathways for Innovation and Development

International research collaborations enhance institutional capacity and technology exchange. In Indonesia, global partnerships have provided co-authorship, access to advanced technologies, and long-term institutional development (Wahyono, 2022). This is especially relevant for microalgae biotechnology, where technology transfer—from bioreactor engineering to strain optimization—depends on joint research and sustained commitments.

Public–private partnerships (PPPs), widely applied in health, education, and infrastructure, offer transferable lessons. For example, in regional hospitals, government–private cooperation has delivered services like hemodialysis through operational cooperation (OC) models, demonstrating effective governance, risk management, and operations (Basabih et al., 2024). The same principles can support biotechnology, where PPPs can provide capital, technology, and expertise to address uneven infrastructure and skills.

Using Emerson's collaborative governance framework, policy incentives, institutional context, and joint capacity strongly shape PPP success (Basabih et al., 2025). For microalgae, subsidies for algae-based products or streamlined biosafety approvals could improve collaboration among universities, agencies, and firms. Meissner's review of science and technology PPPs emphasizes joint committees, clear IP frameworks, and sustained funding as essential for aligning academic research with commercialization (Meissner, 2019). In Indonesia–Taiwan cooperation, these measures are critical for technology transfer, market readiness, and equitable benefits.

Future collaboration must extend beyond R&D to applied innovation, commercialization, and capacity-building. Indonesia faces limited downstream processing and weak standardization, while Taiwan offers experience in photobioreactors, extraction, certification, and training. Co-funded pilot algae farms on Indonesian coasts could act as living labs for commercialization, workforce training, and value-chain development under NSP+. In the long term, such partnerships would help Indonesia shift from biomass producer to high-value product manufacturer, while reinforcing Taiwan's leadership in sustainable biotechnology.

Co-Financing Models and Regulatory Harmonization

Public–private co-financing models are increasingly important in Taiwan and Indonesia’s biotech sectors. Taiwan’s NSP+ and Innovation Fund promote partnerships through industry–academia matching grants and pilot farm joint ventures supported by ITRI. ITRI’s collaboration with local firms on algae-derived astaxanthin shows how co-financing accelerates technology transfer to SMEs.

In Indonesia, BRIN (National Research and Innovation Agency) fosters joint ventures between biotech startups and investors, echoing Taiwan’s incubator strategies. A 2024 study on export agriculture found that Indonesia’s co-farming partnerships with local producers outperformed self-operated models in profitability and export readiness, demonstrating the value of co-financing and risk-sharing (Kurniyanto et al., 2024).

However, both countries face hurdles in regulatory synchronization, especially in biosafety protocols, biomass quality standards, and export certifications. Taiwan’s FDA-led export framework differs from Indonesia’s multi-agency system (BPOM and Ministry of Trade), creating bottlenecks in biosafety testing, contaminant thresholds, and labeling standards. These mismatches increase costs and delay market entry, leading exporters to call for streamlined phytosanitary certification and standardized packaging (Silitonga, 2023).

To address these gaps, Taiwan and Indonesia should pursue bilateral Memorandums of Understanding (MoUs) on product quality and mutual recognition of laboratory results—similar to EU–US FDA MRAs. At the regional level, ASEAN biotech dialogues could embed harmonized microalgae standards. A 2024 policy analysis stressed that deeper science and technology cooperation is essential for enabling knowledge flows and positioning microalgae as a competitive ASEAN-wide commodity (Betrix Betrix & Kolinug, 2024).

Lessons from Indonesia’s strategic trade arrangements could guide new export schemes for microalgae, while Taiwan’s investment incentives could support joint ventures in cultivation and processing. Together, these steps would help Indonesian producers move up the value chain and build a regional consensus for microalgae as a high-value ASEAN commodity.

Conclusion

Collaboration between Indonesia and Taiwan in the microalgae industry holds strong strategic value for advancing sustainable economic development in the Indo-Pacific, especially under the New Southbound Policy Plus (NSP+). This study identifies microalgae as a highly promising bioeconomic platform—uniquely positioned among marine organisms for their rapid biomass yield, high-value compound output (e.g., astaxanthin, omega-3s), and CO₂ absorption potential. These traits make them superior in versatility compared to organisms like coral reefs, which are ecologically critical but commercially limited.

