

The White Book for Business and Investment in Thailand

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The White Book for Business and Investment in Thailand

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Abstract

This research seeks to comprehensively review the changes in Thailand's overall economic, trade, and investment environment in recent years. It will discuss details focusing on the prospects of cooperation between Taiwan and Thailand under the influence of the US-China trade war in a post-pandemic era, and is based on The White Book for Business and Investment in Thailand of 2017. The new 2022 edition will also put forward suggestions to the Thai authorities which govern the economy and investment affairs from the perspective of Taiwanese businesses in Thailand through interview results so as to update the content and policy recommendations of the previous version. By doing so, this research seeks to accurately reflect the actual needs of Taiwanese businesses in Thailand and the issues they face with the recent changes in the global economic and trade environment.

In terms of overall business environment, Thailand's economic growth is expected to recover its momentum in the mid-/long term. It has a good geographical location and complete transportation network, and is adjacent to Cambodia, Laos, Myanmar, and Vietnam (CLMV) of ASEAN and to China. Its business environment continues to improve as well. In addition, Thailand is actively signing trade agreements with other countries or regions, and it is also an important investment target for foreign businesses in the Asia-Pacific region. All these characteristics highlight the importance of Thailand in the Asia-Pacific region.

As for bilateral trade, the import and export trade between Taiwan and Thailand remains stable. After 2017, Thailand's export value to Taiwan remained at roughly US\$3.9 billion, with its import value from Taiwan at more than US\$8 billion. From such data, it is evident that the promotion and complementary nature of government policies have served as one of the important keys to the economic interaction between Taiwan and Thailand. In addition, compared with data from 2016, Thailand's imports from Taiwan are more concentrated in electronic and electrical equipment, and Taiwan's imports from Thailand are also concentrated in the same category. As for investment, the main sectors invested in by Taiwanese businesses in Thailand in the past decade include: electronic component manufacturing (esp. photoelectric material manufacturing and PCB manufacturing) (US\$928 million, 41.04%); finance and

insurance (esp. financial holding) (US\$585 million, 25.87%); and power equipment and manufacturing (esp. battery, power transmission, and distribution machinery) (US\$154 million, 6.81%). Further, investment by Taiwanese businesses in Thailand is in line with Thailand's policy goals and can thus promote the development of local industries.

The economic contributions of investment by Taiwanese businesses mainly include: 1) facilitating economic development in Thailand and contributing to industrial transformation and upgrade as well as the enhancement of human capital, 2) building local supply chains, facilitating manufacturing industry exports, creating job opportunities, and turbocharging Thai industry transformation, 3) the incorporation of Taiwanese technology into startup industries, realizing Thailand's digital innovation policy, and 4) promoting vocational education and industrial-academic collaboration, upskilling Thailand's human resources.

The issues which Taiwanese businesses in Thailand have faced are separated by this white book into six categories, including: 1) legal system and procedural issues, 2) trade issues, 3) investment issues, 4) labor and human resources issues, 5) taxation issues, and 6) infrastructure issues. A more detailed description of each category is as follows.

Legal System and Procedural Issues

First, the Thai government may lack consistency and transparency in law-making and legal interpretation. Government officials or law enforcement personnel do not necessarily carry out their duties according to the law or have excessive discretion of the administrative agency. It is thus suggested that legal reform be considered to reduce the ambiguity of legal norms. Second, the transparency and predictability of Thailand's policies and regulations, including ambush legislation or sudden changes in policies, still have room for improvement. Thus, improving the transparency of regulatory reform and promoting stakeholders' understanding of regulatory changes will help boost foreign entrepreneurs' confidence in Thailand's investment environment. Third, the importers of some industrial products must apply for compulsory certification from the Ministry of Industry's Thai Industrial Standards Institute (TISI) when they are imported. The red tape and complex application

document requirements lead to a long certification process. Thus, it is suggested that the certification process for the import of industrial products be simplified. Fourth, Thailand has recently published English versions of important laws and parent laws, but some documents are still only available in Thai (e.g. product certification of industrial raw materials or application for procurement regulations). Hence, it is suggested that the official English versions of promulgated regulations be continuously updated.

Trade Issues

First, for Taiwan and Thailand, many products still face tariff barriers in market entry. As more and more countries now enjoy preferential trade agreements in the Thai market, it will be unfavorable for Thai businesses to import high-quality intermediate goods from Taiwan. It is suggested that tariff barriers be lowered on both sides to strengthen bilateral economic and trade exchanges. Also, importers and exporters are still encountering difficulties in customs clearance due to lack of transparency of customs laws and regulations, which allows customs officials to have excessive discretion. It is thus suggested that the Thai government increase the transparency of tariff-related regulations and procedures to reduce the cost and uncertainty of customs clearance. In addition, the lack of transparency about customs rewards and penalty schemes increases the cost and uncertainty of customs clearance for enterprises. Hence, it is suggested that the Thai government announce clear and transparent customs technical guidelines to reduce unintentional or technical negligence by importers and exporters. Finally, it is suggested that the Thai government join the WTO Agreement on Government Procurement to assist member states with improving their procurement systems and procedures and ensure that enterprises from member states can enjoy fair competition in the government procurement market of major trading partners. Also, Thailand should consider promoting the relaxation and simplification of the restrictions and procedures for foreign enterprises to obtain an e-GP platform login account and password to participate in e-bidding qualifications in order to enhance the opportunities for Taiwanese and other foreign enterprises to participate in Thailand's government procurement procedures.

Investment Issues

Thailand prohibits foreign firms from operating in nine specific businesses, and either sets shareholding limits for foreign investments or requires them to only work with Thai nationals. We suggest the government adopt a more proactive approach by lifting restrictions on industrial activities in which foreign firms can be involved and increase the shareholding limit. Also, Thailand has a comprehensive land rights system, with only land use legislation still strictly limiting the rights of foreigners to obtain land. To increase willingness for long-term investment, we suggest an extension on lease periods of land and buildings by foreigners and foreign companies. Third, Taiwan and Thailand signed an agreement for the promotion and protection of investments on April 30, 1996, but due to how long ago the agreement was signed, aspects of the agreement may not be applicable to the current situation or be exhaustive enough. We thus suggest Taiwan and Thailand amend the agreement to expand the rights of Taiwanese investors in Thailand. Fourth, Thailand has targeted certain industries and provides them with investment incentives; however, the Thai government may have ignored the peripheral industries which provide services for those industries, which may prove to be an adverse factor to the formation of industrial clusters. Therefore, it is hoped that Thailand expand the scope of investment incentives. Finally, it is more difficult for SMEs in Thailand to get access to financing than similar enterprises with a larger scale. The Thai government may thus consider offering more financing incentives for SMEs.

Labor and Human Resources Issues

It is recommended that the Thai government improve training for professional personnel and Thailand-Taiwan talent exchange to meet demand for talent development in Thailand. On the other hand, Thailand's Smart Visa currently covers only a few specific industries. The Thai government may thus consider expanding the scope of Smart Visas to broaden the talent base in Thailand. Furthermore, the procedures for issuing work visas and permits in Thailand are complicated, resulting in long application times. It is hoped that the application process be simplified. The research also found that some businesspersons coming to Thailand for short-term activities in the form of business meetings or seminars may be considered coming to Thailand for work, and thus need to present a legal work permit. Thus, we suggest

that the government set a clearer legal definition for what constitutes “work” and loosen relevant regulations so that those coming for a business trip can be exempt from a work permit. Finally, it is recommended that the Thai government loosen the 4:1 limit (for every foreign employee, the company must hire four Thai workers) and the regulation which states SMEs must have a paid-up capital of two million baht per foreign employee in order to financially vouch for the employee on work permit applications, in order to make it easier for Taiwanese businesses to operate in Thailand.

Taxation Issues

This study involved interviewing Taiwanese companies, and it was found that most of the third-party vendors in the high-tech industry cannot enjoy the tax benefits provided by the BOI. Therefore, it is suggested that the Thai government provide tax benefits for these third-party vendors to facilitate the formation of industrial clusters and supply chains. Secondly, Thailand’s Revenue Department only offers tax rulings for past transactions. We suggest the Ministry of Finance’s Revenue Department provide enterprises with clear, unambiguous advance tax ruling reports and a consistent explanation of similar laws. Finally, it is recommended that the Thai government extend the five-year tax loss carryforward incentive for startups.

Infrastructure Issues

The Thai government can consider improving various types of infrastructure by tapping into resources from local Taiwanese businesses through public-private partnerships. In addition, the Thailand 4.0 policy plans to build 5G to propel the country’s digital transformation. Thus, the Thai government should accelerate efforts to improve internet access and the quality of its network infrastructure to achieve this goal.

Finally, based on the current economic development needs of Taiwan and Thailand and their complementary advantages, this research proposes the following five prioritized areas of potential cooperation: 1) smart manufacturing, 2) smart healthcare, 3) agriculture and biotechnology applications, 4) the circular and green economy, and 5) EV supply chains. A brief description of the areas of potential cooperation is as follows.

Cooperation in Smart Manufacturing

The industrial structures of both Thailand and Taiwan are dominated by small and medium-sized enterprises (SMEs). Therefore, the smart transformation of SMEs in Taiwan may serve as a great example for the Thai government in its endeavors to promote industrial transformation. It is suggested that Taiwan and Thailand organize more forums in which Taiwanese companies can share their smart industrial solutions and case studies of the successful introduction of smart manufacturing, and at the same time evaluate the feasibility of introducing similar solutions to Thailand. In this way, such events can accelerate the smart transformation of various industries in Thailand, creating positive interaction between the two countries.

Cooperation in Smart Healthcare

Since one of Thailand's policies aims to make the country the medical center of the Asia-Pacific and boost medical development in Thailand, Taiwan-Thailand cooperation can be realized in several aspects. First, Thailand has demand for the import of medical materials, R&D and manufacturing, and quality improvement of medical services. Currently, Thailand attaches great importance to the application of ICT in medicine, so in the future, Taiwan and Thailand can further cooperate in related fields. Secondly, based on past experience, Taiwan can cooperate with Thailand to establish a cloud medical record system in Thailand. In this way, the Thai government can integrate medical records among hospitals and improve the efficiency of medical treatment and referral. Finally, Taiwan's experience in fighting against COVID-19 and the use of technology may serve as a reference for Thailand to build a safer and more efficient medical environment.

Cooperation in Agriculture and Biotechnology Applications

There are several potential areas of cooperation between Taiwan and Thailand in the fields of agriculture and biotechnology applications. The first is to promote cooperation in smart agriculture. Based on its past experience, Taiwan can introduce its advanced technologies and solutions to solve similar industrial problems faced by Thailand regarding its agriculture industry. In terms of the development of circular agriculture, Taiwan's technology applications are diverse and mature, and the feasibility of introducing such applications into Thailand can be assessed. In addition,

global consumers' demand for health supplements and vitamins has increased sharply due to the pandemic. The two countries can hence cooperate in the food biotechnology industry as well. Finally, many biotechnology companies in Taiwan have invested in agricultural biotechnology, recycling, biotech cosmetics, specialty chemicals, and the environment. These extended applications can serve as examples for Thailand's transformation and innovation in the agriculture industry.

Cooperation in the Circular and Green Economy

Taiwan and Thailand can cooperate in the fields of recycling and the green economy and exchange ideas on recycling and reuse technology. Currently, Thailand's recycling rate and technology are rather limited, with the recycling rate lower than the goal set. In this regard, Taiwanese enterprises have relatively mature technology for recycling and reuse, which can serve as a reference for Thailand to develop related technologies. In addition, Taiwan has the successful case of Kaohsiung Port, where the government established an industrial zone which takes advantage of circular energy integration and recycling technologies. Such experience can be shared with Thailand as well.

Cooperation in Electric Vehicle Supply Chains

In recent years, in order to promote the transformation and upgrade of the transportation industry and work towards the goal of carbon neutrality, Thailand has taken active measures to attract foreign-capital enterprises to develop EV technologies. Taiwan and Thailand can thus work together in aspects such as the development of key EV systems, high value-added components like automotive electronics, or other innovative products so as to further cultivate Thailand's manufacturing capabilities. Taiwan also has industrial advantages in areas such as ICT and semiconductor manufacturing; thus, the two countries can also work together to assist EV manufacturers in developing new models, supply global vehicle manufacturers with systems and key components, develop HCI interfaces which integrate software and hardware niches, or develop new-type application service systems. These are all possible areas of further cooperation and development between Taiwan and Thailand.

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Chapter One Overview

I. Introduction

Thailand has always been an important investment target for international companies in Asia and for Taiwanese businesses in Southeast Asia as well. In 2019 and 2020, due to the impacts of the US-China trade war and the COVID-19 pandemic, Thailand's relatively stable political, economic, and investment environment has made it a favored option for foreign capital and supply chain relocation. These factors have prompted more and more Taiwanese businesses to invest in Thailand. Currently, the Thai government is promoting industrial transformation and economic development policies such as Thailand 4.0 and the Eastern Economic Corridor (EEC) plan. It is also actively signing free trade agreements with other countries so as to improve its domestic investment environment and make Thailand an important market and target of investment in Southeast Asia.

In order to strengthen cooperation between Taiwan and Thailand and reflect the actual needs of Taiwanese businesses which have invested in Thailand, the World Taiwanese Chambers of Commerce (WTCC), the Asia Taiwanese Chambers of Commerce (ASTCC), and the Thailand Taiwanese Chamber of Commerce published *The White Book for Business and Investment in Thailand* in 2017, giving substantive advice to the Thai government in the publication. However, with rapid changes in the global economic and trade markets (such as the US-China trade war, the COVID-19 pandemic, and the RCEP), the content and advice from Taiwanese businesses back in 2017 may not be adequate anymore in the current environment. Hence, the present research seeks to comprehensively review the changes in Thailand's overall economic, trade, and investment environment in recent years and discuss the prospects of cooperation between Taiwan and Thailand under the influence of the US-China trade war in a post-pandemic era based on *The White Book for Business and Investment in Thailand* in 2017. At the same time, this research will also put forward suggestions to the Thai authorities which govern the economy and investment affairs from the perspective of Taiwanese businesses in Thailand through interview results so as to update the content and policy recommendations of the previous

version. By doing so, this research seeks to accurately reflect the actual needs of Taiwanese businesses in Thailand and the issues they face with the recent changes in the global economic and trade environment. It is expected that this updated research can provide content which is more in line with current developments so as to facilitate the continuous development of opportunities for industrial cooperation between Taiwan and Thailand.

This research is divided into four chapters. The first chapter is an overview, including an introduction to the update of this white book, exploration into the importance of Thailand in the global economic and trade system, the participation and contribution of Taiwanese businesses in Thailand, and finally, discussion on Taiwan-Thailand economic and trade cooperation in a post-pandemic era influenced by the US-China trade war. The second chapter takes the perspective of Taiwanese businesses to analyze whether these businesses are currently facing any difficulties in the areas of the legal system/legal procedures, trade, investment, labor and human resources, taxation, infrastructure, etc. when investing in Thailand. The specific advice from these businesses will also be included and presented to the Thai government for reference. The third chapter will analyze the industrial cooperation opportunities between Taiwan and Thailand in the fields of smart manufacturing, smart medical care, agricultural and biotech industrial applications, the circular and green economy, electric vehicles, etc. Finally, the fourth chapter is the conclusion and suggestions, which have been compiled to summarize the key research results of this white book.

II. Overall Business Environment of Thailand and Its Importance in the Global Economic and Trade System

1. Overall business environment

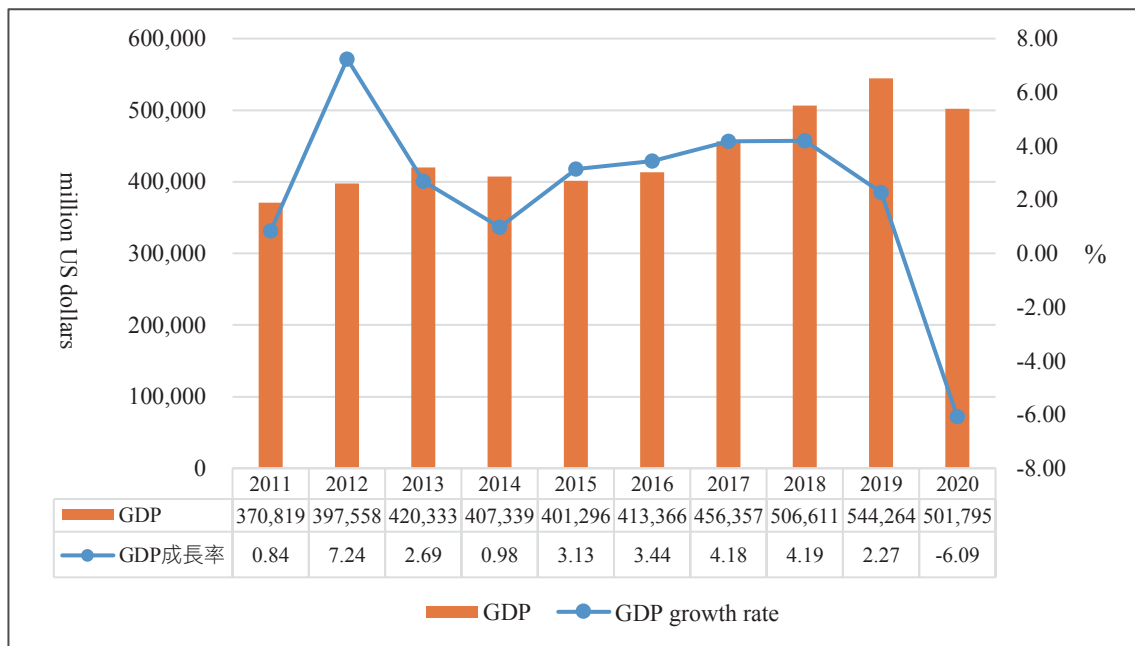
(1) Economic growth has been disrupted by the pandemic in the short term, but growth momentum is expected to recover in the mid-/long term

Among all ASEAN countries, Thailand is the second largest economy after Indonesia, and is a middle-to-high-income country with an open economy, with an annual GDP of US\$500-550 billion in the past three years (2018-2020). After the

Global Financial Crisis in 2009, the economy of Thailand was also affected by the floods in 2011 and the coup in 2014, and the growth rate thus declined significantly. In those two years, the economic growth rates were merely 0.84% and 0.98% respectively. Afterwards, the economy of Thailand gradually grew in a steady manner, with the economic growth rate mostly at 3% or more. However, as the COVID-19 pandemic broke out globally in 2020, even though the pandemic was under stable control domestically, Thailand's two economic pillars, tourism services and export trade, were still greatly affected, resulting in a decline in GDP from US\$544.3 billion in 2019 to US\$501.8 billion in 2020. Thus, in 2020, the economic growth rate was -6.09%, with a decrease of 8.36 percentage points from 2.27% in 2019 (see Figure 1-1).

In 2021, the pandemic's aftermath in Thailand disrupted the economic recovery which was taking place, especially during the third outbreak in April caused by the much more transmissible Delta variant. To check the spread of the pandemic, the Thai government implemented strict measures which reduced mobility and also had a negative impact on consumption and the confidence of local businesses. At the same time, as various countries began COVID-19 vaccination campaigns in 2021, the global economy was gradually recovering. Driven by the increase in foreign demand for automobile components, electronic products, machinery, and agricultural products, commodity exports have supported Thailand's economy. In addition, the timely and active promotion of financial support measures by the Thai government also alleviated some impacts brought about by the pandemic. According to predictions by the World Bank, it'd be difficult for Thailand's economy to return to pre-pandemic standards until 2022 at the earliest, and reforms to reduce trade costs and barriers will help Thailand take full advantage of continued global recovery, including liberalization of trade in services, boosting economic openness, enhanced enforcement of intellectual property rights, and full implementation of new competition laws. All these could attract knowledge-intensive foreign direct investment (FDI), facilitate Thailand's integration into more complex global value chains, generate high value-added goods and services, and accelerate the stabilization of economic growth¹. From this point of view, we can also see how significant it may be, in a post-pandemic era, for Thailand to attract investment from Taiwanese or other foreign businesses and to reduce barriers to doing business.

¹ World Bank Group (2021), *Thailand Economic Monitor*. World Bank, Bangkok.



Source: World Bank, compiled by the research team

Figure 1-1 Thailand's GDP and its growth rate in the past decade

(2) Good geographical location and comprehensive transportation network

Thailand is located in the center of the Indochinese Peninsula, bordering Laos, Cambodia, Malaysia, and Myanmar. The country has also maintained a good relationship with the four emerging ASEAN countries: Cambodia, Laos, Myanmar, and Vietnam (collectively known as CLMV). Enterprises investing in Thailand can enter not only its domestic market, which has approximately 69 million people, but also the market of 250 million people in the surrounding countries (CLMV), the market of 660 million people in all ASEAN member states, and even the markets of China and India.

In addition to Thailand's geographical advantage, the Thai government's continuous investment in the domestic logistics system has also improved transportation networks including railways, highways, waterways, and aviation routes, which in turn accelerated the integration of its transportation system with that of other countries. Such integration has brought huge business opportunities and, at the same time, makes Thailand an ideal target of investment². Therefore, if businesses

² Thailand Board of Investment (BOI), https://www.boi.go.th/index.php?page=thailand_advantages.

investing in Thailand can make use of its geographical advantages and convenient transportation networks, these businesses can set up production bases in Thailand and then strengthen channels for sales. In this way, the convenient transportation can help in selling goods to the greater ASEAN market or even the markets of other East or South Asian countries.

The geographical distance between Thailand and Taiwan is about 2,260 kilometers, with a time difference of one hour. A flight between these two countries takes only three to four hours. In addition, Thailand is one of the countries which Taiwanese people like to travel to best. Taiwanese people are also highly receptive to local Thai culture. All these factors have facilitated the rapid integration of Taiwanese enterprises into the business environment of Thailand. On the other hand, after the US-China trade war, the global supply chain, which used to be China-centered, may undergo a shift of focus, and Thailand's relatively stable political, economic, and investment environment makes it a key option for the redistribution of capital and supply chains. Thus, more and more Taiwanese businesses have chosen to invest in Thailand. In the future, if the Thai government can continue to adopt the constructive suggestions from Taiwanese businesses and create a high-quality and friendly investment environment, it shall attract even more Taiwanese enterprises to invest in Thailand.

(3) Thailand's business environment continues to improve

The Investment Promotion Act (1977) authorizes the Board of Investment (BOI) of Thailand to provide tax and non-tax incentives for local or foreign investors who invest in projects incentivized by the BOI, which is committed to promoting investments beneficial to the economic development of Thailand. Recently, driven by policies such as the Seven-Year Investment Promotion Strategy (2015-2021), Thailand 4.0, and the Eastern Economic Corridor (EEC) Development Plan, Thailand's overall business and investment environment has been significantly improved, and this is concretely reflected in the ranking of the evaluation of its business environment for international stakeholders. According to the *Doing Business 2020* study released by the World Bank, among the 190 economies around the world, Thailand's overall "ease of doing business" score is 80.10, ranking 21st (six places higher from the previous year and the

highest in the past five years). Among all ASEAN countries, Thailand ranks third (in terms of “ease of doing business”), only after Singapore and Malaysia. This ranking undoubtedly reflects the Thai government’s successful efforts in simplifying regulatory procedures, promoting the digitization of public services, and adjusting various investment regulations to adapt to the current economic and trade environment (see Table 1-1).

Table 1-1 Thailand’s Global Competitiveness indicators and changes in ranking of each pillar: 2020-2019

Economy	DB rank in 2020	Change in DB rank from 2019 to 2020	Starting a business	Dealing with construction permits	Getting electricity	Registering property	Getting credit	Protecting minority investors	Paying taxes	Trading across borders	Enforcing contracts	Resolving insolvency
Singapore	2	—	4	5	19	21	37	3	7	47	1	27
Malaysia	12	+3	126	2	4	33	37	2	80	49	35	40
Thailand	21	+6	47	34	6	67	48	3	68	62	37	24
Vietnam	70	-1	115	25	27	64	25	97	109	104	68	122
Indonesia	73	—	140	110	33	106	48	37	81	116	139	38
Philippines	95	-29	171	85	32	120	132	72	95	113	152	65
Cambodia	144	-6	187	178	146	129	25	128	138	118	182	82
Laos	154	—	181	99	144	88	80	179	157	78	161	168
Myanmar	165	+6	70	46	148	125	181	176	129	168	187	164

Note: A total of 190 economies were included in the study

Source: World Bank, *Doing Business 2020*

In terms of competitiveness, in the *IMD World Competitiveness Yearbook 2021* published by the International Institute for Management Development (IMD) in Switzerland, Thailand ranks 28th out of the 64 economies rated, which is one place higher from the previous year (2020). Due to the impact of the COVID-19 pandemic, the average score of all 64 economies rated in 2021 dropped to 68.36 points from 71.82 (out of 100 points) in 2020, with Thailand receiving 72.52 points in 2021, which is higher than the average from the past two years. The IMD World Competitiveness ranking is based on four factors, including economic performance, government efficiency, business efficiency, and infrastructure. From the analysis of these four factors, it can be found that compared with the data from 2020, Thailand has improved in three of them: government efficiency, which has improved the most from 23rd to 20th in 2021; business efficiency, which rose two places to 21st in 2021; and infrastructure, which rose one place from 44th to 43rd in 2021 (see Table

1-2). However, in terms of economic performance, Thailand's ranking dropped from 14th in 2020 to 21st in 2021, mainly because Thailand's tourism industry has always accounted for a relatively high proportion of service exports, which have declined due to the impact of the pandemic³.

Table 1-2 Changes in Thailand's IMD World Competitiveness ranking from 2020 to 2021

	Ranking in 2021	Ranking in 2020	Change in ranking from 2020 to 2021
Overall ranking	28/64	29/63	+1
Economic performance	21/64	14/63	-7
Government efficiency	20/64	23/63	+3
Business efficiency	21/64	23/63	+2
Infrastructure	43/64	44/63	+1

Source: IMD, *IMD World Competitiveness Yearbook 2021*, compiled by the research team

The improvement of Thailand's competitiveness is also reflected in other international reports, helped by the government's specific actions to improve the overall investment environment. According to *The Global Competitiveness Report 2019* released by the World Economic Forum, Thailand's global competitiveness ranked 40th out of the 141 economies rated, which was two places lower from 2018. Among all ASEAN countries, it ranked 3rd, only behind Singapore and Malaysia (respectively 1st and 27th out of the 141 economies rated). Although the overall ranking slipped slightly, among the 12 pillars of the World Competitiveness indicators, Thailand's rankings in six pillars have improved (ICT adoption, macroeconomic stability, health, product market, business dynamism, and innovation capability). Among them, the product market ranking has improved most significantly (ranking 84th in 2019 from 92nd in 2018, showing an improvement of eight places), mainly because the extent of market dominance in Thailand was significantly improved (see Table 1-3).

Although Thailand's WEF global competitiveness has improved in some pillars, there are still indicators with relatively slow progress, including the five pillars of institution, infrastructure, (labor) skills, labor market, and financial system. Among them, infrastructure's ranking dropped the most, from 60th in 2018 to 71st in 2019, mainly due to a slip in the ratings and rankings of sub-items including efficiency

³ IMD World Competitiveness Online, <https://worldcompetitiveness.imd.org/>.

of seaport services (from 68th in 2018 to 73rd in 2019), reliability of water supply (from 56th in 2018 to 60th in 2019), exposure to unsafe drinking water (from 105th in 2018 to 107th in 2019), and railroad density (from 54th in 2018 to 55th in 2019). Other pillars that have regressed somewhat significantly in terms of ranking include institution and (labor) skills, which ranked 67th and 73rd respectively in 2019, showing a regression of seven places from 2018. The institution ranking slipped mainly due to a drop in the ratings and rankings of sub-items including social capital, judicial independence, and incidence of corruption; the ranking for (labor) skills slipped mainly due to a drop in the ratings and rankings of sub-items including mean of schooling years, skillset of graduates, and digital skills of active population as compared to the previous year. If the Thai government wishes to further enhance its global competitiveness, it may give priority to the reform of the aforementioned items which have slipped both in terms of rating and ranking. At the same time, the government may seek suggestions from Taiwanese and other foreign businesses to improve the local investment environment so as to attract more foreign investment. Such measures shall have a positive influence on the overall international competitiveness of Thailand.

Table 1-3 WEF global competitiveness indicators of Thailand and changes in ranking of each pillar from 2018 to 2019

Indicator	Ranking in 2019	Ranking in 2018	Change in ranking from 2018 to 2019	Indicators whose score and ranking both declined from 2018 to 2019*
Ranking in the Global Competitiveness Index	40/141	38/140	-2	—
Indicator pillars				—
Institution	67/141	60/140	-7	<ul style="list-style-type: none"> • Social capital • Judicial independence • Incidence of corruption
Infrastructure	71/141	60/140	-11	<ul style="list-style-type: none"> • Efficiency of seaport services • Reliability of water supply • Exposure to unsafe drinking water • Railroad density

Indicator	Ranking in 2019	Ranking in 2018	Change in ranking from 2018 to 2019	Indicators whose score and ranking both declined from 2018 to 2019*
ICT adoption	62/141	64/140	+2	—
Macroeconomic stability	43/141	48/140	+5	—
Health	38/141	42/140	+4	—
Skills	73/141	66/140	-7	<ul style="list-style-type: none"> • Mean of schooling years • Skillset of graduates • Digital skills of active population
Product market	84/141	92/140	+8	<ul style="list-style-type: none"> • Competition in services • Prevalence of non-tariff barriers • Complexity of tariffs
Labor market	46/141	44/140	-2	<ul style="list-style-type: none"> • Flexibility of wage determination • Workers' rights • Internal labor mobility • Reliance on professional management
Financial system	16/141	14/140	-2	<ul style="list-style-type: none"> • Financing of SMEs • Non-performing loans % of gross total loans
Market size	18/141	18/140	—	—
Business dynamism	21/141	23/140	+2	—
Innovation capability	50/141	51/140	+1	<ul style="list-style-type: none"> • Growth of innovative companies

* Only indicators which were both in the index of 2018 and 2019 were included in this table

Note: Cells in gray are the pillars which had a decline in ranking

Sources: WEF, *The Global Competitiveness Report 2018* and *The Global Competitiveness Report 2019*, compiled by the research team

2. Importance of global economic and trade system

(1) Actively deploying trade agreement networks with other countries/regions to work with foreign capital and give full play to the benefits of existing FTAs/RTAs

In addition to supporting the multilateral system, Thailand's foreign trade policy also actively promotes the signing of free trade agreements (FTAs) and regional trade agreements (RTAs) with other countries/regions. The negotiation and signing of these agreements will not only help Thailand better access the markets of other member

countries, but also present positive benefits in promoting Thailand's integration into global value chains with appropriate rules of origin⁴. At present, Thailand has a total of 14 FTAs/RTAs in effect, covering most countries in Southeast Asia, as well as countries in the southern hemisphere such as Australia and New Zealand (see Table 1-4), and is negotiating and signing bilateral free trade agreements with countries such as Pakistan, Turkey, and Sri Lanka. In addition, Thailand has also actively performed domestic procedure reforms since 2019, and will start negotiations on the signing of a free trade agreement with the European Union and the European Free Trade Association (EFTA)⁵, suggesting an opportunity for Thailand to extend its trade agreement network to Europe. It is also noteworthy that the Regional Comprehensive Economic Partnership (RCEP) was officially signed on November 15, 2020. After conditions are met (i.e. at least six ASEAN member states and three non-ASEAN signatory states have submitted the approval letter), the trade pact will officially enter into force. Then, as a member, Thailand will have direct access to the enormous RCEP market with a population of 2.2 billion and a GDP of approximately US\$26.2 trillion.

A complete external FTA/RTA network can enhance the radiation effect of Thai products to other countries and thus increase the attraction of foreign investment in Thailand. In addition to local enterprises, if Thailand can also reduce investment barriers for Taiwanese and other foreign businesses, local business environments will be further improved. Under such circumstances, the influx of foreign capital to exert existing FTA/RTA benefits is expected to further facilitate the exportation of Thai products. In particular, Thailand's tourism industry has been severely impacted by the pandemic. Hence, exports are instead an important driving force to support domestic economic growth. In addition, export sales has been one of the main goals of Taiwanese businesses investing in Thailand, and this highlights how important it may be for the Thai government to work with Taiwanese companies to leverage the existing FTA/RTA networks and thus enhance Thailand's export potential at this stage.

⁴ Hayakaw, K, N. Laksanapanyakul and T. Matsuura (2019), "Do regional trade agreements really help global value chains develop? Evidence from Thailand," *ERIA Discussion Paper Series*, No. 325.

⁵ *WTO Trade Policy Review: Thailand*. WT/TPR/G/400/Rev.1.

Table 1-4 Overview of FTAs/RTAs signed by Thailand

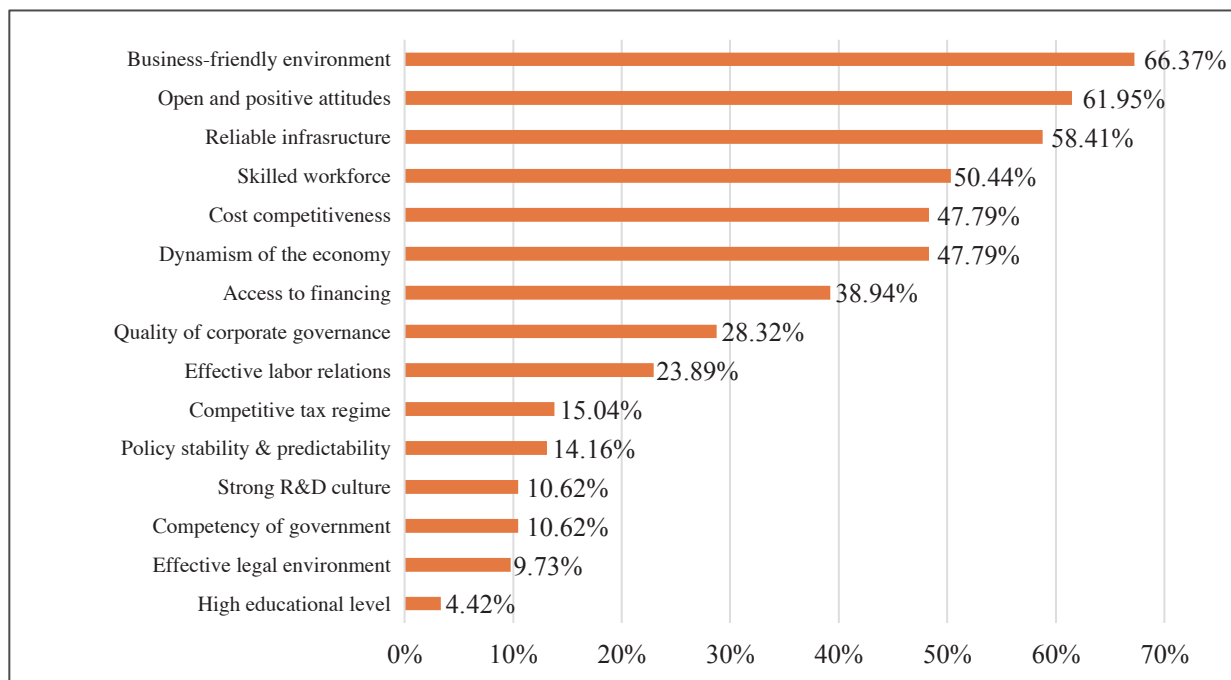
Status	Type of Agreement	Name of the FTA	Date of Signing/Taking Effect
In Effect	Bilateral	Thailand-Australia	January 1, 2005
		Thailand-Chile	September 5, 2015
		Thailand-Laos	June 20, 1991
		Thailand-New Zealand	July 1, 2005
		Thailand-Japan	November 1, 2007
		Thailand-Peru (Early Harvest Program)	December 31, 2011 (goods)
		Thailand-India (Early Harvest Program)	September 1, 2004 (goods)
	Regional	ASEAN	January 1, 1993 (goods) April 30, 1999 (service) June 21, 1999 (investment)
		ASEAN-China	July 20, 2005 (goods) July 1, 2007 (service) February 15, 2010 (investment)
		ASEAN-Japan	June 1, 2009 (goods)
		ASEAN-S. Korea	June 1, 2009 (service) October 1, 2009 (goods) October 31, 2009 (investment)
		ASEAN-New Zealand & Australia	March 12, 2010
		ASEAN-India	January 1, 2010 (goods) July 1, 2015 (service)
		ASEAN-Hong Kong	June 11, 2019
Signed	Bilateral	Thailand-Bahrain	December 29, 2002 (framework of agreement signed, negotiations currently suspended)
	Regional	Regional Comprehensive Economic Partnership (RCEP)	November 15, 2020

Source: WTO, *Trade Policy Review: Thailand* (WT/TPR/G/400/Rev.1), compiled by the research team

(2) Thailand's open investment environment makes it an important investment target for foreign businesses in the Asia-Pacific region

Thailand has always been a key target for foreign investment in the Asia-Pacific region. Among the 10 ASEAN countries, Thailand ranks 5th in terms of the inward foreign direct investment accumulated in the decade, with a cumulative investment

amount of more than US\$80 billion, which is only outperformed by Singapore, Indonesia, Vietnam, and Malaysia⁶. According to the *IMD World Competitiveness Yearbook*, Thailand's friendly, open, and positive business environment is an important factor in attracting foreign investment (see Figure 1-2), indicating that the degree of economic freedom in Thailand has been continuously improved and a free and open investment environment has been created. In other words, the Thai government can certainly attract more foreign investment by ensuring the continuous improvement of the investment environment.



Note: The results presented in this figure are based on a survey conducted by IMD on senior executives in Thailand. Respondents selected the top five factors (out of a total of 15) which they think make Thailand an attractive investment target.

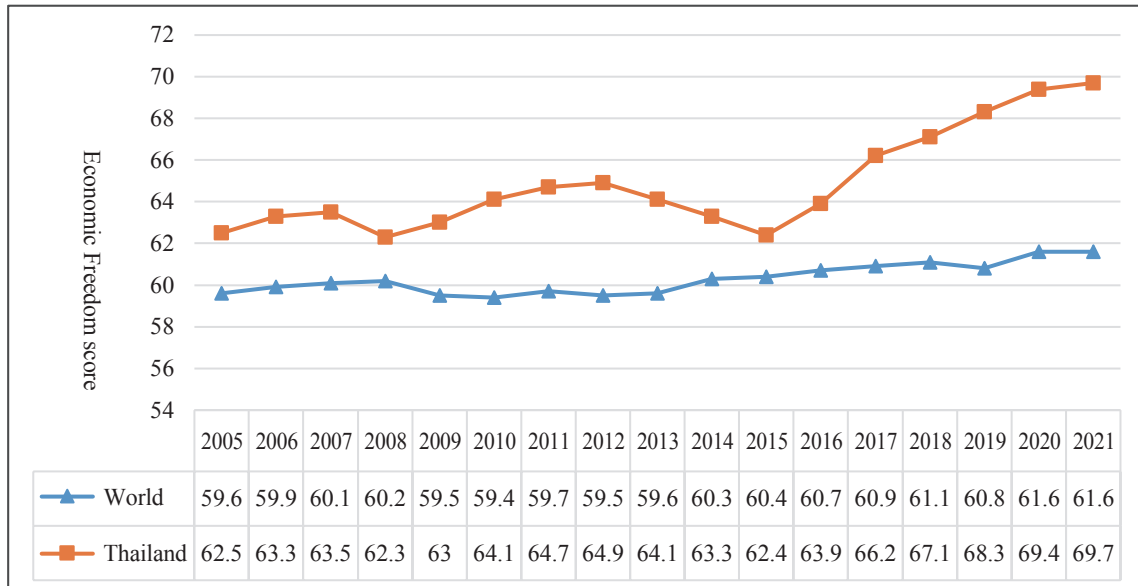
Source: IMD, *IMD World Competitiveness Yearbook 2021*, compiled by the research team

Figure 1-2 Key factors of attraction in the investment environment of Thailand

In recent years, under the active reform of the Thai government, economic freedom in Thailand has continued to improve. According to the data of the Index of Economic Freedom published by the Heritage Foundation in the U.S., Thailand's overall economic freedom has improved significantly since 2015, and its performance is much higher than the world average (see Figure 1-3). In 2021, Thailand's economic freedom ranked 42nd among the 178 economies in the world which were rated, with

⁶ ASEANStatsDataPortal, <https://data.aseanstats.org/>.

a score of 69.7 points, showing an increase of 0.3 points from 2020. This result is higher than the global average of 61.6 points, and a record high for Thailand in the past decade. According to such data, Thailand was classified in the “moderately free” group in 2021⁷.



Source: Heritage Foundation: 2021 Index of Economic Freedom, compiled by the research team

Figure 1-3 Trends of economic freedom in Thailand from 2005 to 2021

Although Thailand has made significant progress in improving its economic freedom, there is still room for improvement compared to the “mostly free” and “free” countries. Table 1-5 below summarizes the four areas of Thailand’s economic freedom index (i.e. rule of law, government size, regulatory efficiency, and open markets) and its 12 indicators for evaluation. As shown in the table, among the 12 indicators, nine indicators in 2021 have improved compared to 2020, three have remained the same, and one (trade freedom) has regressed, which implied that tariff rates and non-tariff trade barriers in Thailand interfered with the free flow of trade, which would directly affect citizens’ pursuit of economic goals and prevent them from maximizing productivity, and thus distort domestic production and the allocation of resources. On the other hand, nine of the 12 indicators of Thailand’s economic freedom in 2021 are higher than the global average, highlighting the achievements of the Thai government in moving towards the goal of economic liberalization, but the other three indicators (i.e. government integrity, monetary freedom, and investment

⁷ Heritage Foundation: 2021 Index of Economic Freedom, https://www.heritage.org/index/pdf/2021/countries/2021_IndexofEconomicFreedom-Thailand.pdf.

freedom) are still lower than the global average. In order to further improve economic freedom, the Thai government may conduct research to gain an in-depth understanding so that authorities concerned may take measures to improve the above-mentioned indicators which have regressed or are lower than the global average. If authorities concerned can cooperate with Taiwanese businesses and other foreign businesses in Thailand to carry out relevant reforms, Thailand will be expected to make significant breakthroughs in economic freedom and hence attract more foreign capital.

Table 1-5 Overall performance of Thailand's economic freedom indicators

Unit: million baht

Area	Indicator	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Global Average in 2021	Change from 2020 to 2021	Comparison Between Thailand's Data and the Global Average in 2021
Overall Score		64.9	64.1	63.3	62.4	63.9	66.2	67.1	68.3	69.4	69.7	61.6	0.3	higher
Rule of Law	Property Rights	45	45	45	40	40	51.3	48.6	53.7	59.5	60	53.6	0.5	higher
	Government Integrity	35	34	33.6	35	38	40.7	34.7	36.4	43.4	45.1	45.4	1.7	lower
	Judicial Effectiveness	—	—	—	—	—	41.7	45.3	45.9	48	48.1	45.9	0.1	higher
Government Size	Tax Burden	75.1	78.9	79.7	81.5	81.1	81	81.3	81.3	80.7	81.5	78.2	0.8	higher
	Government Spending	87.5	83.7	83.6	81.4	82.2	85.3	85.5	85.8	85.9	86	69.4	0.1	higher
	Fiscal Health	—	—	—	—	—	96.3	96.4	96.5	96.4	96.4	74.2	the same	higher
Regulatory Efficiency	Business Freedom	72.5	73.2	71.4	72.5	76.3	69.9	77.2	82.5	83	85.3	63.2	2.3	higher
	Labor Freedom	79	72.9	61.6	63.5	62.5	62.8	62.6	63.9	63.7	64.3	59.5	0.6	higher
	Monetary Freedom	69.3	68.3	68.6	69.9	70.9	72.9	75.5	75.2	74	74.4	76	0.4	lower
Open Markets	Trade Freedom	75.2	75.2	75	75.4	77.6	82.8	83.1	83	83	80	71.1	-3	higher
	Investment Freedom	40	40	45	45	50	50	55	55	55	55	57.7	the same	lower
	Financial Freedom	70	70	70	60	60	60	60	60	60	60	48.8	the same	higher

Source: Heritage Foundation: 2021 Index of Economic Freedom, compiled by the research team

III. Trends in Taiwan-Thailand Trade and Investment and the Contribution of Taiwanese Investments to Thailand

1. Trends in Taiwan-Thailand trade and investment

(1) Overview of trade between Taiwan and Thailand

a. Taiwan-Thailand import and export trade remains stable

Figure 1-4 shows the general statistics of imports and exports between Thailand and Taiwan from 2011 to 2020. From trends in the past decade, it can be observed that there is no obvious fluctuation in Thailand's imports from and exports to Taiwan, with only slight fluctuations or signs of steady growth or decline. The export value is approximately US\$3.3-4 billion, and the import value is US\$7.2-8.7 billion. Thailand's trade deficit with Taiwan over these years has remained at approximately US\$4 billion. In 2012, the trade deficit reached approximately US\$4.8 billion, the highest amount in the past decade. In 2020, Thailand's trade deficit with Taiwan was US\$4.5 billion, showing an increase of US\$350 million compared with that in 2019.