Indonesia contributes rich marine biodiversity and low-cost cultivation zones, while Taiwan brings advanced biotechnology capabilities, including microalgae strain engineering, photobioreactor design, and commercial-scale extraction technologies developed by institutions like ITRI and private firms such as FEBICO. These complementary strengths form the backbone of a high-potential partnership.

To support this collaboration, several strategic enablers are needed. First, formalized institutional linkages—through joint university–industry programs, pilot farms, and public–

private co-financing—can scale innovation and market translation. Second, regulatory harmonization between Taiwan and Indonesia (e.g., mutual recognition of biomass standards, export certifications, and biosafety protocols) will be essential to facilitate trade and investment. Third, inclusive mechanisms such as bilateral training, researcher exchanges, and open innovation platforms should be prioritized to build long-term capacity.

Overall, the microalgae sector represents not just an environmental and economic opportunity, but a catalyst for science-based regional integration. With targeted support in financing and regulation, Indonesia–Taiwan collaboration on microalgae could become a leading model of sustainable cooperation in the Indo-Pacific, reinforcing the broader goals of NSP+.

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Taiwan's Technology Transfer for Climate Resilient Livestock Farming in Indonesia

Ashariah Hapila¹

ABSTRACT

The livestock sector, particularly ruminant animals, is a significant contributor to global greenhouse gas emissions, accounting for approximately 14.5 percent of total emissions. As an agrarian country with a substantial livestock population, Indonesia faces complex challenges in reducing emissions from this subsector. Meanwhile, Taiwan has successfully implemented precision livestock farming technologies and environmentally friendly waste management systems. This study aims to examine the potential adaptation of Taiwanese technologies to mitigate green house gas (GHG) emissions in Indonesia's livestock sector, particularly through feed-based strategies, waste management, and emission monitoring systems. A qualitative research design employing a comparative case study approach was utilized. Taiwan's success is evident in its integration of livestock waste-based bioenergy systems and the implementation of carbon tax incentives. Technologies such as biogas installations, emission sensoras, and waste treatment systems show considerable promise for application in Indonesia through technology transfer mechanisms and capacity-building programs for farmers. The findings of this study are expected to support the advancement of low-carbon livestock farming in Indonesia and open up opportunities for carbon credit initiatives. The Indonesia–Taiwan partnership could serve as a model for integrating policy frameworks into livestock development, in alignment with the 2030 Nationally Determined Contributions (NDC).

Keywords : Indonesia Taiwan Cooperation; Low-Carbon Livestock; Precision Livestock Farming; Sustainable Agriculture; Technology Transfer.

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Research Background

The greenhouse effect is a natural process in which gases like water vapor, CO₂, methane, and ozone trap heat in the atmosphere, raising the Earth's average temperature by about 32°C (Schwartz, 2018). This increase has caused the Earth's average surface temperature to rise by 0.8°C since the beginning of the 20th century (Singh and Purohit, 2014). Since the Industrial Revolution, human activities have further amplified the greenhouse effect by increasing the concentration of CO₂ by 36 percent and methane by 148 percent in the atmosphere since 1750 (Singh and Purohit, 2014). In addition, methane has a significant contribution as the second largest contributor to global warming through radiative forcing of $0.97 \pm 0.16 \text{ W m}^{-2}$ after CO₂ (Chang et al., 2019). Understanding the global methane balance and its sources is very important in efforts to mitigate climate change.

The livestock sector is a major contributor to global greenhouse gas (GHG) emissions, producing 87–97 Tg of methane (CH₄) annually from enteric fermentation in ruminants, in addition to manure-related emissions (FAO, 2017; Hur et al., 2023). Overall, livestock accounts for about 14.5% of global GHG emissions, with significant impacts on water quality, biodiversity, biogeochemical cycles, and land use (Leip et al., 2015; Schwartz, 2018). In Indonesia, emissions are dominated by cattle (66%), followed by goats, sheep, and buffalo, with CH₄, nitrous oxide (N₂O), and carbon dioxide (CO₂) as the main gases (Nugrahaeningtyas et al., 2018; Musa, 2020; Bhatta and Malik, 2017; Sejian et al., 2016; Heriyanti et al., 2022). Although emission intensity per unit of meat has decreased due to efficiency gains, total emissions continue to rise. Mitigation strategies such as better manure management, feed optimization, biogas use, sustainable grazing, and herd reduction face limited adoption due to high costs, weak regulations, low institutional capacity, and stakeholder resistance. (Gerber et al., 2010; Zhang et al., 2017; Malahayati and Masui, 2018; Zahar and Nurhidayah, 2023; Alicia, 2024). Policy support that enhances efficiency, stimulates innovation, and integrates adaptation with mitigation is therefore essential to reducing the climate impact of livestock while ensuring food security (Agus et al., 2023; Ngadisih et al., 2024).

Recent studies have highlighted effective mitigation strategies, such as animal diet manipulation, use of feed additives to reduce enteric methane emissions (Prathap et al., 2021), and waste management techniques such as regular manure removal, acid addition, and Anaerobic Digestion (AD) that can reduce methane, ammonia, and nitrous oxide emissions (Yan et al., 2024). In Taiwan, the successful implementation of technologies such as the integration of AD systems and the utilization of biogas to electricity in farms has shown great potential in reducing methane emissions while generating renewable energy (Tsai, 2018). Taiwan's integration of AD and biogas for farm electricity, supported by policies, economic incentives, and technology, cut 36,000 metric tons of CO₂ in 2019 with a 67,390 tons target by 2030 (Lee and Tsai, 2020; Tsai, 2016).

Taiwan exemplifies successful biogas use as both an emissions mitigation tool and renewable energy source, with small-scale studies showing high efficiency and methane utilization that indicate strong potential for large-scale electricity generation (Chang et al., 2015). To support this development, the government has implemented regulations requiring food waste recycling, encouraging the construction of AD and composting facilities, and providing economic incentives such as feed-in tariffs and subsidies (Tsai, 2020; Lee and Tsai, 2022). Globally, the adoption of AD systems varies, with developing countries in Asia constrained by low-quality organic waste and high infrastructure costs, although the prospect of

carbon credits is beginning to attract farmers' interest (Liang et al., 2008). In Spain, system efficiency depends on farm scale, with biological systems being more suitable for small-scale farms (Sánchez-Martín et al., 2022). Meanwhile, in developed countries, implementation is more common at large scales or in centralized installations, driven by regulations and economic incentives (Vasco-Correa et al., 2018).

Emission monitoring systems are also essential to support data-driven policies (Prathap et al., 2021). Increasing the efficiency of livestock and feed production can also reduce emissions while maintaining economic benefits (Liu and Liu, 2018). These strategies that have proven successful in Taiwan are expected to be adopted in Indonesia by considering mitigation efficiency, technical feasibility, local regulations, climate conditions, scale of implementation, and cost-effectiveness (Yan et al., 2024).

A comparative method was used to analyze the differences and similarities in climate change mitigation strategies between Indonesia and Taiwan. Given their differing contexts, comparing the policies, economic instruments, and implementation challenges of both countries helps identify best practices for Indonesia (Gacek, 2023; Patunru and Rakhmah, 2017). Taiwan, although not a member of the United Nations Framework Convention on Climate Change (UNFCCC), is targeting net-zero emissions by 2050 through a polycentric strategy, renewable energy, and carbon markets (Biedermann, 2017). Meanwhile, Indonesia is targeting a 29 percent emission reduction by 2030 through a low-carbon technology approach and fiscal policies such as a carbon tax (Rahman and Djasuli, 2024; Yusuf et al., 2010). This approach not only highlights the strengths and weaknesses of each strategy but also opens up opportunities for cross-country learning and collaboration in achieving climate targets.

Method

This study employs a comparative literature-based approach to analyze greenhouse gas (GHG) mitigation strategies in the livestock sector of Taiwan and Indonesia. The analysis is conducted qualitatively, focusing on feed-based mitigation, emission monitoring systems, and supporting policies. The study identifies differences, similarities, and the potential adoption of Taiwan's strategies relevant to the Indonesian context, thereby providing insights into policy and technological opportunities to strengthen national livestock sector GHG mitigation efforts.