However, as shown in the figure, it can also be observed that the lowest point of Taiwan-Thailand import and export trade in the past decade occurred in 2016, when Thailand announced the Thailand 4.0 national development plan, which aims to promote the development of the manufacturing industry and the value chain, transforming the country's economy through technology and innovation. On the other hand, Taiwan also started to actively implement the New Southbound Policy in the same year to promote and expand two-way exchanges of trade, investment, tourism, culture, and personnel with Southeast Asian countries. After 2017, Thailand's export value to Taiwan remained at roughly US\$3.9 billion, with its import value from Taiwan at more than US\$8 billion. From such data, it is likely that the promotion and complementary nature of these two policies have served as one of the important keys to the bilateral economic interaction between Taiwan and Thailand.

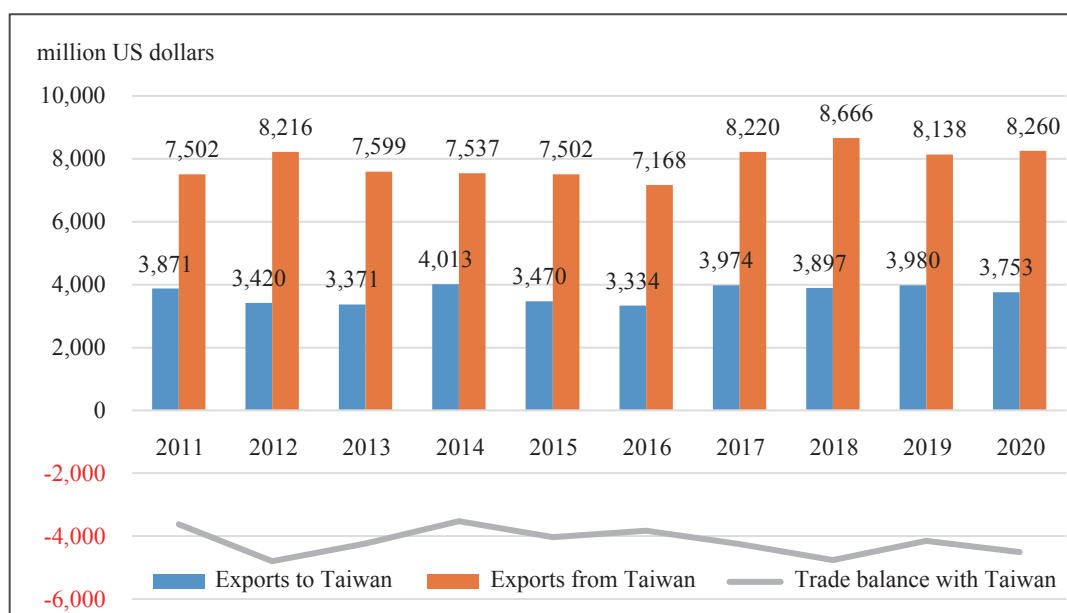


Figure 1-4 Overview of import and export trade between Thailand and Taiwan from 2011 to 2020

b. Thailand's imports from Taiwan are mainly electronic/electrical equipment

In the past decade, there has been little change in the top 10 industries of imports from Taiwan to Thailand, but the structural proportions have slightly changed, focusing more on electronic/electrical equipment. Take 2016 and 2020 for example. Table 1-6 below shows the top 10 industries of imports from Taiwan to Thailand and their respective value, structural proportion, and the proportion of such industries in the total imports of similar industries in Thailand. In 2016, products imported from Taiwan to Thailand were mainly electronic/electrical equipment (HS85), with the import value reaching US\$3.058 billion, accounting for 42.67% of Thailand's imports from Taiwan. This category is followed by mechanical equipment (HS84), steel (HS72), chemicals (HS28-38), and plastics (HS39), accounting for 6-10% of Thailand's imports from Taiwan. The structural proportion of all other categories is lower than 5%. In 2020, the products imported from Taiwan to Thailand were mainly under the same five categories, with an even higher concentration in electronic and electrical equipment at an increased import value at US\$4.782 billion, accounting for 57.89% of Thailand's imports from Taiwan. On the contrary, the import value and structural proportion of the other four categories all decreased compared with the data in 2016. The import proportions of machinery equipment and chemicals dropped to 7.05%

and 5.41% respectively, while the import proportions of plastics and steel products were both lower than 5%.

Table 1-6 Main industries of imports from Taiwan to Thailand

Unit: million US dollars

Rank	Industry	2016			2020		
		Import Value	Structural Proportion	Market Share	Import Value	Structural Proportion	Market Share
	Imports from Taiwan	7,168.32	100.00%	3.66%	8,260.18	100.00%	3.96%
1	Electronic/electrical equipment (HS85)	3,058.48	42.67%	7.94%	4,781.88	57.89%	11.01%
2	Mechanical equipment (HS84)	707.02	9.86%	2.70%	582.65	7.05%	2.24%
3	Chemicals (HS28-38)	551.03	7.69%	3.40%	446.97	5.41%	2.44%
4	Plastics (HS39)	444.26	6.20%	5.53%	410.33	4.97%	4.78%
5	Steel (HS72)	571.52	7.97%	6.00%	381.77	4.62%	4.09%
6	Metal products (HS74-81)	326.20	4.55%	4.86%	300.53	3.64%	3.80%
7	Animals and plants (HS01-14)	250.84	3.50%	2.97%	247.60	3.00%	2.37%
8	Textiles (HS50-60)	343.74	4.80%	10.45%	225.05	2.72%	7.87%
9	Steel products (HS73)	196.92	2.75%	2.90%	217.90	2.64%	3.66%
10	Rubber (HS40)	131.96	1.84%	6.02%	155.55	1.88%	6.37%
-	Others	586.36	8.18%	0.84%	509.94	6.17%	0.70%

Note: Sorted by the value of imports from Taiwan to Thailand in 2020

Source: ITC trade map

c. Taiwan's imports from Thailand are mainly electronic/electrical equipment and mechanical equipment

In the past decade, there has been a slight change in the top 10 industries of imports from Thailand to Taiwan. The main imported products are still electronic/electrical equipment and mechanical equipment, but the imports of both categories have increased significantly, making Taiwan's imports from Thailand more concentrated. Adjustments can also be observed in the category of imports in other industries. For example, the import value and structural proportion of automobiles and motorcycles have both increased significantly. Take 2016 and 2020 for example. Table 1-7 below shows the top 10 industries of imports from Thailand to Taiwan and their respective value, structural proportion, and the proportion of such industries

in the total imports of similar industries in Taiwan. In 2016, products imported from Thailand to Taiwan were mainly electronic/electrical equipment (HS85) and mechanical equipment (HS84), with the import value reaching US\$951 million and US\$795 million respectively, accounting for 24.92% and 20.83% of Taiwan's imports from Thailand. The two categories are followed by chemicals (HS28-38), processed food (HS15-24), animals and plants (HS01-14), plastics (HS39), and automobiles/motorcycles (HS87). The import value falls between US\$200-300 million, accounting for 5-7% of Taiwan's imports from Thailand. The structural proportion of all other categories is lower than 5%. In 2020, products imported from Thailand to Taiwan were still mainly electronic/electrical equipment and mechanical equipment, with the import value reaching US\$1.335 billion and US\$1.026 billion, respectively. The total proportion of the two in Taiwan's imports from Thailand further increased to 51.71% combined. In other words, Taiwan's imports from Thailand were even more concentrated in these industries. These categories are followed by, in the order of structural proportion, processed food, automobiles/motorcycles, chemicals, animals and plants, and plastics. However, the import value and structural proportion of these categories have changed compared with the data from 2016. Among them, the import value and structural proportion of automobiles/motorcycles have both increased, while the import value and structural proportion of chemicals and plastics have both declined. In addition, the structural proportion of plastics imported fell below 5%.

Table 1-7 Main industries of imports from Thailand to Taiwan

Unit: million US dollars

Rank	Industry	2016			2020		
		Import Value	Structural Proportion	Market Share	Import Value	Structural Proportion	Market Share
	Imports from Thailand	3,818.73	100.00%	1.67%	4,566.20	100.00%	1.59%
1	Electronic/electrical equipment (HS85)	951.49	24.92%	1.63%	1,334.65	29.23%	1.43%
2	Mechanical equipment (HS84)	795.42	20.83%	2.49%	1,026.38	22.48%	2.38%
3	Processed food (HS15-24)	281.35	7.37%	5.70%	332.49	7.28%	6.48%
4	Automobiles/motorcycles (HS87)	191.39	5.01%	2.61%	298.99	6.55%	3.10%
5	Chemicals (HS28-38)	283.40	7.42%	1.13%	273.89	6.00%	1.03%
6	Animals and plants (HS01-14)	210.14	5.50%	2.90%	231.09	5.06%	2.70%
7	Plastics (HS39)	201.72	5.28%	3.13%	200.71	4.40%	2.62%

Rank	Industry	2016			2020		
		Import Value	Structural Proportion	Market Share	Import Value	Structural Proportion	Market Share
8	Rubber (HS40)	152.89	4.00%	13.61%	179.72	3.94%	13.69%
9	Metal products (HS74-81)	116.53	3.05%	1.41%	139.81	3.06%	1.49%
10	Mineral products (HS25-27)	78.43	2.05%	0.22%	76.05	1.67%	0.22%
-	Others	555.98	14.56%	1.29%	472.44	10.35%	0.97%

Note: Sorted by the value of imports from Thailand to Taiwan in 2020

Source: ITC trade map

(2) Overview of Taiwanese businesses' direct investment in Thailand

a. Investment by Taiwanese businesses in Thailand in the past decade is mainly in the industries of electronic component manufacturing, finance and insurance, and electrical equipment manufacturing

The investment by Taiwanese companies in Thailand began in 1962, but before 1982, the annual investment in Thailand had not exceeded US\$1 million. However, not long after, the annual investment in Thailand exceeded US\$100 million for the first time in 1990. Since then, the annual investment by Taiwanese companies in Thailand would mostly exceed US\$10 million, with 2007 and 2015 being the peaks of Taiwan's investment in Thailand, as the investment amounts from both years exceeded US\$700 million. By the end of 2020, Taiwan had invested in a total of 591 deals in Thailand, with the amount reaching US\$4.232 billion. The target industries are mainly finance and insurance (31.39%), electronic component manufacturing (23.13%), and computer, electronic product, and optical product manufacturing (6.17%) (see Figure 1-5).

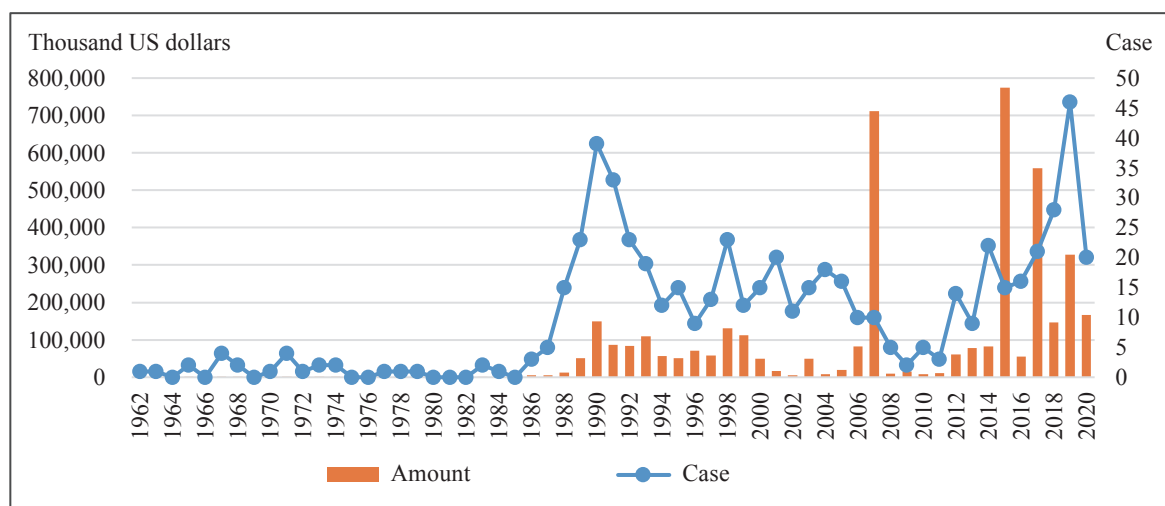


Figure 1-5 Amount and number of Taiwanese investments in Thailand

Observing Taiwan's investment in Thailand in the past decade, the minimum annual investment amounts all exceeded US\$10 million. In 2015, Taiwan's investment amount in Thailand was US\$775 million, which was the peak in recent years. The largest investment in Thailand that year was Gintech Energy Corporation Limited, which invested US\$737 million in Gintech (Thailand) Limited. 2017 was the second peak of Taiwan's investment in Thailand in recent years. The largest investment that year was China Trust Commercial Bank's application for remittance of approximately US\$471 million for equity participation in the LH Financial Group from Thailand. In the past decade, there have been a total of 194 Taiwanese investments in Thailand, with a total amount of US\$2.262 billion, accounting for 1.21% of Taiwan's foreign investment during that period, making Thailand the 11th largest foreign investment destination for Taiwan.

In terms of different industries, Taiwan's investment in Thailand in the past decade has mainly been made in electronic component manufacturing (mainly optoelectronic materials, other related components, and printed circuit boards), with a cumulative investment amount of US\$928 million, accounting for 41.04% of all investments by Taiwan in Thailand. The second highest is the financial and insurance industry (mainly financial holding), with a cumulative investment amount of US\$585 million, accounting for 25.87% of all investments by Taiwan in Thailand. In addition, during this period, Taiwan's investment in the industries of power equipment and manufacturing (mainly batteries and power transmission/distribution machinery) and wholesale/retailing (mainly aquatic product wholesale) has also accumulated a total investment amount of more than US\$100 million, accounting for 5-7% of all investments by Taiwan in Thailand. In addition, the investment by Taiwan in Thailand does not involve the industries of agriculture, forestry, fishery, animal husbandry, or the manufacturing of beverages, tobacco, wooden/bamboo products, printing and data storage media equipment, petroleum/coal products, pharmaceuticals, and medical chemicals. In general, nearly 70% of Taiwan's investment in Thailand is in the manufacturing industry, and electronic components are the focus of such investments, especially the manufacturing of optoelectronic materials and other related components.

b. Taiwanese investment in Thailand in line with Thailand's policies, promoting the development of local industries

From 1959 to the end of 2020, the Thai government approved a total of 2,535 investments from Taiwan, with an accumulated amount of approximately US\$16 billion⁸. According to statistics from the Board of Investment of Thailand, most approved investments by Taiwanese businesses in Thailand in the past five years have been concentrated in industries such as the manufacturing of chemicals, paper, electrical/electronic equipment, metal products, machinery, transportation equipment, etc. In 2020, the approved amount of Taiwan's direct investment in Thailand reached 15.64 billion Thai baht, accounting for 6.20% of all foreign direct investments and being among the top five sources of foreign investments that year (after Japan, China, the Netherlands, and Singapore). Most of Taiwan's direct investments were made in the electrical/electronic equipment industry (76.61%), followed by metal products, machinery, and transportation equipment (9.34%), then light industry and the textile industry (8.22%). Most of Taiwan's investment targets in Thailand are the industries targeted in the investment promotion policies of the Thai government, with an investment amount of 13.12 billion baht. Such investment targets include electrical/electronic products (11.95 billion baht), petrochemicals and chemicals (370 million baht), medical care (330 million baht), automobiles and components (280 million baht), agriculture and processed food (150 million baht), digital products (50 million baht), etc. Approved investment projects by Taiwanese businesses in Thailand plan to use local raw materials at the approximate worth of 39.24 billion baht, mainly in industries such as metal products, machinery, and transportation equipment (82.56%), followed by electrical/electronic equipment (11.22%), and then light industry and the textile industry (3.01%)⁹, which is expected to drive the development of these local industries (see Table 1-8).

⁸ The statistics accumulated up to 2019 are from the 2020 profile of Thailand's investment environment compiled and printed by the Department of Investment Services, Ministry of Economic Affairs, Taiwan. The investment statistics in 2020 are from the official website of the Board of Investment of Thailand. The Thai baht is converted to US dollars at an exchange rate of 0.03.

⁹ Thailand Foreign Direct Investment Report 2020. https://www.boi.go.th/upload/content/2563_6082a4cb538c1.pdf

Table 1-8 Approved investments by Taiwanese businesses in Thailand

Unit: million baht

Industry	2016		2017		2018		2019		2020		In the past five years	
	Amount	Proportion	Amount	Proportion	Amount	Proportion	Amount	Proportion	Amount	Proportion	Amount	Proportion
Agriculture and processed food	2,000	24.90	421	8.84	819	10.91	2,038	7.18	147	0.94	5,425	8.43
Mineral products and ceramics	10	0.12	470	9.86	520	6.93	22	0.08	80	0.51	1,102	1.71
Light industry and textile industry	140	1.74	0	0.00	252	3.35	316	1.11	1,286	8.22	1,994	3.10
Metal products, machinery, and transportation equipment	1,910	23.78	1,911	40.10	3,540	47.17	2,065	7.28	1,461	9.34	10,888	16.93
Electrical/electronic equipment	3,544	44.12	335	7.03	634	8.45	3,871	13.64	11,999	76.71	20,383	31.69
Chemicals and paper	153	1.90	1,285	26.96	431	5.74	19,970	70.36	613	3.92	22,451	34.90
Services	276	3.43	343	7.21	1,309	17.44	99	0.35	56	0.36	2,084	3.24
Technology and innovation	-	-	-	-	0	0.00	0	0.00	0	0.00	0	0.00
Total	8,032	100	4,765	100	7,505	100	28,382	100	15,642	100	64,326	100

Source: Board of Investment of Thailand

It is worth noting that the statistics of the Investment Commission (under the Ministry of Economic Affairs of Taiwan) only include the approved investments of Taiwanese companies in Thailand, and that does not include investments which are made by Taiwanese companies but not reported to the Commission, nor does it include investments made in Thailand by Taiwanese companies through third places (e.g. the Cayman Islands, Singapore, China, etc.), so the statistics may not reflect the full picture of investment made by Taiwanese companies in Thailand. According to the statistics of the Taiwanese Investment Commission, the total investment amount of Taiwanese businesses in Thailand has reached approximately US\$4.2 billion. However, according to the statistics of the Board of Investment of Thailand, the cumulative amount of approved investment by Taiwan in Thailand has reached

approximately US\$16 billion—a difference of more than US\$10 billion. In addition, because many Taiwanese companies or factories in Thailand are registered under the name of Thai co-owners, or because the Taiwanese owners have less than 50% of the equity, these companies may not be listed as Taiwanese businesses. It is conservatively estimated that there are at least 5,000 Taiwanese businesses in Thailand. Hence, the statistics from the Taiwanese Investment Commission and the Board of Investment of Thailand may have both underestimated the economic influence of Taiwanese businesses in Thailand.

c. Taiwanese investments in Thailand: Shifting from low-cost production to local domestic consumption

In the 1990s, Taiwan implemented the Southern Policy as a strategy to assist Taiwanese businesses in their overseas investment prospects, diversify the risk of excessive investment concentration, and encourage Taiwanese businesses to invest in Southeast Asian countries. The Southern Policy has also contributed to industrial construction and development in Southeast Asian countries and invigorated local economies. In 2016, the Taiwanese government implemented the New Southbound Policy, which is different from the Southern Policy, which positioned Southeast Asia as a production base for international division of labor. Instead, the New Southbound Policy seeks to integrate the supply chain with these countries and establish strategic partnerships based on economic/trade cooperation, talent exchange, resource sharing, and regional integration. In addition to continuously expanding production capacity in the machinery, electronics, and automobile industries, Taiwanese businesses also exhibit a clear trend of growth in the investment in Thailand's finance, telecommunications, e-commerce, and medical service industries. In terms of investment history, the prospects of Taiwanese businesses in ASEAN countries have gradually shifted from treating these countries as low-cost production bases to focusing on the domestic consumer market, which has great potential for growth.

At this stage, the most important factor for Taiwanese investors in Thailand is the demand of the local market, followed by the cost of labor and fixed assets acquisition cost (fixed assets include land, plants, machinery, etc.). In addition, the supply of raw materials in these countries is relatively cheap, and other incentives include local

tax concessions or other measures. Taiwanese businesses may also cooperate with upstream, mid-stream, or downstream manufacturers to relocate, meet customer requirements, enjoy reduced tariff or non-tariff trade barriers, utilize local advanced technology or technical personnel, etc. All these are factors which can incentivize Taiwanese businesses to invest in Thailand¹⁰.

An analysis by Nomura Securities has pointed out that the US-China trade war has prompted affected US companies to seek short-term import substitution and mid-to long-term production line shift. Under such circumstances, Thailand, as a member of ASEAN, is one of the beneficiary countries. Thailand enjoys the agglomeration effect of Japanese businesses, serves as a logistics hub, and owns a complete electronics supply chain. In addition, Thailand has also adopted a series of measures to stimulate investment, such as providing a 50% corporate income tax concession to attract foreign investment. Thus, it may become a choice of supply chain relocation for Taiwanese businesses in the electronics industry.