Discussion

Policy Comparison: Taiwan and Indonesia

Taiwan faces unique challenges in addressing climate change due to its international isolation that limits its policy latitude (Liu and Chao, 2023). However, Taiwan's pig and cattle farming sector has leveraged biogas production and AD of livestock waste to achieve environmental, energy, and economic benefits (Tsai, 2018). Taiwan's policies also focus on adaptation and mitigation strategies that are designed with farmers' perceptions in mind to align with food security and environmental conservation (Sohan et al., 2023). Strategies include land-use management, feed adjustments, genetic improvements, livestock diversification, and institutional support for adaptation and mitigation (Zhang et al., 2017). As a result of policy interventions, the focus shifted to livestock and high-value commodities. The Taiwanese government supported this transition through policies that promoted the utilization of agricultural waste as fertilizer, provision of production inputs (Sijaya, 2019), and market stabilization during the pandemic (Mayulu et al., 2023). At the same time,

the private sector advanced innovation in livestock genetics, production services, and sustainable farming models, with public–private collaboration emerging as a key driver of productivity, sustainability, and poverty alleviation, particularly for smallholder farmers (Costales, 2012).

In contrast, Indonesia faces different structural and economic constraints in implementing similar strategies. In Indonesia, various studies have calculated GHG emissions from livestock using IPCC methodology, with dairy cattle being the largest emitter in rural areas (Heriyanti et al., 2022). Emission intensity has decreased over time, indicating increasing livestock productivity, and chicken farming has been proposed as a lower-emission option to meet meat demand (Nugrahaeningtyas et al., 2018). The Indonesian government has formulated mitigation strategies in Indonesia's Updated Nationally Determined Contribution document, including improved manure management, adoption of biogas technology, and improved feed quality (Government of Indonesia, 2021).

The Ministry of Agriculture, with the Ministry of Environment and Forestry and other institutions, promotes community-based biogas programs like BIRU and integrated farming to turn livestock and organic waste into clean energy and bio-slurry fertilizer, while mitigation options such as biodigesters and improved feed management remain constrained by high costs and GHG trade-offs (CCAFS, n.d.; Malahayati and Masui, 2018). Research on specific emission factors for beef cattle in Indonesia using the IPCC Tier-2 method showed lower values than the IPCC default values for Asia, highlighting the importance of considering local conditions in emissions calculations (Widiawati et al., 2016). The GAIA 2024 report also recommends decentralized organic waste management, including composting and biodigesters, as an effective strategy for methane reduction, which aligns with Indonesia's efforts to achieve national climate change mitigation targets while improving farmer welfare (GAIA, 2024).

However, the biggest challenges in Indonesia are the high implementation costs and the complexity of implementing mitigation technologies (Enrici and Hubacek, 2018). Adaptation strategies also prioritize decision-making related to land use, feed changes, and genetic manipulation. Despite remaining challenges, improvements in livestock efficiency contribute to Indonesia's efforts to mitigate GHG emissions.

Comparison of Feed-Based Approaches

To reduce greenhouse gas emissions, Taiwan has adopted a promising feed-based approach, addressing feed production and processing, which account for about 45% of global livestock sector emissions (Makkar, 2016). Therefore, Taiwan has developed strategies such as balanced feeding, improving forage quality, reducing grain use, and utilizing crop by-products. Research has shown that the use of crop by-products in dairy cattle feed can reduce GHG emissions without reducing milk production or disrupting rumen microbiota (Wang et al., 2024). Increasing feed efficiency not only reduces emissions but also provides economic benefits. Improving feed efficiency and applying genetic selection can increase profits (13.23 CAD/unit; 0.89 CAD/unit) while reducing methane emissions by 28% and nutrient excretion by up to 29%, supporting sustainability and a lower carbon footprint (Boaitey et al., 2017; Schweer, 2016; Richardson et al., 2020; DiLorenzo and Lamb, 2012; Liu and Liu, 2018).

Meanwhile, in Indonesia, feed-based strategies are also recognized as important for reducing GHG emissions, especially from enteric fermentation. Despite government policies

promoting balanced feed and anti-methanogenic supplements like tannins (Ramaiyulis et al., 2022), feed-based strategies in Indonesia face uneven adoption and awareness, particularly among small-scale livestock farmers. Relying mainly on pasture and crop waste, farmers face seasonal and regional feed variability, highlighting the need to improve crop waste quality, strengthen the feed value chain, and raise awareness of feed quality for emissions mitigation (Amole et al., 2021).