2. Contribution of Taiwanese investments to Thailand's economic development

(1) Taiwanese investment has facilitated economic development in Thailand and has contributed to industrial transformation and upgrade as well as enhancement of human capital

Southeast Asian countries have abundant natural and human resources as well as large markets. The continuous improvement of their economies and investment environments has attracted the attention of many international investors around the world. Foreign investment is an important driving force for Thailand's economic development. It not only provides a large number of domestic job opportunities and improves productivity, but also helps Thailand's industrial transformation and upgrade via the introduction of advanced technologies. Such improvements also help develop local human capital via talent training. Past research and related literature also confirm that foreign investment has a significant positive impact on Thailand's economic growth, employment, and exportation¹¹. Furthermore, foreign investment

¹⁰ Overseas Community Affairs Council (OCAC), Taiwan (R.O.C.), *2017 Economic Yearbook of Overseas Taiwanese Businesses: Thailand*

¹¹ Anita Maček, Vito Bobek, & Tina Vukasovi (2015), Foreign Direct Investment as a Driver of Economic Development

can capitalize on the raw materials, intermediate goods, and local suppliers of Thailand to carry out the production process from raw materials to final products. In order to meet the needs of the production process, these investments have also helped introduce complex machinery or components that cannot be produced domestically in Thailand. Hence, the injection of foreign capital not only strengthens the development of Thailand's capital-intensive industries, provides a large number of employment opportunities, and promotes the export of the Thai manufacturing industry, but also drives the export of the manufacturing industry of the investing countries to Thailand¹². For example, Taiwan's main investment in Thailand involves electronic component manufacturing, so Thailand's imports from Taiwan are concentrated in the same industry as well.

(2) Taiwanese enterprises' investment layout in Thailand and its contribution to Thailand's economic development

a. Taiwanese enterprises' investment in Thailand's manufacturing industry, building local supply chains, facilitating manufacturing industry exports, creating job opportunities, and turbocharging Thai industry transformation

Electronic components is Taiwanese entrepreneurs' major investment target in the manufacturing industry in Thailand. In terms of Taiwanese entrepreneurs' investment layout in Thailand's electronic manufacturing industry, the most representative Taiwanese electronic manufacturing enterprises are located in central and eastern Thailand, including Bangkok, Nakhon Pathom, Samut Sakhon, Phra Nakhon Si Ayutthaya, Pathum Thani, Samut Prakan, Chachoengsao, Chonburi, Rayong, etc.

Taiwanese entrepreneurs' layout has turbocharged Thailand's electronic industry supply chains. As multinational electronic enterprises have had long-term investment in central Thailand, it has been mostly exporting electronics and related components. Since the Thai government passed the Eastern Economic Corridor (EEC) initiative

in Thailand. https://www.researchgate.net/publication/316475368_Foreign_direct_investment_as_a_driver_of_economic_development_in_Thailand

¹² Piya Wongpit (2015), Impact of FDI on manufacturing exports in Thailand. <http://www.freit.org/WorkingPapers/Papers/ForeignInvestment/FREIT517.pdf>

in 2016, it has been planning a corridor of industry clusters from Chachoengsao, Chonburi to Rayong, with electronics-related core industries (including smart electronic and data centers) as another major region and industry of investment for Taiwanese entrepreneurs. With the Thai government's support, we believe we may be able to bring Thailand's economy to the next level.

When it comes to building industrial clusters and supply chains, Taiwanese entrepreneurs have been earnestly helping Thailand's electronic industry with the construction of the supply chain, from upstream supplies and supporting industries (metalworking industries like Jinpao Precision Industry Co., Ltd and Shenmao Technology, chemical enterprises like UNIC Technology Corp, machine tool and molding enterprises like Hwang Cherng Bin Specialty Tools Inc.), mid-stream component industries (passive component companies like Taiwan Chinsan Electronic Industrial Co., Ltd. and Uni-Royal Group; PCB companies such as Chin-Poon Industrial Co Ltd, Apex International Co., Ltd, APCB Inc., Elitegroup Computer Systems, Biostar Microtech International Corp.; electrical connector companies like Pan-International, K.S. Terminals Inc., J.B.T Industrial Co., Ltd., Welltend Group; power supply and battery module companies like Delta Electronics, Inc.; LED component companies like LITE-ON Technology, as well as packaging and printing, components, acoustic components, camera module, memories, etc.) to downstream packaging and system products (electronic manufacturing services like New Kinpo Group, Quanta Computer Inc.; computer related industries such as Acer Group, ASUSTeK Computer Inc., Micro-Star International Co., Ltd., GIGABYTE Technology). From these industries, we could see Taiwanese entrepreneurs' significant contribution to Thailand's export performance¹³, as well as the creation of job opportunities for the locals.

Further, Thailand has been an important manufacturing country for automobile and components among the ASEAN members. Besides providing internal needs for the automobile assembly plants and maintenance, Thailand's automobile component industry is an export-oriented industry. As the Thai government is currently pushing for Industry 4.0, i.e. a next generation scheme in the automobile industry, the electric

¹³ New Southbound electronics industry mapping, by Industry, Science and Technology International Strategy Center (ISTI), Industrial Technology Research Institute, published in December, 2020.

vehicle industry has been regarded as a major industry for potential development. As Taiwanese entrepreneurs possess the expertise for developing electric vehicle components, the automobile industry should be progressing to make high-value automobile parts. As certain enterprises have entered the supply chain of leading automobile plants, Taiwanese entrepreneurs have played an important role in Thailand's automobile supply chain by focusing on mid-stream function modules (steering wheels, headlights, sheet metal parts, tires/rims, motor control/electrical control systems, telematics systems) and downstream integrated systems (engines, car suspension, drivetrain/rolling chassis), which greatly contributed to the building and development of the electric vehicle industry chain in Thailand¹⁴, as well as its export performance and employment.

The Thai government has been promoting two important industrial sectors: electronics and automobiles, which gave rise to the development of local metalworking machinery, technologies, and other related industries. Currently, Thailand has become the largest metal processing and manufacturing base in Southeast Asia, a result that was partly facilitated by Taiwanese entrepreneurs' achievements and hard work.

For example, Taiwan's Jinpao Precision Industry Co., Ltd is the largest customized precision metal processing factory in Southeast Asia. Located in the suburbs of Bangkok, it boasts exceptional technologies such as flexible and smart manufacturing. It has attracted multinational manufacturers from the US, Europe, and Asia to place orders for its high-end products in industries like aerospace, electronics, food processing, medicine, communications, and green energy. As a current supplier of Airbus and Boeing, Jinpao Precision Industry not only strives to have a corporate edge with high-end automation equipment, but has also developed corporate management software via cross-nation collaboration, integrating different systems such as production scheduling, enterprise resource planning, product life cycle management, manufacturing execution, and real-time monitoring, etc. In response to the increasingly complex production model, it has created a smart digital factory and realized Industry 4.0. In other words, Taiwanese entrepreneurs' investment in Thailand has helped connect local supply chains with multinational manufacturers,

¹⁴ New Southbound electronics industry mapping: Thai automobile components, by Industry, Science and Technology International Strategy Center (ISTI), Industrial Technology Research Institute, published in December, 2018.

and driven the transformation of Thai industries via the introduction of advanced technologies.¹⁵

b. The incorporation of Taiwanese technology into startup industry, realizing Thailand's digital innovation policy

Since the Thai government proposed the digital innovation policy “Thailand 4.0” in 2016, it has been pushing for labor-intensive industries to transform into high-value and innovative smart industries, thereby leading to the flourishing startup industries. According to the 2020 Global Innovation Index, Thailand's development in the innovation industry ranked 44 out of 131 countries in the world. Ranking 7th in Asia, it only falls behind Singapore (8th in the world), Korea (10th), Hong Kong (11th), China (14th), Japan (16th), and Vietnam (42nd).¹⁶

The major advantages that Taiwanese startup teams bring to Thailand are mainly the exceptional development talents and the integration skills of software and hardware. These corporate teams that intended to explore the Thai market included pesticide spraying drone and drone delivery service enterprises like Aeroprobing Inc., retail AI and analytics service enterprises like SkyREC, e-commerce payment system and related service enterprises like Hyweb Technology Inc., indoor mapping, navigation, and shopping guide service enterprises like Osense, travel service enterprises like KKday, travel and shopping service enterprises like iCarry, etc.¹⁷

Further, Taiwan established the “Thailand and Taiwan Startup Industry Service Platform” in 2018, in the goal of assisting both countries' startup businesses and teams with access, exchange and collaboration with different connections, resources, and information, thereby facilitating the development of startup businesses in Thailand.

c. Promoting vocational education and industrial-academic collaboration, upskilling Thailand's human resources

Human resources is an essential production element in industrial transformation. As Thailand lacks a complete vocational and educational training system, many

¹⁵ Lynn Su (2018), Powering Up: Thailand's Taiwanese Entrepreneurs, Taiwan Panorama Magazine. <https://www.taiwanpanorama.com.tw/Articles/Details?Guid=bff97797-b59f-4bc3-aefd-ab72ce43b12f>

¹⁶ Uniform Lin et al. (2021), Startup in South East Asia: A Look at Thailand's Startup Industry <https://startup101.biz/news/57>

¹⁷ Taiwanese Startup Entrepreneurs: Meeting Local Needs, Anue, <https://news.cnyes.com/news/id/4193849>

enterprises are facing talent shortfall in the technological field. As a result, Taiwanese entrepreneurs' long-term investment in Thailand not only seeks to develop local business management, but also the cultivation of technology talents, helping Thailand with industrial and human resources development. For example, the BDI Group has established Thai-Taiwan (BDI) Technology College. By introducing the collaborative model between industry and academia, BDI has incorporated innovative technologies like 3D, AI, automation, and robotics into its training program, which solidifies Taiwan and Thailand's industrial-academic collaboration in higher education. To promote Thailand 4.0's smart production policy, the Thai-Taiwan (BDI) Technology College has collaborated with 18 enterprises on industrial-academic collaboration projects regarding specialization training and nurturing exceptional talents for Taiwanese and Thai enterprises.

The Delta Electronics, Inc. has also signed industrial-academic collaboration projects with several Thai universities, which included the donation of Delta IA Lab to Chulalongkorn University and the establishment of the Delta IA Academy, all of which are to assist Thailand with the fostering of a new generation of talents for enterprises and technologies.

In addition, Taiwan and Thailand also established the Thailand Taiwan AI College (TTAIC) in 2020. With Taiwan's two major advantages in the AI industry: skilled talents and complete industry chain, the college could not only serve to introduce Taiwan's AI technology, but also foster local AI talents to meet the needs of local Thai enterprises that are seeking digital transformation, and strengthen the connections of Taiwan's startup businesses with local industries.

IV. The US-China Trade War and COVID-19 Pandemic's Impact on Taiwan-Thailand Economic Collaboration

1. The US-China trade war

(1) Impact on Thailand

The US-China trade war has sent tremors through the world economy since 2018. In short, the US has reduced its reliance on Chinese goods, and increased its

reliance on other nations for goods, thereby benefiting such nations. In fact, in the current global supply chain, many Asian countries have been exporting intermediate goods like chips and monitors to China, where they are assembled and made into cell phones and laptops. Since the US-China trade war has disrupted these supply chains to decrease production, it has caused negative impacts to the economies of those countries which have been exporting to China.¹⁸

For Thailand, the trade war's negative impact on the nation are as follows: 1) supply chain disruption due to the US-China trade war; 2) decrease in tourism demand and exports to Thailand because of the slowdown in Chinese economy; 3) escalating trade war between China and the United States has spilled over into finance and technology.

On the other hand, the positive impact on Thailand are as follows: 1) part of the production capacity has been transferred to Thailand; 2) forming of new supply chain relationships with other nations which might benefit from the transfer of production capacity in the trade war other than China; 3) the growth of economies of those countries which have benefited from the trade war, thus increasing tourism demand and exports to Thailand; 4) entrepreneurs move investments in products that have been influenced by China's tariff policy back to Thailand; 5) entrepreneurs move investments in products that have been influenced by China's tariff policy to other substitute countries. According to research analysis, the trade war's negative impact outweighs the positive on Thailand's economy.¹⁹

Since the trade war has brought about uncertainties to the global economy, leading multinational enterprises have slowed down production and decreased investment spending while waiting for the war to play out. This situation has dealt a blow to the manufacturing industry in Thailand, especially on the export-oriented businesses or high overtime industries, which had to deal with issues like production decline or layoff during the first five months in 2019.

In addition, the trade war has wreaked havoc on nations which have close supply

¹⁸ Wu Hui-chen (June 21, 2018) China-US Trade War: Exporting "Intermediate Goods" and its Negative Impact on Asian Economy <https://www.chinatimes.com/newspapers/20180621001145-260203?chdtv>

¹⁹ Comments on Impacts of the U.S.-China Trade War on ASEAN: Case of Thailand, MIT Press Direct, December 01 2019, <https://direct.mit.edu/asep/article/18/3/190/17315/Comments-on-Impacts-of-the-U-S-China-Trade-War-on>

chain collaborations with China. Although Thailand has benefited from the transfer of orders and increased its export to the US, its gross exports in the initial stage of the war has actually dropped. Further, China has been exporting goods that were originally for the US to other markets. Facing tough competition from China with its dumping of cheap products, local Thai enterprises have suffered in terms of revenue and corporate performance as well.²⁰

To mitigate the impact of the trade war, foreign entrepreneurs in China have left in pursuit of substitute countries. As a result, as the ASEAN members and India became favorable options for investors, various nations have proposed preferential tax rate and investment plans to attract foreign investment. Under such circumstances, Vietnam, with its abundant and cheap labor supply, has been regarded as the champion in this war, while some consider Thailand the biggest beneficiary. In fact, a percentage of foreign entrepreneurs who left China have been Japanese entrepreneurs. As the biggest source of direct foreign investment in Thailand, Japanese manufacturers have been exporting Thai-made automobile components and electronic components to the US, allowing Thailand to benefit from the war.²¹

However, some critics believe that while Vietnam may seem like the biggest beneficiary in the short term, as its labor market becomes tighter, entrepreneurs are now transferring the production lines to other Asian countries. As Vietnam's trade deficit towards US continues to widen, the US might impose similar trade war measures on Vietnam. Consequently, investors have come to regard Thailand as an option.²²

(2) Impact on Taiwanese entrepreneurs in Thailand

The following figures show the impact of the trade war on Taiwanese entrepreneurs' investment in Thailand. The results are based on Chung-Hua Institution for Economic Research's WTO and RTA surveys, conducted from August 6 to August 20 in 2021. The institution received 47 responses, and there were 45 valid samples left after omitting overlapping answers.

²⁰ The U.S.-China trade war: Implications on the global economy and Thailand, Monetary Policy Report, Monetary Policy Report, June 2019, chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.bot.or.th%2FEnglish%2FMonetaryPolicy%2FMonetPolicyComittee%2FMMPR%2FBOX_MRP%2FBOX1Chinatradewar_EN_June2019.pdf&cldn=521122

²¹ Liberty Times (Nov. 5, 2019) Not Vietnam! Standard Chartered: Thailand as the Biggest Beneficiary <https://ec.ltn.com.tw/article/breakingnews/2967742>

²² Anue, the US-China Trade War: Investors Turn to Thailand <https://news.cnyes.com/news/id/4372323s>

a. Overall impact on investment

Figure 1-6 shows the impact of the trade war on Taiwanese entrepreneurs' investment in Thailand. 21 entrepreneurs (46.67%) stated that they increased investment in Thailand, 2 entrepreneurs (4.44%) stated that they decreased investment, while 22 entrepreneurs (48.89%) stated that there were no changes to their investments.

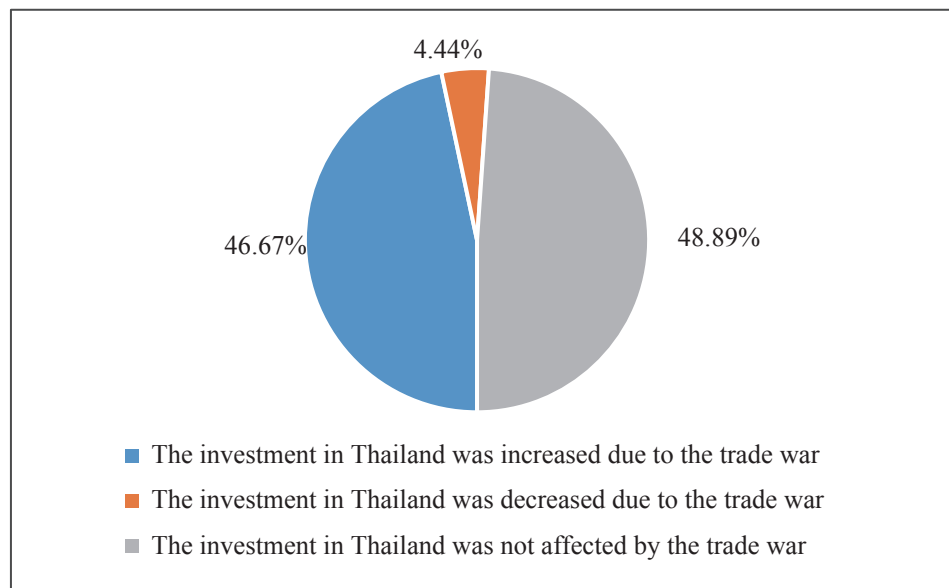


Figure 1-6 The impact of the trade war on Taiwanese entrepreneurs' investment in Thailand

b. Reasons for increasing investment

Figure 1-7 shows the reasons why the 21 entrepreneurs have increased their investments in Thailand. There were 15 (71.43%) entrepreneurs who stated it was out of the request of their clients, 12 (57.14%) entrepreneurs stated it was the transfer of production capacity, 8 (38.10%) stated it was to boost production, 3 (14.29%) stated it was due to lower labor costs, while 2 (9.52%) said it was low cost in land. Other options, such as transparent policies and regulations, preferential tax rate provided by the Thai government were not among the entrepreneurs' considerations.

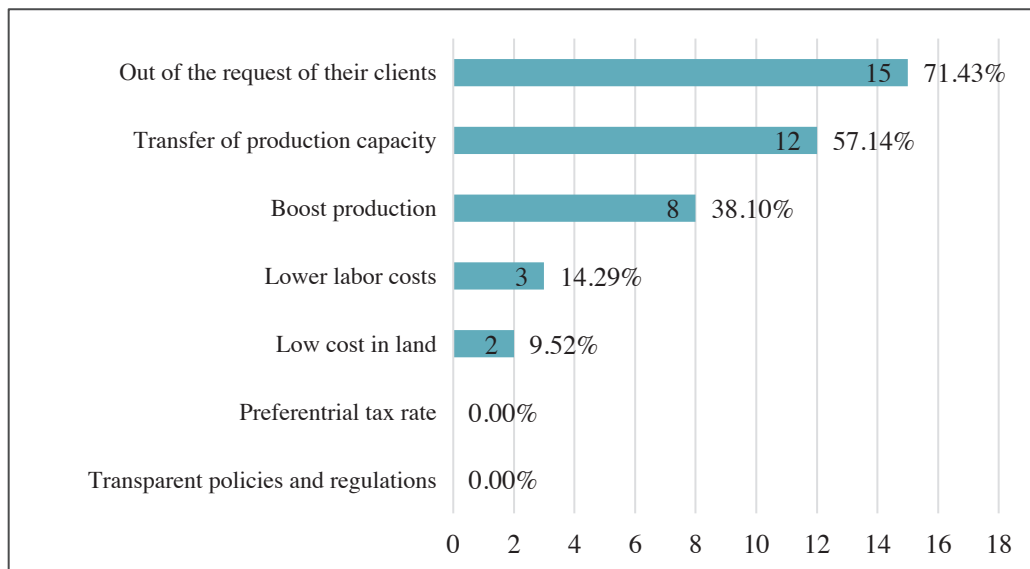


Figure 1-7 Reasons why Taiwanese entrepreneurs increased their investments in Thailand

2. The COVID-19 pandemic

(1) Impact on Thailand

Although Thailand has successfully curbed the COVID-19 pandemic with strict measures in 2020, local businesses and tourism have suffered greatly. Even though Thailand has benefited from the transfer of orders from China in the beginning of the pandemic, orders have resumed back to normal after China put a stop to the pandemic. After Thailand imposed lockdown to control the pandemic in the second quarter, it has gradually lifted its ban on economic restrictions in the third quarter. Even though the pandemic was still under control in the first quarter in 2021, its tourism industry has not been rejuvenated due to the ever-fluctuating pandemic situation worldwide. However, as Western countries have achieved high vaccine coverage rates, Thailand has been able to increase its export due to the rebounding economy in the western countries, enabling its economy to remain on the rise.

Nevertheless, Thailand's tourism industry has been forced to a halt again as COVID-19 confirmed cases spiked in the second quarter. The Bank of Thailand (BOT) has also lowered its economic growth forecast from 3% to 1.8%. Currently, as Thailand's economy continues to take a heavy toll due to the COVID-19 pandemic, the Thai government should consider prioritizing promoting pandemic prevention

measures and vaccine coverage rates, or foreign entrepreneurs may still have qualms about investing in Thailand.²³ According to the respondents in this survey, some entrepreneurs have moved their production lines to Thailand at the beginning of the US-China trade war, but moved their production lines back to China when the pandemic started to escalate in Thailand.

Although the COVID-19 pandemic has brought uncertainties to foreign investment in Thailand, there were respondents who stated that they saw limited impact on their investment and production from the latest outbreak in Thailand in the long run. It was because the COVID-19 pandemic is a global and temporary event, not a phenomenon unique to Thailand. Therefore, when choosing countries to invest, entrepreneurs would still be taking into account investment incentives as major investment considerations in the long run.

In addition, in terms of production, the Thai government would not force manufacturers to suspend production. As long as the factories follow pandemic prevention measures and adopt the Thai government's Bubble and Seal pandemic prevention policy, the Thai government will not interfere with the running of the factory. In conclusion, the COVID-19 pandemic has dealt a massive blow to Thailand's economy. However, as the world enters the post-COVID-19 era – where humans need to coexist with the virus – the pandemic's negative impact will gradually lessen over time. In the long run, the domestic investment environment and related investment incentives remain the decisive factors for the investors.

(2) Impact on Taiwanese entrepreneurs in Thailand

The following figures show the impact of the COVID-19 pandemic on Taiwanese entrepreneurs' investment in Thailand. The results are based on Chung-Hua Institution for Economic Research's WTO and RTA surveys, conducted from August 6 to August 20 in 2021. The institution received 47 responses, and there were 45 valid samples left after omitting overlapping answers.

a. Overall impact on investment

The results in Figure 1-8 show that among the 45 Taiwanese entrepreneurs who

²³ Taipei Economic and Cultural Office in Thailand. Thailand Monthly Economic Monitor.

took the survey, 38 (84.44%) respondents stated that their investments in Thailand were affected by the COVID-19 pandemic, while the other 7 (15.56%) stated their investments were not affected by the pandemic. In general, a majority of Taiwanese entrepreneurs' investments were affected by the COVID-19 pandemic.

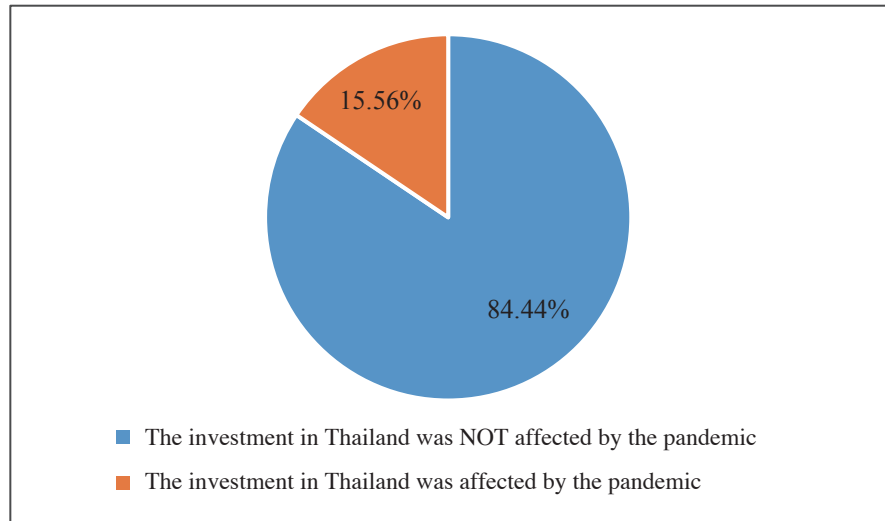


Figure 1-8 The COVID-19 pandemic's impact on Taiwanese entrepreneurs' investments in Thailand

b. Level of impact on the Taiwanese entrepreneurs' investments

The results in Figure 1-9 show that among the 38 Taiwanese entrepreneurs affected by the COVID-19 pandemic, 23 (60.53%) respondents stated a decline in the domestic demand has been the most severe impact brought on by the pandemic. Restriction in personnel movement and delayed delivery or service suspension tied for second place, with 19 (50.00%) respondents stating them as the biggest impact respectively; 16 (42.11%) respondents stated that it was putting new investment plans on hold; 12 (31.58%) respondents stated that it was shortage of raw materials; 11 (28.95%) respondents stated it was financial difficulties; 11 (28.95%) respondents stated it was the suspension of factories and production, while 4 (10.53%) stated it was clients transferring their orders.

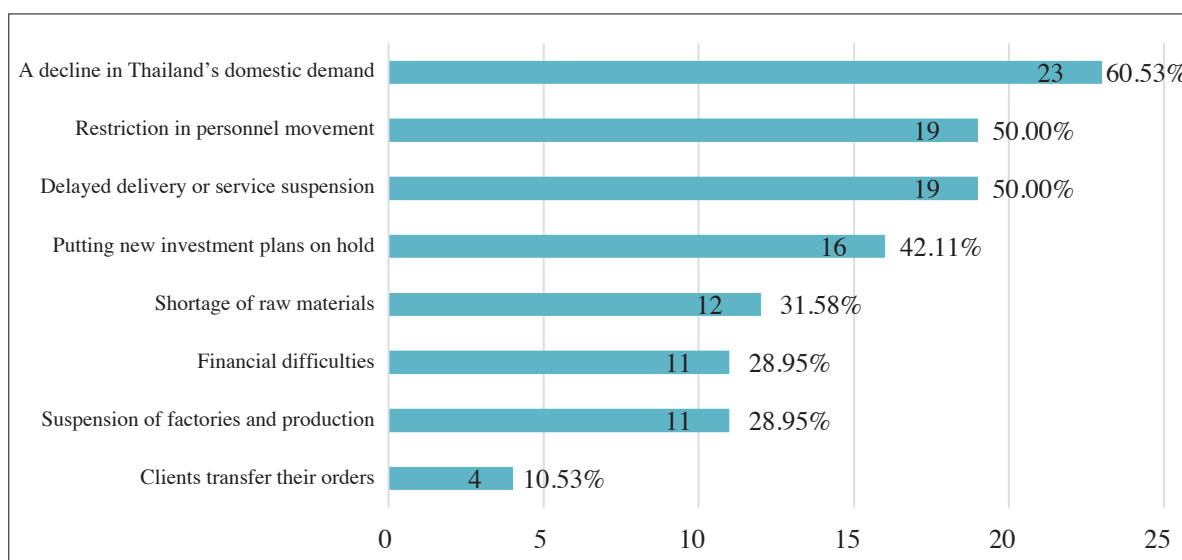


Figure 1-9 Level of impact of the COVID-19 pandemic on the Taiwanese entrepreneurs' investments in Thailand

c. In response to the pandemic, relief measures that the Taiwanese entrepreneurs hope to receive from the Thai government

Figure 1-10 shows the relief measures that the 45 Taiwanese entrepreneurs hope to receive from the Thai government in response to the COVID-19 pandemic. A majority of 30 (66.67%) respondents require tax assistance (tax relief, tax extension), 27 (60.00%) respondents opted for personnel assistance (wages, insurance subsidies) as their most needed relief measure, while 26 (57.78%) respondents stated financing (increase of financial quota or loan extension). 17 (37.78%) respondents wish to see the government provide stimulus plans for their industries, 16 (57.78%) entrepreneurs wish for utility bill subsidies, while 13 (28.89%) entrepreneurs opted for introduction of business opportunities and only one entrepreneur (2.22%) refrained from giving any opinion.

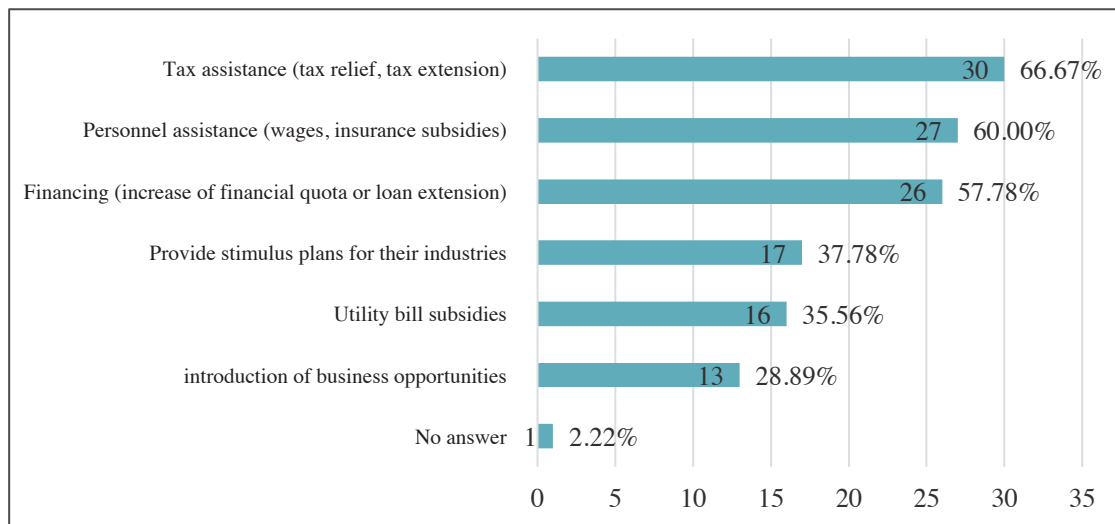


Figure 1-10 Relief measures that Taiwanese entrepreneurs hope to receive from the Thai government in response to the COVID-19 pandemic

3. Opportunities and challenges for Taiwan and Thailand to enhance collaboration amidst the US-China trade war and the COVID-19 pandemic

(1) Opportunities

The US-China trade war, along with the COVID-19 outbreak, have accelerated the restructuring of the global supply chain. With the trade war and the beginning of the COVID-19 outbreak in China, multinational corporations have realized that they have been over-reliant on China that they were seeking to diversify supply chains as to avoid high tariffs or to minimize supply chain disruptions due to the suspension of factories. Thailand's electronic components industry has also suffered from the suspension of Chinese factories last year, leading to a breakdown in supply chains. As a result, the Thai business industry has urged the government to capitalize on the current situation by attracting and encouraging foreign investment in Thailand as supply chains moved out of China during the US-China trade war and the COVID-19 outbreak.

In terms of investment incentives in attracting foreign investment, vice chair of the Federation of Thai Industries (FTI) Kriangkrai Thiennukul pointed out that Thailand and Vietnam are two main countries in the ASEAN members for attracting

investment and business expansion. With an excellent geographic location, Thailand has been the hub of the region, boasting ample infrastructure to support foreign investment. However, Vietnam has a younger and cheaper labor market. To have an upper hand in the competitive market, Thailand should upskill its workforce and prepare for industrial transformation in due course. Thai industrial estate provider Amata CEO Viboon Kromadit said that Thai industries should take advantage of the COVID-19 pandemic to attract those multinational corporations that left China to invest in Thailand. However, compared to neighboring countries such as Vietnam, Thailand's investment incentives (in terms of wages, labor, etc.) are not as enticing. Consequently, the Thai government can propose more specific incentives to attract investors.²⁴ In general, although the Thai government intends to capitalize on the China-US trade war and the COVID-19 pandemic to attract more foreign investment in Thailand, the Thai government's investment incentives leave a considerable room for improvement in the eyes of the industry. It should thus increase its own labor advantages, expand preferential measures, and reduce barriers for foreign investment as to keep foreign investors interested.

Currently, Thailand's investment incentives mainly derive from Thailand 4.0, an idea proposed by Prime Minister Prayuth Chan-Ocha in 2016. The idea was for Thailand to transform from Thailand 1.0's agriculture, 2.0's light industry, 3.0's heavy industry to 4.0's innovation-oriented manufacturing industry. According to the Thailand 4.0 plan, the Thai government will seek to transform five domestic industries with development foundations by introducing foreign capital, technologies and equipment, such as electric vehicles, smart electronics, high-end tourism, agricultural biotechnology, and processed food. In addition, it will also pour in resources to develop five future industries, including: robotics (automation), aviation and logistics, biofuels and biochemistry, digital economy, and medical services.

The Eastern Economic Corridor (EEC) plan proposed by the Thai government in 2017 is a special economic zone²⁵ set to develop the ten key industries proposed in

²⁴ Economic Division, Taipei Economic and Cultural Office in Thailand, Ministry of Economic Affairs (June 18, 2020). Global Supply Chain Transformation: An Opportunity for Thailand. Taiwantrade. <https://info.taiwantrade.com/biznews/%E5%85%A8%E7%90%83%E4%BE%9B%E6%87%89%E9%8F%88%E6%94%B9%E9%80%A0-%E6%B3%B0%E5%9C%8B%E7%9A%84%E6%A9%9F%E6%9C%83-2021715.html>

²⁵ Kao, Chun-I. (Sep. 2018). Thailand's road to industrial transformation. Chung-Hua Institution for Economic Research, *Economic Outlook Bimonthly*, Vol. 180, pp. 105-106.

the Thailand 4.0 plan. The incentives provided by the EEC include corporate income tax exemption for up to 13 years, import duty exemption (import of raw materials or machines for R&D for production and export), financial subsidies (target industries for investment, R&D, innovation or labor development), permission to hold land and lease of state-owned land for up to 50 years, which can be extended for 49 years, 17% of personal income tax (managers, experts, and researchers), one-stop service (One Start One Stop, OSOS) to facilitate investment, and work visa that is valid for up to five years²⁶. In order to attract entrepreneurs affected by the US-China trade war, Thailand passed the Thailand Plus stimulus package in early October 2019, and also set up new investment zones for Taiwan, Japan, South Korea, China, and the United States²⁷, among which Taiwan YAMATO Industrial Estate is an investment zone established by the Thai government in the EEC specifically for Taiwan.²⁸

Based on the aforementioned points, the opportunity for collaboration between Taiwan and Thailand lies in the development of key industries in Thailand 4.0. At the 2021 Taiwan-Thailand Industry Integration Summit Forum held by the Thailand Federation of Labor and Federation of Thai Industries in September this year, five MOUs were signed and an industrial collaboration was achieved and the areas of cooperation include smart city, textile business, food biotechnology, and automation industry.

In terms of smart city: (1) AnaSystem and Thailand's Synergy Technology signed an MOU, where both parties will build business collaboration and practices of AIoT smart environment and flood solutions in Thailand; (2) SIMIS Information Management Co. and Thailand CWTel signed an MOU, where SIMIS Information Management Co would provide relevant Manufacturing Execution System (MES) solutions, and through the collaboration between both parties, they would jointly promote the MES of the Japanese home appliance brand and strengthen collaboration in the smart manufacturing industry in Thailand; (3) Turing Drive and Thailand's Chulalongkorn University collaborated to develop autonomous

²⁶ Invest in Thailand FAQ (May 31, 2021). Invest Taiwan. https://investtaiwan.nat.gov.tw/showBusinessPagechtG_Contract05?lang=cht&search=G_Contract05&menuNum=111

²⁷ Science and Technology Policy and Research Information Center. Thailand launches the Thailand Plus program to attract foreign entrepreneurs and seize the leading position in the trade war. <https://iknow.stpi.narl.org.tw/Post/Read.aspx?PostID=16115>

²⁸ Li Shuilian (March 18, 2020). Thailand-Taiwan Yamato Industrial Estate: Wire Master Industry Co. creates a one-stop service. *Commercial Times*. <https://ctee.com.tw/industrynews/237663.html>

driving and 5G applications; Turing Drive purchased three self-driving buses and sent a technology team to Thailand to pass on the experience, and Chulalongkorn University continued to develop algorithms in autonomous cars and 5G vehicle-to-everything applications, and adopted them to practice and field tests.

In the textile industry, the Taiwan and Thailand textile research institutes signed an MOU to expand collaboration in the testing and assurance of medical textiles, and strengthen and promote partnership between both parties in the development of inspection, assurance, testing, and verification of new opportunities in medical textiles, in order to vie for opportunities to drive the mutual recognition agreement (MRA) between Taiwan and Thailand textile businesses. In regards to food biotechnology, Food Industry Research and Development Institute and the National Food Institute (NFI) of Thailand will renew the previous memorandum this year, working together on further opportunities in the food biotechnology industry chain.

In the automation industry, Taiwan's Accutex Technologies Co., Shieh Yih Machinery Industry Co., 3Egreen, Molding Innovation Technology Co., Coretech System Co. and other smart mechanical system solution companies have teamed up with Thailand's Thai-Taiwan Business Association (TTBA), TGI, Kinzoku Precision, Civilised Cars, PLEXPART, SMARTPLAS, MATSUI, SODICK Thailand and other smart manufacturing application companies, jointly establishing the Taiwan-Thai Smart Molding Industrial Collaboration Digital Platform. In response to the current pandemic, individual enterprises are urgently thinking about how to use industrial clusters to form alliances and create smart manufacturing business opportunities in the "New Southbound" region in the post-COVID-19 era.²⁹

From the results of this summit, we learned that most of the collaborations between Taiwan and Thailand lie in technology sharing and joint R&D. After Thailand adopts Taiwan's technology, it will indirectly increase its demand for Taiwan's high-tech products, such as purchasing three self-driving buses from Taiwan for smart city collaboration. If this exchange continues with Taiwan incessantly providing technology and high-tech products in due course, the trade and investment

²⁹ Hsieh Bohong (September 14, 2021). 2021 Taiwan-Thailand Industrial Collaboration Summit: promoting "new normal" collaboration in post COVID-19 era. Economic Daily News. <https://money.udn.com/money/story/5612/5745704>

between Taiwan and Thailand will be even more vigorous, thereby turbocharging Thailand's development of economy and technology.

(2) Challenges

As far as the survey respondents are concerned, the biggest difficulty in moving the supply chain out of China is the movement of the third-party subcontractors. Thousands of chain supply manufacturers that have been in collaboration with large scale corporations in Thailand – such as New Kinpo Group, Delta, Quanta, etc. – have had solid foundations in China for ages. The scale of these third-party subcontractors is normally not big, so the cost of moving these supply chains is costly without the assistance of major enterprises. For example, Quanta has introduced 500 third-party subcontractors to Thailand, but if Quanta were to independently produce laptop computers in Thailand, it must introduce at least 2,000 third-party subcontractors to Thailand. From this example, we can see that the biggest issue that the Taiwanese entrepreneurs face for moving supply chains to Thailand lies in the completeness of industrial clusters. Therefore, in terms of supply chain transfer, in addition to attracting investment from large-scale corporations, the movement of third-party small and medium-sized subcontractors is also essential for the formation of industrial clusters and supply chains. The Thai government may choose to approach the issue by facilitating investment incentives for SMEs and reduce investment barriers for better investment incentives.

As mentioned above, as large-scale Taiwanese enterprises in Thailand have solid foundations, and are closely connected with the Thai government and the Board of Investment of Thailand (BOI), the Thai government may take advantage of these large-scale Taiwanese enterprises to achieve independent R&D and production in Thailand, as well as give Thailand an edge in the global market. On the other hand, for these large-scale Taiwanese enterprises to establish complete supply chains or even industrial chains, it requires the introduction of a large number of SMEs in Thailand. Introducing a large number of Taiwanese SMEs to Thailand not only proves conducive to the formation of an industrial chain with large-scale Taiwanese enterprises, but also provides Thailand with job opportunities, reduces over-reliance on China, increases Thailand's production capacity, and achieves Thailand's goal of self-

sufficiency. This will benefit Thailand in the long run by boosting its national strength and competition in the global market. Therefore, for the long-term development of the country, the Thai government should improve the investment environment and expand investment incentive programs, especially for SMEs, in order to attract more Taiwanese enterprises to move to Thailand for joint development and construction.

Chapter Two Issues that Taiwanese Entrepreneurs Are Concerned With

I. Legal System and Procedural Issues

1. Survey results

This research summarizes the legal system and procedural issues that Taiwanese entrepreneurs that have investment in Thailand may be concerned with, which includes nine related questions. A majority of respondents were of the opinion that the government officials or law enforcement personnel do not necessarily carry out their duties according to the law or have excessive discretion of the administrative agency. 24 out of the 45 respondents agreed to the aforementioned statement, accounting for a total of 53.33%. In terms of other options, among the 45 respondents, 46.67% of the respondents believed that the current regulations were outdated or insufficient; 44.44% believed that the transparency or predictability of policies and regulations has room for improvement, and foreign entrepreneurs lacked access to voice their opinions regarding laws and regulations implemented in Thailand. 42.22% said that certain industrial products' import certification procedures are complicated and time-consuming; 35.56% believed that there is little paperless government services and the official English version of regulations and enforcement rules are relatively insufficient; 24.44% said that some imported products have not met certain standards, leading to the proliferation of other nations' inferior products; only three of the respondents agreed that the requirement for multinational companies to set up data centers in the local area or corporate data must be stored in local servers according to data localization laws and regulations is creating business barriers. In addition, 6.67% (three respondents) of the respondents did not encounter any aforementioned issues related to the legal system and procedural issues when investing in Thailand.

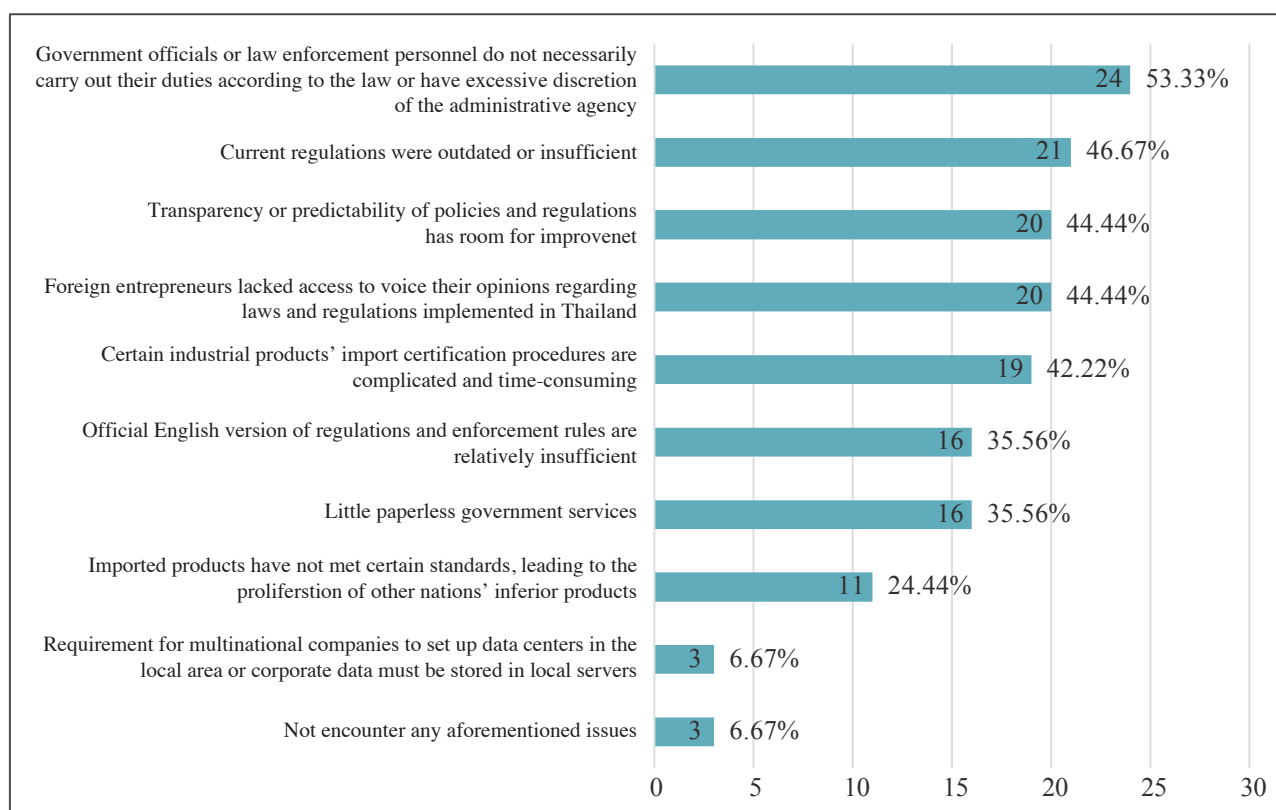


Figure 2-1 Survey results: Legal system and procedural issues that Taiwanese entrepreneurs are concerned with

2. Overall explanations and solutions

(1) Promoting legal reform and reducing the ambiguity of laws and regulations

Explanation and impact of problem

The Thai government actively maintains a regulatory framework that encourages investment, but some foreign entrepreneurs feel that the Thai government lacks consistency and transparency³⁰ in law-making and legal interpretation. According to the survey results, in terms of legal system and procedural issues, the biggest concern for Taiwanese entrepreneurs in Thailand is that the government officials or law enforcement personnel do not necessarily carry out their duties according to the law or have excessive discretion of the administrative agency. The reason for excessive discretion is due to outdated or ambiguous regulations, resulting in administrative or law enforcement personnel's different interpretations. This result shows that the Thai

³⁰ US Department of State (2021), "2021 Investment Climate Statements: Thailand," <https://www.state.gov/reports/2021-investment-climate-statements/thailand>

government still has room for improvement in terms of legal reform and reducing legal ambiguity.