Interventions like balanced feeding, improved forage, and efficient crop waste use can reduce emissions and boost productivity, as demonstrated by the successful feed strategy initiative in Selobanteng, Situbondo. The Selobanteng project successfully achieved a net carbon sequestration surplus of 56.16 Gg CO₂-e/year by planting forages like calliandra, lamtoro, and elephant grass, exceeding livestock emissions (Putra et al., 2024).

Table 3.2 Comparison of Livestock Emission Mitigation Strategies: Taiwan and Indonesia

No.	Indicator	Taiwan	Indonesia	Gap
1	Regulatory and Policy Support	There are strict regulations regarding livestock waste, the Office for Biogas Promotion program, carbon tax incentives, and feed-in tariffs for biogas electricity.	There is the NDC 2030 policy, the BIRU (household biogas) program, but specific regulations on livestock emissions are still weak.	Indonesia needs to strengthen regulations and incentive schemes to attract farmers to adopt technology.
2	Technology Availability	Large and small scale AD biogas, emission sensors, precision livestock farming (smart farming tools).	Biogas technology exists but is limited to certain areas; precision farming has not been widely implemented.	Technology transfer from Taiwan could accelerate the modernization of Indonesian livestock farming.
3	Farmer Adoption	High, because there is financial support and capacity building.	Low, small farmers still rely on traditional feed and are not yet familiar with green technology.	There is a need for training and capacity building programs within the NSP+ framework.
4	Emission Reduction Impact	2019: reduction of 36,000 tons CO ₂ eq; 2030 target: 67,390 tons (from biogas and AD).	Livestock emissions are still rising despite decreasing intensity; cattle contribute 66% of livestock emissions.	Indonesia can achieve its NDC targets by adopting an AD-biogas + feed strategy like in Taiwan.

What Can Be Adopted from Taiwan to Indonesia

These comparisons demonstrate that Indonesia has significant potential to adopt several approaches from Taiwan, particularly in the application of AD-based biogas technology and feed strategies utilizing crop byproducts. Taiwan's approach demonstrates that integrating policy, technological innovation, and farmer education can yield dual benefits: reducing GHG emissions while improving farmer welfare and production efficiency. This aligns with the objectives of Taiwan's New Southbound Policy (NSP+), which actively promotes collaboration opportunities with Southeast Asian countries such as Indonesia (Executive Yuan, n.d).

Within the NSP+ framework, specific collaboration pathways include technology transfer for efficient small-scale biogas digesters and sustainable feed formulation, which directly address Indonesia's challenges of high initial costs and unequal access to modern technology. Furthermore, investment and joint venture opportunities facilitated through NSP+ can help bridge the financing gap for livestock infrastructure development in Indonesia and make advanced feed supplements more accessible and affordable (CSIS, n.d.). This collaboration can also facilitate capacity building and livestock education programs, directly increasing awareness and adoption rates among Indonesian livestock farmers, which has been identified as a key challenge (FFTC, 2022).

Indonesia and Taiwan both include the livestock sector in their emission reduction commitments outlined in their NDCs. Indonesia aims for 31.89% (unconditional) and 43.20% (conditional) emission reductions by 2030 and net-zero by 2060 through biogas use and feed efficiency, whereas Taiwan targets 24% by 2030, 50% by 2050, and net-zero by 2050 (Climate Action Tracker, 2024). Taiwan's agriculture and livestock sector contributes approximately 2.22 percent of total emissions, and the government promotes low-carbon agricultural practices through livestock waste utilization, renewable energy, and circular farming models (Chang and Lin, 2023).

Despite differences in scale and targets, both countries emphasize the importance of technology and sustainable practices in transforming the livestock sector to support national climate targets. Strengthening local institutions and increasing consumer awareness are also crucial to maintaining manageable demand for animal protein. Considering local conditions, this collaboration can strengthen sustainable mitigation and adaptation policies in Indonesia's livestock sector.