For example, Thailand fully implemented the “Rules, Procedure and Condition for Labels of Alcoholic Beverages” in October 2015, in the goal of preventing children from drinking alcoholic beverages. The catch is the part of the act governing labeling is ambiguous and lacks explicit instructions on what content is allowed or not allowed on the labeling and packaging of alcoholic beverages. Regarding this issue, the Ministry of Public Health and the European Association for Business and Commerce (EABC) discussed the issue of alcohol labeling in February 2016. Both parties agreed that the act and related technical instructions are obscure and therefore difficult to implement, which has proven to be a business barrier for European entrepreneurs in Thailand.

Although Thailand issued a revision of the technical guidelines for the act in April 2017, there has not been much improvement on the issue of ambiguity, resulting in subjective interpretations and excessive discretion of the administrative agency for individual cases.³¹ What is important is that the administrative personnel have too much discretion in law enforcement or inconsistent standards. In addition to increasing extra cost for business operations, it may also undermine the willingness of investors to invest in Thailand, which will hinder the economic development of Thailand.

Solutions

In response to the issues above, we would suggest that the Thai government address the issue from the short-, mid-, and long-term approach. In the short term, the Thai government can designate a single window for addressing enterprises’ concerns and questions about laws and regulations when ambiguity is involved. The window should be able to provide the enterprises with written responses within a reasonable time limit, explain the basis and reasons for the enforcement of the law, and thereby reduce scenarios of giving subjective interpretations of the law.

Due to the excessive discretion of administrative agency which arises from

³¹ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, p. 104

outdated laws or ambiguous regulations, the Thai government should promote legal reform to create a business-friendly legal environment as the mid- and long-term approach. The Thai government can set up a legal advice platform to collect feedback from local enterprises or different nations' chambers of commerce regarding outdated regulations or interpretation ambiguity scenarios, take actions to amend the laws based on feedback, and finally publish the assessment results and reasons as the basis for the amendment of the law.

If we use Taiwan as an example, in order to create an investment-friendly environment for entrepreneurs, the National Development Council (NDC) started to improve the various functions of the Regulations Relaxation Platform established in 2010 since 2015, and consulted other nations' chambers of commerce for feedback. In this way, the domestic investment and legal environment can meet the needs of chambers of commerce, as well as review and bring domestic regulations up to par with global standards, and minimize the ambiguity of domestic regulations and reduce scenarios of personnel executing excessive discretion of administrative agency.

Furthermore, in addition to the autonomous review of outdated laws and regulations by different ministries and departments in Taiwan, the NDC is the coordinating unit in that it serves as a bridge between foreign chambers of commerce and domestic ministries and departments. Also, the NDC responds and studies each suggestion put forward by domestic and foreign industrial groups, thereby bringing domestic economic and trade legal system up to par with the global standards. With the joint efforts of all parties, Taiwan's Regulations Relaxation Platform has achieved substantial results in opening up business opportunities in the financial market, formulating legal norms, triggering talent activation, and improving the investment environment³², which can be a model for the Thai government's mid- and long-term approach for legal reform.

(2) Enhancing the transparency of the regulatory reform consultation process

Explanation and impact of problem

³² NDC (2016), "Strengthen the function of Regulations Relaxation Platform to improve the efficiency of advice processing by the Chambers of Commerce," https://www.ndc.gov.tw/nc_27_25326

According to the US Department of State's investigation, the regulations and acts passed by the Thai government will be promulgated to the public, but foreign entrepreneurs still have concerns that the public may not have access to the lawmaking process before the passing of the draft regulations. Aside from regulations related to digital and cyber security, stakeholders' feedback regarding the draft regulations are unlikely to be accepted.³³ Based on the findings of this study, the lack of transparency or predictability of Thailand's policies and regulations – including ambush legislation or sudden changes in policies – are Taiwanese entrepreneurs' biggest concern in Thailand, which echoes the concern that the draft regulations are not accessible to the public until passed. Therefore, improving the transparency of the regulatory reform and promoting the stakeholders' understanding of the regulatory changes will help boost foreign entrepreneurs' confidence in Thailand's investment environment, an important issue that the Thai government must pay attention in the current state.

Solutions

According to Constitution of Thailand B.E. 2560 (2017) Section 77: "Prior to the enactment of every law, the State should conduct consultation with stakeholders, analyze any impacts that may occur from the law thoroughly and systematically, and should also disclose the results of the consultation and analysis to the public, and take them into consideration at every stage of the legislative process. When the law has come into force, the State should undertake an evaluation of the outcomes of the law at every specified period of time, for which consultation with stakeholders shall be conducted, with a view to developing all laws to be suitable to and appropriate for the changing contexts."

In order to comply with the aforementioned article in the Thai Constitution, the Thai government subsequently passed the Act on Legislative Drafting and the Evaluation of the Outcomes of Law, B.E. 2562 in 2019, an act that establishes the minimum standard for regulatory impact assessments (RIA) and stakeholder consultation. From this, we can see that the Thai government has established relevant regulations for RIA and stakeholder consultation.

³³ US Department of State (2021), "2021 Investment Climate Statements: Thailand," <https://www.state.gov/reports/2021-investment-climate-statements/thailand>

In the aforementioned context, we would suggest that the Thai government reserve ample time when negotiating with capital-funded enterprises during the promulgation of new regulations, increase the transparency of the consultation process, and take into account the negotiation results. After the regulations are promulgated, there should still be regular assessment and revision, and authorities concerned should also take on board foreign enterprises' feedback so as to confirm whether there are issues and investment barriers following the implementation of the new regulations, or whether there is space for improvement. At the same time, the government may also disclose feedback from private sectors such as foreign enterprises to the public, while allowing ministries and departments to explain the reasons for adopting or not adopting measures in response to such feedback.

Taiwan's experience in strengthening RIA and stakeholder consultation can be divided into two sections: foreign participation and domestic training. Foreign participation is achieved by participating in APEC or other seminars concerning organization and capacity building, exchanging information and experiences with relevant countries, keeping a tab on international trends, etc. In such ways, Taiwan has developed a set of RIA legal framework, which is a common practice in countries with democracy and free economic systems. On the other hand, domestic training is achieved by strengthening the promotion and training of RIA, increasing administrative units' understanding and familiarity with the system, continuously improving administrative units' RIA capabilities, and keeping domestic practices up to par with global standards.³⁴

It is worth mentioning that the situation varies from nation to nation. Taiwan has made many efforts to improve the transparency of the legal reform consultation process. Certainly, the Thai government can adjust the RIA process that suits its own economic situation, and mitigate foreign companies' concerns about the opaque lawmaking process. Therefore, improving the legal reform consultation process is undoubtedly a critical way to attract foreign enterprises, especially in a time when the global supply chain is facing disruption and should prove to be even more significant for the Thai government.

³⁴ National Development Council, Regulatory Impact Analysis, RIA, https://www.ndc.gov.tw/Content_List.aspx?n=0CF7EEAD9B7962E3

(3) Simplifying the certification process for the import of industrial products

Explanation and impact of problem

According to Thailand's Industrial Product Standards Act, some industrial products must apply for compulsory certification from Ministry of Industry's Thai Industrial Standards Institute (TISI) when they are imported. The scope of the certification includes hundreds of industrial products³⁵ in ten industries, including civil engineering and building materials, consumer goods, electrical and electronic products, fluid engineering, food, heat transfer engineering, medicine, coatings, machinery and vehicles, and chemical products. However, the latest survey results in Taiwan³⁶ show that when traders of the aforementioned products applied to TISI for compulsory certification, it has cost the entrepreneurs much time, thereby increasing the risk of failing to deliver the final products to the buyer in time due to red tape, complex application document requirements, and the long certification process. The risk increases the cost and difficulty of the production and manufacturing process for Taiwanese enterprises in Thailand, which may have a negative impact on the development of related industries.

Solutions

In response to the aforementioned compulsory certification of industrial products, we would suggest that the Thai government, while maintaining domestic consumer safety and environmental protection, focus on the following two aspects to reduce the cost derived from product inspection. First, the Thai government can comprehensively review the documents and inspection process, and simplify documents or streamline the inspection process. Second, the Thai government should evaluate and consider the feasibility of jointly promoting the negotiation and signing of a Mutual Recognition Agreement (MRA) or other forms of mutual recognition agreements with Taiwan. These mutual recognition of test reports or verification certificates may enable Taiwanese enterprises to expand the choice of certification

35 Thai Industrial Standard Institute (TISI), "List of Compulsory Standards," https://www.tisi.go.th/website/standardlist/comp_thai/en

36 Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan, "2020-2021 National Trade Estimate Report on Foreign Trade Barriers to Taiwan" p. 26

institutions and receive more efficient inspection services, and thereby reduce redundant inspection costs, deepen Taiwan and Thailand's industrial supply chain connections, and facilitate industrial development.

(4) Updating the official English version of promulgated regulations

Explanation and impact of problem

For each nation, language is the one of the most common challenges foreign entrepreneurs have to face when investing in a foreign country. Thailand has recently published the English version of important laws and parent laws, and provided relevant investment guidelines and application procedures in English on the BOI website, which significantly reduced the language barrier for foreign enterprises. However, according to Thailand's investment restrictions, there are still many industries that put a cap on the stocks of foreign shareholding or limit the collaboration partner to only Thai citizens. Since relevant regulatory documents are only available in the Thai language, Chinese National Federation of Industries have received many Taiwanese entrepreneurs' complaints, saying that they struggled with the Thai-language application documents, and had to seek help from locals or legal institutions when applying for product certification of industrial raw materials or application for procurement regulations.³⁷

Solutions

We would suggest that the Thai government provide more detailed explanations and forms in English regarding the certification procedures and application forms for foreign enterprises. For example, on the TISI website, although there is English information regarding the product certification process, entrepreneurs may not be able to fully grasp the product certification process due to the limited amount of information in English. Details which need to be further explained include the application website, sample delivery address, laboratory information, and what documents to fill in, etc. In this regard, Taiwan has currently established a Taiwan Desk specifically for Taiwanese investors in Thailand, in the goal of assisting them (especially SMEs) with investment in Thailand, which includes removing barriers

³⁷ Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan, "2020-2021 National Trade Estimate Report on Foreign Trade Barriers to Taiwan," p.27

regarding investment, language, and legal issues, whether prior to or after investment, which pose restrictions on enterprise investment and operation management. Taiwan Desk has proven to be another important window³⁸ for Taiwanese entrepreneurs in Thailand besides BOI. As a result, the Thai government may give thoughts to collaborating with Taiwan Desk. The window may help deal with the language barriers that Taiwanese entrepreneurs face when applying for legal or application documents, and provide Taiwanese entrepreneurs with assistance in time so as to increase Taiwanese entrepreneurs' willingness to invest in Thailand.

II. Trade Issues

1. Survey results

The research has also summarized trade issues that Taiwanese entrepreneurs may be concerned about, including a total of 7 related questions. A majority of respondents have stated that the biggest issue is Taiwan-Thailand bilateral trade tariffs. 26 out of the 45 respondents agreed to the statement, accounting for 57.78%. In terms of other options, among the 45 respondents, 33.33% believed that the custom officers' inconsistent interpretations of regulations have added hindrance to customs clearance; 33.33% believed that importation documents or other requirements have caused extra barriers (such as permits, Food and Drug Administration's product labeling requirements, etc.); 13.33% indicated that foreign (Taiwanese) entrepreneurs have a cap in participating in government procurement projects; 11.11% believed that government procurement bidding procedures do not favor foreign investors (for example, the bidding documents are written in Thai, or investors have difficulty obtaining an account on the electronic bidding platform); 11.11% said that the customs clearance review was too strict and the fines were too high. In addition, 22.22% (10 respondents) stated that they did not encounter the aforementioned trade issues when investing in Thailand.

³⁸ Invest Taiwan, Taiwan Desk: Thailand https://investtaiwan.nat.gov.tw/showPagechtG_Contact05?lang=cht&search=G_Contact05

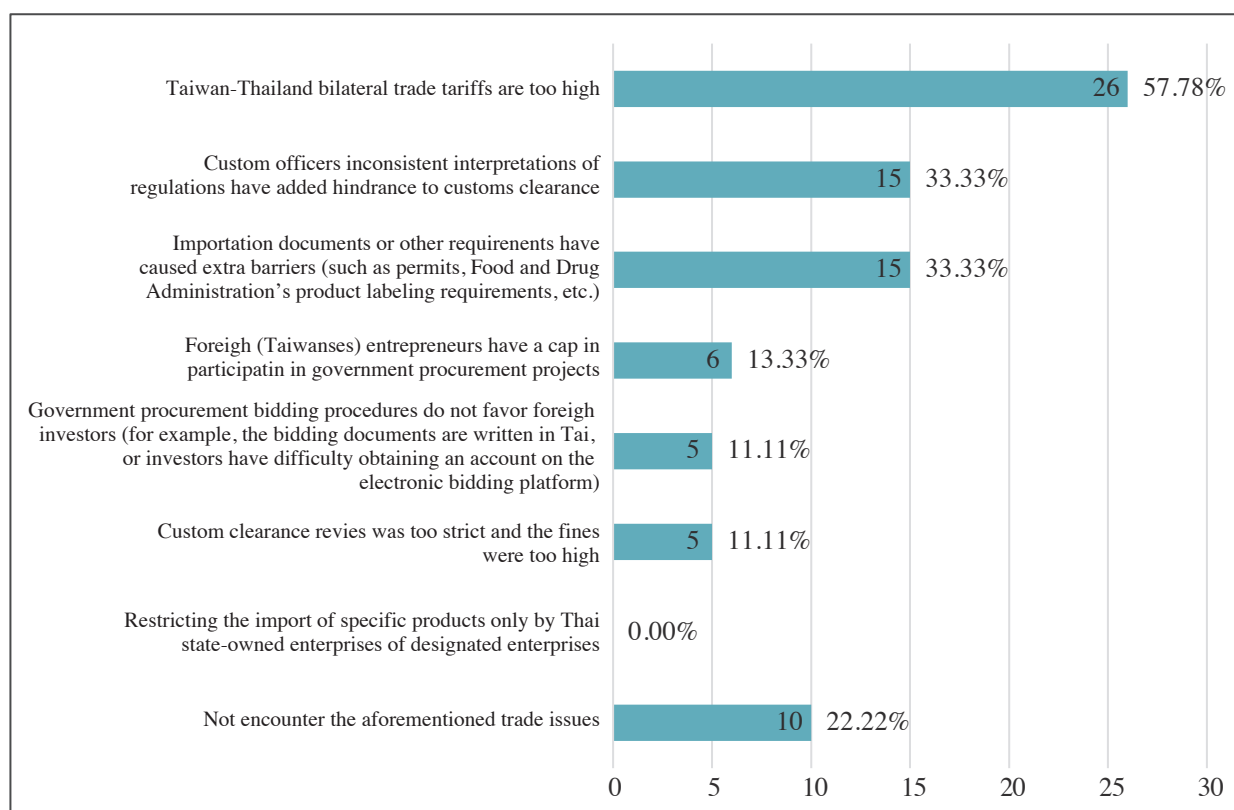


Figure 2-2 Survey results: Trade issues

2. Overall explanations and solutions

(1) Reducing bilateral tariff barriers to strengthen economic and trade exchanges

Explanation and impact of problem

Taiwan-Thailand bilateral trade is applicable to WTO's Most Favored Nation (MFN) tariffs. As far as Thailand's 2021 MFN tariff is concerned, a small percentage of its taxes are compound taxes or specific taxes, with most of the taxes being *ad valorem* duty. Among them, zero-tariff taxes account for 30.42% of the total tariff lines, and tax rates lower than 10% accounted for 20.09%, tax rates above 10% accounted for 41.54%, and 40 HS 8-digit products are subject to tax rates of 100% or more. In general, Thailand's Most Favored Nation (MFN) import average tariff rate for all goods is 13.69%.³⁹ Compared to Taiwan's MFN tariffs in 2021, there is also a small percentage of compound taxes or specific taxes, accounting for 1.74% of the total

³⁹ The average tax rate of HS 8-digit tariff items is 13.69%, and the average tax rate of HS 6-digit code tax items is 9.27%.

tariff lines, while zero-tariff tax account for 30.52% of the total tariff lines; tax rates lower than 10% account for 40.72%, tax rates above 10% account for 27.02%, and 12 HS 8-digit products are subject to tax rates of 100% or more. In general, the MFN import tariff for all goods in Taiwan is 6.3%. For both nations, there are still many products that face tariff barriers in terms of market entry, thereby leading to a drop in competitiveness in these products and undermining the growth of bilateral trade relations.

In addition, as one of the ASEAN members, Thailand has signed regional FTAs with Australia, New Zealand, China, Hong Kong, India, Japan, South Korea, and other countries under the ASEAN framework. It has also signed bilateral FTAs with Chile, India, Japan, Laos, Peru, Australia, and New Zealand. The aforementioned countries can thus enjoy preferential market access for their exports to Thailand. In addition, Thailand submitted the ratification for the Regional Comprehensive Economic Partnership (RCEP) in February 2021 and resumed negotiations on an FTA with the European Union. As more and more countries enjoy preferential market access in Thailand, Thai enterprises' cost of importing semi-finished products, components, or machinery from Taiwan has become higher, which makes Taiwanese entrepreneurs, foreign investors, and local enterprises lose the opportunities of using Taiwan's high-quality intermediate products. This will in turn inhibit or even weaken the trade and supply chain collaboration between the two nations.

Table 2-1 Taiwan-Thailand bilateral trade tariff structure

MFN tariff range	Taiwan		Thailand	
	Tariff lines	Percentage	Tariff lines	Percentage
MFN tariff rate=0%	2,788	30.52%	3,289	30.42%
<10%	3,720	40.72%	2,172	20.09%
>10%	2,469	27.02%	4,492	41.54%
Non Ad Valorem Equivalents	159	1.74%	860	7.95%
Total	9,136	100.00%	10,813	100.00%

Source: WTO IDB database

Solutions

Thailand has made preferential trade agreements with a number of major trading partners such as China, ASEAN countries, Japan, and South Korea. Thailand's economic and trade exchanges with the United States is manifested in the US-Thai Treaty of Amity and Economic Relations. Domestic industries have improved their adaptation and response to market liberalization. Although Taiwan is one of Thailand's most important trading partners, and the recent adoption of the New Southbound Policy is complementary to Thailand's industrial development policy, under the current tariff framework, there are still many tariff and non-tariff barriers between the two nations. Product items such as Thailand's machinery and equipment, food processing, automobiles, motorcycles as well as Taiwan's electronic and electrical equipment, automobiles, motorcycles, plastics, and steel products, etc. need to pay more tariffs in the bilateral trade. In order to strengthen Taiwan-Thailand economic and trade exchanges, as well as deepen bilateral industrial collaboration and the efficiency of the supply chain, we would recommend that the Thai government evaluate the feasibility of negotiating and signing an FTA or economic collaboration agreement with Taiwan in order to reduce the barriers in economic and trade exchanges.

(2) Increasing the transparency of tariff-related regulations and procedures, and reducing the cost and uncertainty of customs clearance

Explanation and impact of problem

Thailand ratified the Trade Facilitation Agreement (TFA) in 2015, and has fulfilled about 97.1% of its commitment. The establishment of its electronic customs system has facilitated import declarations. However, importers and exporters are still encountering difficulties in customs clearance. These barriers arise from lack of transparency of laws and regulations related to customs procedures, which allows customs officials to have excessive discretion. Currently, the legal structure of the Thai government's customs department is still opaque, and detailed technical guidelines for customs affairs may not be accessible to the public, leading to inconsistent regulation interpretations by individual customs officials. Specifically, the transparency of the

Thai customs valuation system needs to be improved. Since the valuation methods and criteria are determined by customs officials, it is often said that the standards remain inconsistent. This will increase the uncertainty of handling customs affairs and hinder customs clearance.⁴⁰

Solutions

Facilitation measures such as simplifying customs procedures, document requirements, and increasing automation can reduce the administrative and transaction costs of import and export, thereby creating incentives for relevant entrepreneurs to engage in trade and investment. Thailand's customs department has undergone several reforms in the past that have helped boost its rank in the World Bank's Ease Of Doing Business index. We would recommend that Thailand take note of the difficulties encountered by importers and exporters in real practice, and further increase the transparency of laws and regulations related to customs procedures to reduce the cost and uncertainty of trade customs clearance.

Specifically, Thailand should establish a clear and consistent customs legal system and regulations, try to avoid the situation where the tariff evaluation system standards vary from individual to individual, and reduce the uncertainty of entrepreneurs in complying with customs regulations. Before the formulation and revision of relevant regulations of the Thai government, all relevant stakeholders and groups should be allowed to participate in the consultation process fairly and openly so as to improve the transparency and predictability of the formulation and implementation of policies and regulations.⁴¹ As far as the customs reward and penalty mechanism is concerned, the Customs Department has conducted a public consultation on the customs reward and penalty mechanism in 2019 for possible legal amendments and is expected to announce a new amendment to the Customs Law in 2021.

In addition to improving the transparency of customs-related regulations and procedures, Thailand may also consider establishing external legal channels for the equal participation of the government and the private sector, such as establishing a communication and negotiation platform for customs to solve disputes between Thai customs, importers and exporters, agents, or other related parties.

⁴⁰ "2020-2021 Thailand's National Trade Estimate Report on Foreign Trade Barriers to Taiwan"

⁴¹ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*

(3) Announcing clear and transparent customs technical guidelines to reduce unintentional or technical negligence by importers and exporters

Explanation and impact of problem

The Thai government gives rewards to customs officials who initiate investigations or enforcement actions, e.g. customs valuations, document review, controls, and audits at customs clearance, and other strict assessment measures. At the same time, traders with apparent or willful non-compliance or negligence will receive penalties. However, the lack of transparency of customs reward and penalty scheme increases the cost and uncertainty of customs clearance for entrepreneurs, and easily becomes an unnecessary barrier to customs clearance. In this regard, Taiwanese entrepreneurs must strictly abide by various customs norms in Thailand, cooperate with the requirements of Thai customs, and refrain from committing any illegal conduct of clearing customs. If the custom officials are too strict in their review, it would cause inconvenience to the custom clearance procedures, delay delivery, and undermine the ease of conducting local businesses.

Since Thailand amended the Customs Act in 2017, it has cancelled the excessive discretion of the General Administration of Customs to increase the value of imported goods, reduced the rewards given to customs officials (set at the price of seized goods or 20% of fines, or a maximum of five million Thai baht (approximately US\$150,000), and restricted audit inspections to five years⁴² from the date of import and export. However, the reward cancellation will not undermine the motivation of customs officials to seize goods, and may even prompt customs officials to conduct wrongful investigations to make up for the reduction in their income.

Solutions

In order to reduce the possible negative impact of the customs reward and penalty scheme on the customs clearance process, the Thai customs should promulgate explicit customs technical guidelines, so that importers and exporters can abide by relevant customs regulations, and reduce the occurrence of unintentional or technical negligence. The Thai government should also refer to the Revised Kyoto

⁴² 2021 National Trade Estimate Report on Foreign Trade Barriers

Convention (RKC) and impose high penalties for cases with obvious fraudulent intent to avoid abuse of the customs reward and penalty scheme.

(4) Relaxation of restrictions on foreign investors in government procurement

Explanation and impact of problem

Thailand became an observer of the WTO's Agreement on Government Procurement (GPA) in 2015, and is still not a party to the agreement. In addition, among the FTAs signed by Thailand, it has no relevant commitment to open the government procurement market. This indicates that Thailand has adopted a more prudent attitude in the opening of the government procurement market.

Thailand passed the Public Procurement and Supply Management Act in 2017 with the aim of preventing corruption and anti-competitive practices. The Act covers state-owned enterprises, bids require due consideration of performance in addition to price, promotes transparency through the use of e-procurement, and cancels the preferential price scheme for domestic suppliers, even though some domestic suppliers in Thailand can still enjoy preferential treatment via specific procurement methods.⁴³ For example, Thailand launched the Thai Innovation List in 2016, boasting priority in government procurement. Only authorized Thai stock shareholding enterprises can list products on the innovation list. For pharmaceutical and medical products, government agencies and the public hospital's 30% of the procurement budget must be drugs listed in this list.⁴⁴

Currently, Thailand's Ministry of Finance has established a single platform for government procurement (website: www.gprocurement.go.th), and relevant information such as bid specifications and bidders are open to the public on the website. Enterprises can only apply for an e-GP system account to participate in the electronic bidding. However, the information on the website is written in Thai, and foreign entrepreneurs need to register in Thailand to obtain the login account, password, and bidder qualification. In addition, some international tenders have

⁴³ World Trade Organization (WTO), "Trade Policy Review: Thailand," 24 and 26 November 2020, https://www.wto.org/english/tratop_e/tpr_e/tp500_e.htm

⁴⁴ 2021 National Trade Estimate Report on Foreign Trade Barriers

restrictions on the country of origin of bidders. In general, language, business registration regulations, and restrictions on investment source country conditions have posed a certain degree of barrier for Taiwanese and other foreign entrepreneurs to obtain information on government procurement in Thailand and participate in public works construction.⁴⁵

Solutions

Joining the WTO Agreement on Government Procurement can assist member states to improve their procurement systems and procedures, to improve the degree of institutionalization and information transparency, and to have open access to each other in accordance with reciprocity and national treatment. Take public construction projects for example. Joining the GPA ensures that member-state entrepreneurs can enjoy fair competition in the government procurement market of major trading partners. In addition to obtaining the lowest bidding price, the Thai government can attract foreign entrepreneurs to participate in domestic government procurement, and introduce new concepts, new construction methods, and a solid management system, which has significance for improving the quality of domestic infrastructure and public works. However, Thailand has not officially joined the GPA since it became an observer of the WTO Government Procurement Agreement in 2015. Thus, it is suggested that the Thai government actively push for the participation for joining the GPA.

In terms of language, the development of emerging technologies and the integration of cultures have greatly reduced the language barriers between nations. However, in order for government procurement plans to remain explicit and reduce barriers for foreign entrepreneurs to obtain information, we would suggest that Thailand should adopt a single platform for government procurement and provide official English version for important information such as government procurement specifications. More importantly, Thailand should promote the relaxation and simplification of the restrictions and procedures for foreign enterprises to obtain e-GP platform login account and password to participate in e-bidding procedures, and reduce restrictions on the source country of bidders. By building a fair competitive

⁴⁵ “2020-2021 Thailand’s National Trade Estimate Report on Foreign Trade Barriers to Taiwan”

government procurement environment, it will enhance the opportunities for Taiwanese and other foreign entrepreneurs to participate in Thailand's government procurement procedures.

III. Investment Issues

1. Survey results

In this study, we compiled 15 investment issues with which Taiwanese firms investing in Thailand may be concerned. With regards to the other survey statements, 48.89% of the 45 respondents believe local business partners make demands of or place investment restrictions (such as a 49% share ownership limit) on foreign (Taiwanese) firms. 42.22% believe the restrictions for foreign (Taiwanese) firms to obtain lands are too strict. 37.78% say Taiwanese firms lack adequate guarantees protecting their investment rights. 35.56% say there's a lack of investment incentives. 35.56% think local banks place high banking and investment hurdles for small and medium-sized enterprises. 31.11% think the price of raw material is either inflated or there is a shortage. 20.00% say the EEC (Eastern Economic Corridor) limits investments for certain industries or does not provide sufficient investment incentives. 17.78% think foreign (Taiwanese) firms face strict limits in obtaining building ownership rights. 17.78% believe land costs are high. 13.33% feel it takes too long to invest in and incorporate a company. 6.67% feel foreign (Taiwanese) firms are forced to transfer their company's technology or intellectual property rights to local Thai enterprises, and foreign (Taiwanese) firms are required to employ local workers, provide education and training, or build specific infrastructure to promote the development of the local economy. 4.44% say foreign (Taiwanese) firms are required to use a certain proportion of local raw material, buy work-in-progress inventory from specified manufacturers, or maintain a certain domestic content rate in their material. Only 2.22% of respondents think an economic and business hurdle they face is that the Thai government will expropriate land or factories without warning and adequate compensation. Additionally, 6.67% (3 total) respondents have not encountered any of the aforementioned issues when investing in Thailand.

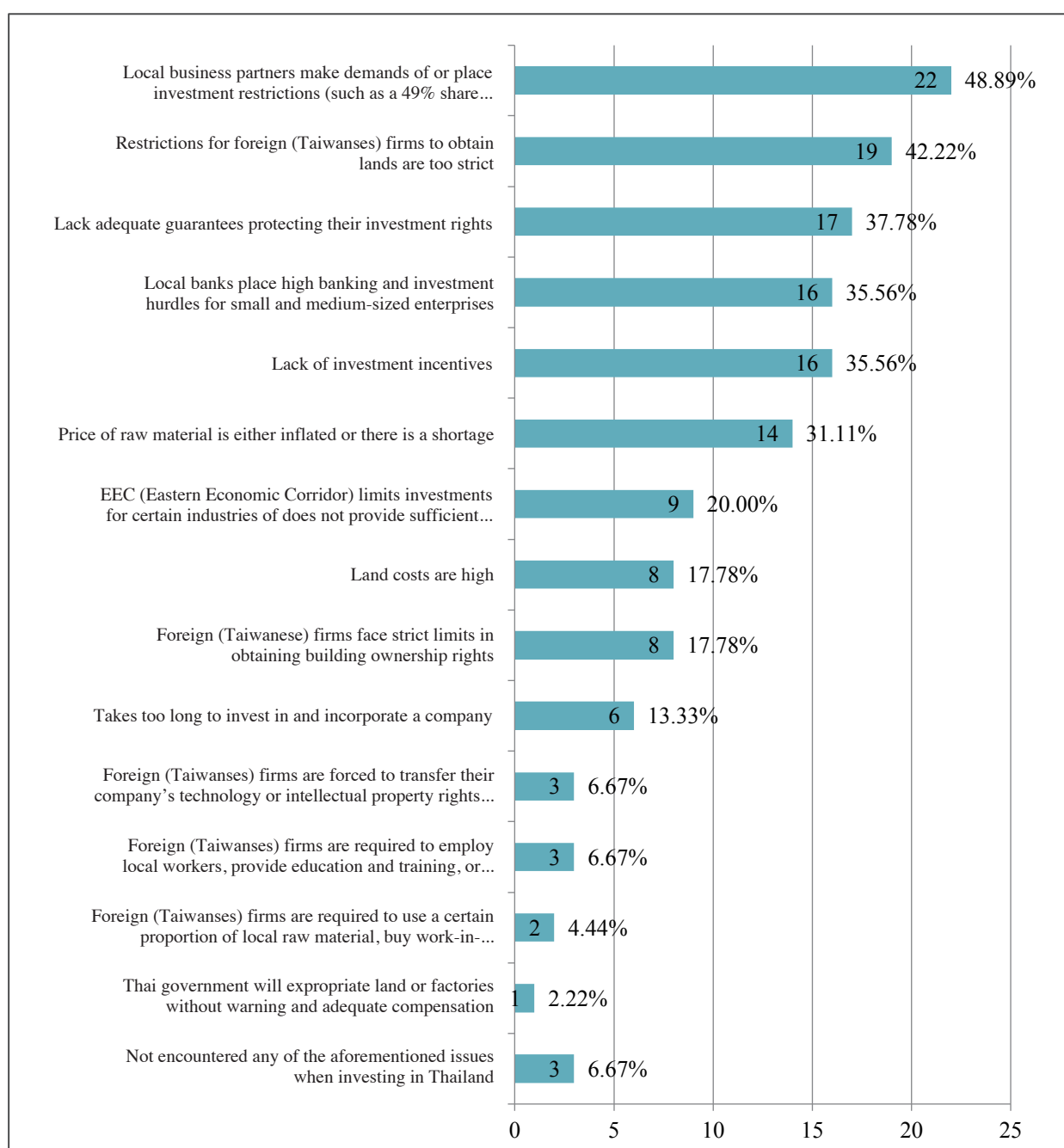


Figure 2-3 Survey results: Investment issues

2. Overall explanations and solutions

(1) Accelerate loosening of restrictions on shareholding and types of industry in which foreign firms invest and operate

Explanation and impact of problem

The Foreign Business Act (FBA) announced by the Thai government in 1999 holds jurisdiction over the vast majority of investment activities by non-Thai

citizens. Relevant laws and regulations restrict foreign investors from participating in certain industries, which mainly involve services such as banking, insurance, and telecommunications. The FBA further stipulates nine businesses foreigners cannot engage in without obtaining additional permission or exemption (Table 2-2), such as:

1) Non-Thai citizens are prohibited from engaging in agricultural enterprises, forestry and timber processing from a natural forest, fishery, extraction of Thai medicinal herbs, trading and auction sale of antique objects of Thailand or objects of historical value to the country, making or casting Buddha images and monk alms-bowls, and land trading.

2) After first receiving the approval of the cabinet of Thailand, a foreign holding company where not less than 40% of its shares and total number of directors are held by Thai nationals or juristic persons, may operate in national safety or security, arts, culture, traditions, customs, folklore handicrafts, and businesses that have an impact on natural resources or the environment.

3) No enterprise where a foreign shareholder holds more than 50% of shares may operate a business where Thai nationals are not yet ready to compete with foreigners without permission from the Director-General with the approval of the Commission. These 21 industries are: rice milling and production of flour from rice and economic plants; fishery only in respect of the hatching and raising of aquatic animals; forestry from a grown forest; production of plywood, veneer wood, chipboards or hardboards; production of lime; accounting services; legal services; architectural services; engineering services; construction; brokerage or agency businesses; internal trade related to traditional agricultural products or produce not yet prohibited by law; sale by auction; retail sale of goods; wholesale of all types; advertising; hotels; guided touring; food and beverage; cultivation, propagation or development of plant varieties; and other service businesses, with the exception of service businesses as prescribed in the Ministerial Regulation.

As stated above, Thailand prohibits foreign firms from operating in the nine businesses in 1), and either sets shareholding limits for foreign investments in numerous industries or requires them to only work with Thai nationals. Unless given special permission or other exemptions, an enterprise's foreign investment shareholding

ratio must be less than 50%. As a whole, Thailand has placed relatively strict limits on foreign shareholding in primary and service industries⁴⁶. However, as the global supply chain continues to evolve, the service sector remains a key supporting industry for manufacturing abroad. For example, servicing local Taiwanese firms is the main objective of the overseas expansion of Taiwan's financial industry, and is an essential channel through which overseas Taiwanese firms obtain financing. It is also key to the operation of the Overseas Credit Guaranteed Fund (Taiwan). If Thailand sets harsh investment limits in the financial market, those restrictions will indirectly impede investment by Taiwanese firms in Thailand's manufacturing industry.

Table 2-2 Foreign investment limitations by Thai government departments

Area of investment	Measures taken
All areas	Foreign investors (those with more than 50% shares in foreign investments) are prohibited from land ownership. However, they can acquire land through leasing. Only foreigners whose capital flow exceeds 40 million Thai baht can obtain exemptions, at which point they can purchase a maximum of 400 square meters of land in specified areas, primarily in Bangkok, Pattaya, and designated residential areas.
Real estate	The commercial or residential real estate ownership by majority-foreign owned investors (more than 50% voting capital) cannot exceed 49% of the total area of all apartment units.
Media - radio and TV broadcasts	Foreign investments in radio and TV broadcasts cannot exceed 25% of the total voting capital. Three-fourths of the directors must be Thai citizens.
Media - print media	Foreign investment in print media (news) cannot exceed 30% of the total voting capital. Three-fourths of the directors must be Thai citizens.
Air transportation	Foreign investment in regular and irregular aviation services and other aviation business services cannot exceed 49% of the total voting capital. Two-thirds of the directors and managers or persons in charge must be Thai citizens.
Travel	Foreign investment in travel services (mainly, travel agencies and tour operators) cannot exceed 49% of the total voting capital. Half of the directors must be Thai citizens.

⁴⁶ 2021 Investment Climate Statements: Thailand, <https://www.state.gov/reports/2021-investment-climate-statements/thailand>

Area of investment	Measures taken
Financial institutions	Foreign shareholding in commercial banks, financial services, and credit banking services cannot exceed 49% of the total voting capital. However, this limit can be raised should there be a need to provide added stability to financial institutions or their systems. The majority of directors must be Thai citizens.
Insurance	Foreign shareholding in the insurance industry cannot exceed 25%. Three-fourths of the directors must be Thai citizens. Foreign shareholding rights can exceed the legal limit under special permission from the Ministry of Finance.
Financial securities	Foreign firms investing in securities services must register locally.
Telecommunications	Foreign shareholding in basic telecommunications service providers is limited to 49%. Foreign shareholding in value-added service providers can be higher. This regulation is an improvement over 1997 WTO promises made by Thailand. Only Thailand has yet to fulfill its promise made in GATS to reduce restrictions on foreign shareholding and improve regulatory measures.

Source: OECD Investment Policy Reviews: Thailand

Solutions

According to the FDI Regulatory Restrictiveness Index, Thailand's primary industries and service sector departments still have relatively strict limitations on foreign investment. However, in the context of the global value chain, developing a competitive service sector is key to growing and evolving Thailand's manufacturing industry. Financial, insurance, and modernized services can bring about a more effective and adaptable supply chain, as well as have a crucial impact on advanced manufacturing and innovation. To implement the "Thailand 4.0" policy, Thailand must consider further opening of foreign investments in the service sector.

More specifically, Thailand's Ministry of Commerce conducts an annual examination of the three lists of businesses which the FBA restricts foreigners from conducting. In 2019 and 2020, the Ministry removed four of these industrial activities to further lower the hurdles for investments by foreign firms. These activities include telecommunication services with type-1 permits (telecommunications operators without their own service network), financial centers, aircraft maintenance, and

software development⁴⁷. Through these annual assessments of activities in which foreigners are restricted from participating, foreign investment restrictions have begun to relax. To attract more foreign investments in Thailand, we suggest the government adopt a more proactive approach by lifting restrictions on industrial activities in which foreign firms can be involved and increase the shareholding limit.

(2) Accelerate loosening of restrictions on shareholding and types of industry in which foreign firms invest and operate

Explanation and impact of problem

The Land Code Promulgating Act B.E. 2497, Industrial and Commercial Real Estate Leasing Act, and Industrial Zone Act describe the regulations surrounding foreign land use in Thailand. In principle, foreigners are prohibited from land ownership without a special legal permit. However, foreign investment enterprises and foreign investors can obtain land ownership rights by going through the proper legal channels. First, the Thailand Board of Investment (BOI) gives the following investment incentives: Thai and foreign enterprises receive tax and non-tax benefits when investing in BOI incentive programs. Non-tax incentives mainly include certain assurances and protective measures such as: permission to bring in professional and skilled personnel; permission for enterprises to obtain permanent land ownership under the company's name; permission for foreign investors to be independent shareholders; and permission to remit foreign currency. Second, the Industrial Estate Authority of Thailand (IEAT) has an incentive policy where investors in General Industrial Zones or IEAT Free Zones are permitted to own land within those zones. Third, the Eastern Economic Corridor (EEC) 2021-2025 keynote plan on Thailand's development gives land ownership permission as an incentive to promotional projects⁴⁸. Overall, Thailand has a comprehensive land rights system, with only land use legislation still strictly limiting the rights of foreigners to obtain land.

Land is an indispensable aspect of an investor's business operations and services in Thailand. While Thailand's laws allow foreigners to obtain land through certain

⁴⁷ 2021 Investment Climate Statements: Thailand, <https://www.state.gov/reports/2021-investment-climate-statements/thailand>

⁴⁸ Investment in Thailand 2020, Klynveld Peat Marwick Goerdeler (KPMG)

means, regulations in the 1954 Land Code Promulgating Act strictly limit foreigners' capability of obtaining land ownership rights, which may adversely affect foreign investors and their investment activities.

Solutions

Land ownership reform has long been a sensitive topic in Thailand, and is unlikely to see any short-term change. However, Thai laws regarding land rights such as leases and mortgages are relatively lax and do not distinguish between foreigners and Thai nationals. To increase the willingness of Taiwanese and foreign firms to invest in Thailand in the long term, we suggest an extension on lease periods of land and buildings for foreigners and foreign companies.

(3) Update bilateral investment treaties to bolster investment rights of Taiwanese firms

Explanation and impact of problem

On April 30, 1996, Thailand and Taiwan signed the Agreement between the Taipei Economic and Trade Office in Thailand and the Thailand Trade and Economic Office in Taipei for the Promotion and Protection of Investments (hereinafter “the Agreement”). The Agreement had 11 articles which included: term definitions; its scope of application; promotion and protection of investments; treatment of investments; exceptions; expropriation and compensation for losses; transfers of investments and returns; subrogation; settlement of disputes between the contracting parties; disputes relating to investments; and entry into force, duration, and termination. Due to how long ago the Agreement between Thailand and Taiwan was made, aspects of the Agreement may not be applicable to the current situation or are exhaustive enough. For example, it does not mention Thai national treatment and may not adequately protect the rights of Taiwanese investors in Thailand.

Solutions

International investment agreements have evolved to provide more complete guarantees for investors. Considering 25 years have passed since the signing of the Agreement, we suggest Taiwan and Thailand amend the Agreement to expand and improve investment assurance standards. Having the two governments consult with

one another on investment matters will expand the rights of Taiwanese investors in Thailand. Furthermore, if Thailand provides more sufficient protection of investment rights of Taiwanese firms, it will not only boost the confidence of these firms in investing in Thailand, but will also attract more Taiwanese firms to invest in Thailand.

(4) Expand the scope of application of investment incentive measures

Explanation and impact of problem

The investment incentive measures of Thailand mainly include: 1) The Seven-Year Investment Promotion Strategy (2015-2021): Provides incentives to target industries and value-added products. On the other hand, labor-intensive industries must introduce new technology to increase workers' productivity and skill level before offering investment incentives. New investment incentives are mainly geared towards environmental protection research and R&D in related high-tech industries. 2) Special Economic Zone (SEZ) programs: Provide investment incentives to SEZs on the border between Thailand and Myanmar, Laos, Cambodia, and Malaysia. Each SEZ designates target industries to be given preferential treatment. 3) Eastern Economic Corridor Development Plan: Provides investment incentives to spur technological innovations and promote development in new technology-intensive industries. The plan encourages EEC zones to develop four target industry clusters (biotechnology, automotive electronics and parts, aerospace and maintenance centers, and medical hubs). It also provides an incentive to allow the 10 larger target industries described in the Thailand 4.0 policy to extend their land leases.

We can see from this that Thailand has targeted certain industries and provides them with investment incentives to attract specific industries to invest in Thailand. By fixating on investment incentives for specific industries, Thailand has ignored the peripheral industries which provide services for those industries, which may impair the growth of these specific industries.

Solutions

The majority of the target industries which receive investment incentives in Thailand are technology-intensive industries such as: environmental protection

research and R&D in related high-tech industries or modernized automobiles; smart electronics; high-income and wellness travel; agriculture and biotechnology; food processing; robotics; medical treatment centers; aviation and logistics; biofuels and biochemistry; and the digital industry. Since the development of the targeted industries mentioned above requires the assistance and services of other non-targeted industries, and foreign investors in the non-targeted industries have a demand for human resources, there is a vast number of job opportunities for Thai workers. The development of these industries will also spur economic growth and social stability in Thailand. Thus, we suggest Thailand broaden the scope of industries for which it provides investment incentives to include non-targeted (e.g., manufacturing, technical, or auxiliary service industries that greatly impact the Thai economy) industries that support the supply chain of the targeted industries non-targeted industries including.