Conclusion

The comparative study results show that both Indonesia and Taiwan have implemented various climate change mitigation and adaptation strategies in the livestock sector, despite facing different challenges. Taiwan has leveraged biogas production, AD of livestock waste, and feed-based strategies using crop by-products to increase feed efficiency. This strategy not only reduces GHG, but also provides economic and social benefits for livestock farmers, while maintaining food security. Meanwhile, Indonesia has also developed mitigation efforts through changes in feeding patterns, improving livestock manure management, and increasing production efficiency, although it still faces challenges of high costs and limited technology at the local level. There are still great opportunities to adopt similar approaches as in Taiwan, including the application of AD based biogas technology and optimization of crop by product waste as livestock feed.

Overall, strengthening policies, technological innovation, and increasing awareness of farmers and consumers are the keys to successful emission mitigation in the livestock sector. This approach is in alignment with Indonesia's commitment in the 2030 NDC framework, which targets reducing GHG. These findings provide a basis for enhancing livestock policies and technological innovations in Indonesia for a more sustainable and low-emission food system.

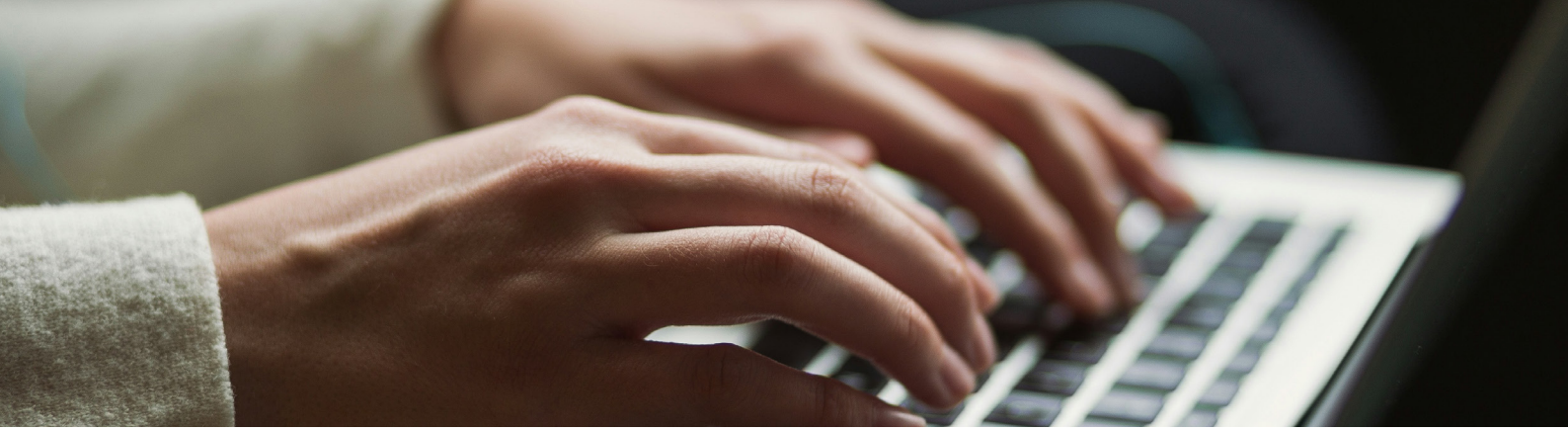
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Ashariah Hapila is a graduate student at IPB University, majoring in Nutrition and Feed Science. She holds a bachelor's degree in Animal Science from Universitas Hasanuddin. Her research interests include ruminant nutrition, nutritional physiology, and cattle immunology. In 2023, she was awarded Indonesia's Flagship Scholarship Program and the Thesis Research Funding Scholarship from the Ministry of Education. Her thesis-based scientific paper has been accepted for publication in a reputable international journal indexed by Scopus. Alongside her studies, she gained professional experience as a part-time editor at Community Forest Ecosystem Services (2022) and as a correspondent at Poultry Indonesia (2022–2024).



About The Habibie Center

The Habibie Center was founded by Bacharuddin Jusuf Habibie and family as an independent, non-governmental, and non-profit organization on November 10, 1999. Our vision is to promote the modernization and democratization of Indonesian society based on morality and integrity of sound cultural and religious values.

The missions of The Habibie Center are:

- 1** First, creating a culturally and structurally democratic society that recognizes, respects, and upholds human rights, as well as examines and raises issues of democratic development and human rights
- 2** Second, promoting and improving human resources management and technology socialization efforts.

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