(5) Lower financial barriers for small and medium-sized enterprises

Explanation and impact of problem

Small and medium-sized enterprises (SMEs) play a key role in global (including Southeast Asian) employment and the growth of an integrated economy. According to estimates by the Office of Small and Medium Enterprises Promotion (OSMEP), Thailand had three million enterprises in 2018, 99.8% of which were SMEs, with the other 0.2% being large enterprises (roughly 6,455 businesses). The employees of SMEs account for 85.5% of the total number of employed individuals. However, they account for a relatively low proportion of the GDP (about 43.0%) and of total exports (about 28.7%)⁴⁹. To help SMEs become the driving force for economic growth, inclusiveness, and competitiveness, Thailand has formulated numerous plans, programs, and incentives to assist these enterprises and help them reach their potential. One crucial measure is to improve the financial system for SMEs.

SMEs in Thailand have access to financing via commercial bank loans. They can also obtain funds through other financial institutions, capitalist markets, crowdfunding, and venture capital investment. Some SMEs face collateral limits or lack credit records, which limit their chances of obtaining bank loans. Thailand has

⁴⁹ ADB Asia SME Monitor 2020 database

also taken relevant measures to alleviate these financial difficulties. For instance, the Thai Credit Guarantee Corporation (TCG) provides a credit guarantee to SMEs that exhibit a degree of survivability so as to ensure they can take out a bank loan even if they lack adequate collateral. Additionally, in 2015, the Business Collateral Act B.E. 2558 simplified the application process for security interest and expanded the types of collateral for which SMEs could register and use for secured loans. However, a study in an OECD report showed SMEs face more difficulties obtaining financing than larger enterprises in the same industry, with a loan refusal rate of 44.8%. This indicates Thailand's SMEs have lower credit or continue to experience financing gaps, meaning their financial service needs have not been met⁵⁰. Thailand still has room to improve with regards to lowering the financial hurdles for SMEs.

Solutions

The Thai government has proposed multiple measures to assist with financing SMEs, such as pushing for easier access to alternative financing, as well as promoting electronic financial transactions to narrow the current gap between the credit and financial market for SMEs. Helping SMEs obtain financial services is one of the objectives of the Policy Guidelines for the Specialized Financial Institutions with Regards to SMEs, 2016-2020. To bolster the overall competitiveness of SMEs in Thailand, we suggest Thailand broaden the scope and recipients of financial policy services for SMEs by accounting for all SMEs established within Thailand's borders that carry out business activities. This includes some SMEs which are primarily funded by Taiwanese or foreign investments, in turn creating a more financially-friendly environment for SMEs in Thailand.

In more concrete terms, in addition to loosening restrictions on financial industry investments, Thailand can encourage private Thai banks to cooperate with local Taiwanese banks (such as the Bangkok Branch of Mega International Commercial Bank). If, in the future, these banks can share and integrate their credit reporting system, it will help Thai and Taiwanese banks get a better handle on the credit situation of Thai and Taiwanese enterprises (including SMEs), as well as lower the risk of lending money locally.

⁵⁰ SME Policy Index: ASEAN 2018, OECD ilibrary. <https://www.oecd-ilibrary.org/sites/9789264305328-24-en/index.html?itemId=/content/component/9789264305328-24-en>

IV. Labor and Human Resources Issues

1. Survey results

In this study, we compiled the labor and human resources issues with which Taiwanese firms investing in Thailand may be concerned. The results of this survey show that the statement Taiwanese firms agree with the most is that there is a lack of skilled workers and personnel. Of the 45 respondents, 27 (60%) agreed with that statement. As for the other statements, 55.56% of the 45 respondents believe the process of getting a visa or work permit is challenging. 46.67% think the employee turnover rate is high. 42.22% agree there is a lack of personnel training, educational subsidies, or tax incentives for enterprises. Overall, the study has shown a lack of skilled workers and a training system. The visa and work permit application process and regulations have hindered the ability to obtain said documents, restricted employment of foreigners, and limited where a person can work with a work permit.

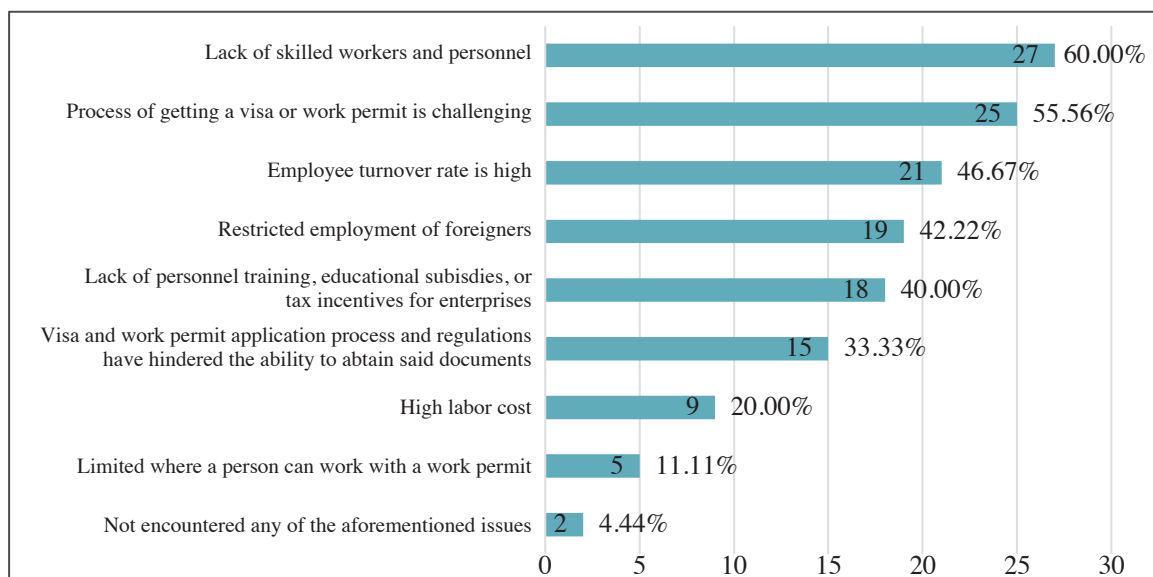


Figure 2-4 Survey results: Labor and human resources issues

2. Overall explanations and solutions

(1) Improve training for professional personnel and Thai and Taiwanese talent exchange to meet demand for talent development in Thailand

Explanation and impact of problem

This study has shown that the human resource issue with which Taiwanese firms are most concerned is the lack of professional personnel. In the training of its own personnel, while Thailand has long invested in technological and vocational training, there still exists a discrepancy between what is taught in its education system and what can be gained from practical work experience. Thailand lacks a cooperative education model that balances classroom education and work experience. Even if a small number of enterprises have started to merge industry and academia, the practice is still not widespread. Moreover, with the many policies to promote economic development and industrial restructuring and upgrading such as the Thailand 4.0 policy, Seven-Year Investment Promotion Strategy (2015-2021), and Eastern Economic Corridor Development Plan, Thailand will have an increasingly greater need for relevant personnel for the foreseeable future. Thus, increasing the number of personnel in these industries is a critical issue which the Thai government must face head on.

Solutions

With regard to professional personnel training, Thailand needs to establish a more complete and long-term training system to provide accessible channels for students to intern at the business of their choice so as to gain practical work experience. Thus, Thailand and Taiwan can start with educational training and talent exchange, or possibly start a technological and vocational training class to train overseas Chinese students in using Taiwanese-produced equipment and machinery. We can better integrate industry and academia if we work together to train personnel. For example, the Thai-Taiwan (BDI) Technological College located in Samut Prakan incorporates Taiwan's technological and vocational training into their institution, helping to solve the personnel shortage for Taiwanese firms. It is a prime example of cooperative education⁵¹. Based on this, we suggest the Thai government provide

⁵¹ CAE Molding Magazine (2019), "A Cradle of Entrepreneurial Talent: Thai-Taiwan (BDI) Technological College and

subsidies or tax incentives to enterprises for employee education and internships, both of which help to increase the ratio of skilled workers in the workforce. Having a comprehensive training system can also make workers more willing to stay at the company to pursue further training, as well as lower the turnover rate. We believe this should have a positive effect in solving the issue regarding the talent shortage within Thailand.

In addition, under Taiwan's New Southbound Policy, Thailand and Taiwan can work together to promote talent training and exchange amongst themselves. Taiwan's universities can provide excellent education and training for high-level personnel in major industries such as high-tech and information and communications technology (ICT). This should be able to meet the demand for talent to realize the Thai government's economic policies. More specifically, the Taipei Economic and Cultural Office in Thailand has established the Taiwanese-Thai Education Exchange Service Platform under the New Southbound Policy. The platform gathers information on the personnel training needs of Taiwanese firms and sends it to all the universities in Taiwan to use as a reference when planning personnel training courses at Taiwanese firms. The platform also collects information for scholarships at Taiwanese universities to assist in recruiting Thai students⁵². The Thai government can make good use of this platform to add to the channels through which Thailand can gain industrial personnel.

(2) Expand the scope of Smart Visas to broaden the talent base in Thailand

Explanation and impact of problem

The Thai government began implementing the Smart Visa system in 2018 to promote key industrial talents and technologies outlined in the Thailand 4.0 policy. It scrapped the regulation where foreigners needed to check in at the Immigration

Its Model of Industry-Academia Cooperation - A New Paradigm of Technological and Vocational Training", <http://www.caemolding.org/cnm/%E4%BC%81%E6%A5%AD%E4%BA%BA%E6%89%8D%E7%9A%84%E6%90%96%E7%B1%83%E7%BC%8D%E6%B3%B0%E5%9C%8B-%E5%8F%B0%E7%81%A3bd%E7%A7%91%E6%8A%80%E5%AD%B8%E9%99%A2-%E6%B7%B1%E8%80%95%E7%94%A2%E5%AD%B8%E5%90%88-2/>

⁵² Taipei Economic and Cultural Office in Thailand (2018), "TECO in Thailand Creates the Taiwan-Thailand Educational Exchange Platform to Promote Bilateral Educational Exchange and Industry-Academic Cooperation", <https://www.roc-taiwan.org/th/post/8902.html>

Bureau every ninety days, instead allowing for one-year check-ins. The visa is valid for as long as four years and does not require one to have a work permit. Industries included in the Thai government's Smart Visa program include: automobiles; smart electronics; high-end and medical wellness tourism; agriculture and biotechnology; food for the future; automation and robotics; aviation and logistics; biofuels and biochemistry; the digital industry; medical treatment; alternative dispute resolution; human resource development in science and technology; and environmental management and renewable energy. However, Thailand's Smart Visa coverage currently favors a few specific industries. While the visa program conforms to Thailand's industrial development policy goals, it may be limited in its ability to help form industrial clusters.

Solutions

Thailand's Smart Visa system is quick and convenient for professional personnel in specific industries. It deserves credit for enlisting overseas professional personnel and drawing new ideas from them. However, the firms interviewed in this study believe manufacturing should focus on forming industrial clusters. While it is important to make it easier for professional personnel in major industries to enter and leave Thailand, third-party vendors also play an indispensable role in the formation of industrial clusters. As such, we suggest Thailand's BOI should not only provide Smart Visa services for key industries, but also for other enterprises which do not fall under the industries covered by the Smart Visa program if they can prove to be key third-party vendors that form an industrial cluster (such as automobiles or smart electronics) to allow for a more complete formation of industrial clusters. Additionally, for professionals at Taiwanese firms who began working in Thailand before 2018 under the previous visa version and are included amongst the Smart Visa industries, the Thai government can consider upgrading them to the Smart Visa for a reasonable fee.

(3) Simplify work permit application process

Explanation and impact of problem

The Taiwanese firms interviewed in this study wish the work permit review and issuance process could be expedited. Thailand 4.0 objectives such as manpower revitalization, establishment of targeted industries, and bilateral, cooperative

education all rely on the issuance of visas and work permits. These documents help meet the demand for talent that is needed to spur Thailand’s economic development. However, the procedures for obtaining a work permit are extremely complex. There is excessive and, ultimately, unnecessary paperwork⁵³ which draw out the application process that will be a hindrance to Taiwanese firms trying to expand their business and technological exchange in Thailand.

Solutions

In terms of visas and work permits, we suggest the Thai government to accelerate the process for approval and issuance of these documents for Taiwanese employees. Improving the efficiency of approving and issuing visa and work permits will help solve manpower shortages. It will also benefit Taiwanese firms creating an enterprise, as well as personnel deployment needed for setting up factories.

(4) Clarify definition of work and ease requirements for work permit applications for business travel

Explanation and impact of problem

Thailand’s regulations for approving work permits do not provide a clear definition of “work”, which may affect travelers to Thailand on business. More specifically, the Thailand 4.0 policy’s objectives urgently require personnel with certain skills or professional abilities to relocate to Thailand. However, businesspersons coming to Thailand for the short term are there for exchanges in the form of business meetings or seminars. Thus, these short visits by businesspersons do not fulfill the internationally-recognized definition of “work”. However, in Thailand, the law leaves a broad definition for the term “work”, such that in many cases, businesspersons on short visits will be considered coming to Thailand for work, and thus need to present a legal work permit.

Solutions

We suggest government employees set a clearer legal definition for what constitutes “work”, especially in the amended 2018 clause for the literal definition

⁵³ EABC (2019), pp. 10, 57-62

of “work”. Additionally, we suggest Thailand’s Ministry of Labour write a letter categorizing what constitutes work and non-work. Lastly, we also suggest the Thai government loosen on-arrival business visa regulations for those simply in Thailand to visit, or to allow for those coming for a business trip from countries without any national security concerns to be exempt from a visa, perhaps providing them with a single-entry 30-day visa.

(5) Loosen regulations where “companies hiring Taiwanese to intern in Thailand must apply for a work permit” and “small and medium-sized enterprises must have a paid-up capital of two million Thai baht per foreign employee in order to financially vouch for the employee on work permit applications”

Explanation and impact of problem

According to Thailand’s Alien Employment Act, for companies registered in Thailand, the legal ratio of local to foreign workers is 4:1 (for every 1 foreign employee, the company must hire 4 Thai workers). While this can help ensure foreign investment enterprises contribute to local employment, the interviews with Taiwanese firms in this study indicate some enterprises need to provide internship opportunities to Taiwanese students due to operational demands. However, due to the 4:1 limit, the cost of hiring 4 local workers overrides the benefits of offering one internship position, inhibiting the sustainable development of Taiwanese firms in Thailand. Moreover, the Alien Employment Act stipulates that Thai companies must have a paid-up capital of two million Thai baht per foreign employee in order to financially vouch for the employee on work permit applications. Foreign employees are required to obtain a work permit to work in Thailand, which means that for investments by SMEs (especially those that provide technical services for large enterprises or third-party vendors), this will increase the cost of coming to Thailand to assist other departments or industries. It will also inhibit the development of both industrial clusters and the supply chain in Thailand⁵⁴.

Solutions

According to the opinions of the interviewees in this study, many Taiwanese

⁵⁴ Hong Kong Productivity Council (2019), Guide to Thailand: Opportunities and Limitations in Manufacturing

firms set aside a quota for interns from Taiwanese universities and colleges to come to Thailand, a boost to the sustainability of the Thai market. Taiwanese firms strictly abide by the Thai government regulation of the 4:1 Thai to Taiwanese worker ratio when offering internships to Taiwanese students. The Thai government can consider loosening this restriction and lowering the ratio to increase the staying power of Taiwanese firms. Moreover, for SMEs that provide technical services for large enterprises or are key third-party vendors, we suggest the Thai government relax the regulation that Thai companies must have a paid-up capital of two million Thai baht per foreign employee in order to financially vouch for that employee on work permit applications.

V. Taxation Issues

1. Survey results

The study compiles a total of five tax issues with which Taiwanese investors in Thailand may be concerned. The statement with which most respondents agreed was that Thailand has a high tax burden (e.g., corporate tax, value-added tax, withholding tax, etc.), with 29 (64.44%) of the 45 respondents agreeing. For the other statements, amongst the 45 respondents, 22.22% think the government does not provide information for advance tax rulings. 20.00% agree the tax incentives for startup companies are inadequate, and the evaluation reports by tax collectors are inconsistent with legal statutes. No respondents agreed tax audits had an unclear deadline. Additionally, 7 (15.56%) respondents have not encountered any of the aforementioned investment hurdles in Thailand regarding the legal system and procedures.

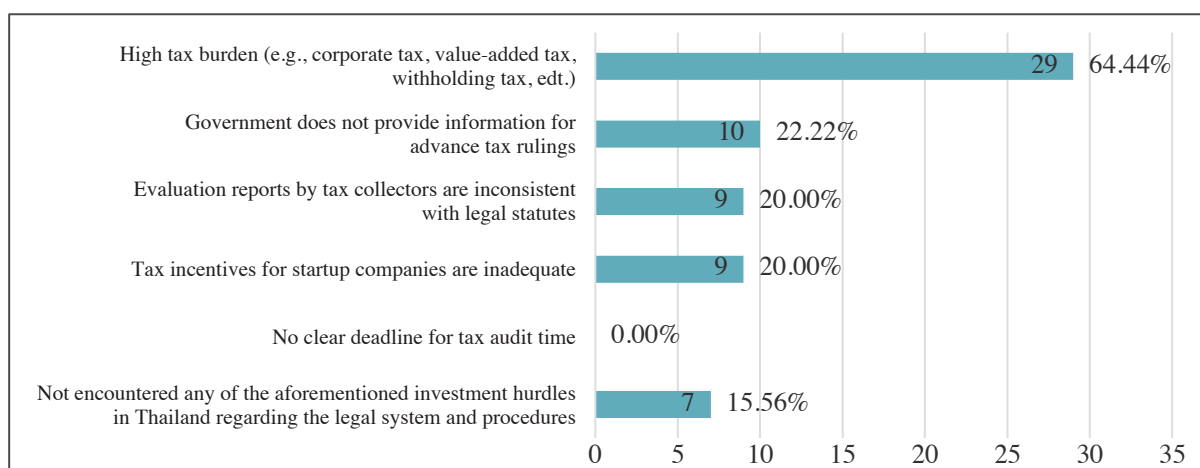


Figure 2-5 Survey results: Tax issues concerning Taiwanese firms

2. Overall explanations and solutions

(1) Lower the tax rate, simplify procedures, and expand the scope of investment incentives

Explanation and impact of problem

Thailand's corporate income tax rate used to be 30%, but has decreased to 20%. However, the withholding tax was not lowered in the process. In Thailand, a company must pay a withholding tax when they reach a certain income. The withholding tax is determined based on different types⁵⁵ of income and the tax status of the taxpayer. The person paying the income needs to fill out an application and pay the withholding tax to the District Revenue Offices within seven days of the following month in which the income payment is made. The tax withheld will be credited against the final tax liability of the taxpayer⁵⁶. Currently, the withholding tax rate for Thailand's domestic service and professional fees is 3%. Corporations paying withholding tax must have an earnings before tax of 15%, which is difficult to attain for many corporations, causing many to overpay their taxes⁵⁷. Thailand currently refunds any overpaid taxes⁵⁸, yet in interviewing Taiwanese firms, some mentioned Thailand has a prolonged tax refund

⁵⁵ Some important types of income with withholding tax are: dividends, interest, royalties, advertising fees, service and professional fees, and prizes.

⁵⁶ Investing in Thailand Q&A (May 31, 2021) Invest Taiwan. https://investtaiwan.nat.gov.tw/showBusinessPagechtG_Contact05?lang=cht&search=G_Contact05&menuNum=111

⁵⁷ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 48

⁵⁸ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 49

process. Countries which refund taxes more quickly will take only two or three days. However, in Thailand, it takes two or three months, and can take six months for those with a weak tax base. The tax refunds can be substantial, and the lengthy refund process can negatively affect the capital turnover of SMEs.

Solutions

If the withholding tax can be lowered to 1.5%, then the earnings before tax need only be 7.5%, which is more reasonable for the current environment in Thailand. It can also reduce the number of occurrences of overpaying income tax. For the long term, we suggest to eventually and gradually lower the withholding tax for the various income types to create a more competitive investment environment in Thailand. Moreover, for tax returns, the Thai government can consider using the extra tax they receive to reduce income taxes for the following fiscal year. Corporations would not need to wait for their tax returns, and the Thai government would not need to process cash refunds, thereby simplifying the multifarious tax procedures⁵⁹.

Explanation and impact of problem

Currently, every company needs to pay value-added tax, salaries, and withholding tax to the Revenue Department every month, creating a considerable tax administration burden for small and medium enterprises who tend to lack the administrative resources of larger enterprises.

Solutions

To effectively reduce the administrative burden and cost for small and medium enterprises to file taxes every month, we suggest changing the filing frequency from monthly to quarterly⁶⁰.

Explanation and impact of problem

Currently, BOI incentives are given according to their level of importance, starting with Group A, Group B, Assistive Targeted Technology, and Technology and Innovation Development (Type 8). The incentives are primarily focused on

⁵⁹ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 48-49

⁶⁰ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 49

the development of high-tech industries and formation of high-tech industrial clusters. Although the industries in Group B “do not employ high technology, but are important supporting industries for industrial growth”, they need to meet certain criteria⁶¹ to apply for three years of corporate income tax exemption. Other high-tech industries need only fall within the categories laid out by the government to be able to unconditionally receive three to eight years (depending on activity group) of corporate income tax exemption. However, many industrial clusters and third-party vendors cannot receive incentives because they are not in the high-tech industry and do not meet the right conditions. This will be a hindrance to the formation of high-tech industrial clusters⁶².

Solutions

We can conclude from the interviews with Taiwanese firms that large Taiwanese corporations are granted the vast majority of incentives, such as lower taxes, due to their close relationship with the BOI. Small and medium enterprises that cannot get the assistance of the BOI must set up business in special industrial zones provided to Taiwanese firms by the Thai government before they can receive any tax benefits. Thus, we suggest the Thai government consider relaxing the restrictions on incentives for third-party vendors in the high-tech industry. If these small and medium enterprises are not limited to special industrial zones, it will attract more manufacturers to come to Thailand and form high-tech industrial clusters.

(2) Clearer advance tax ruling reports and consistent explanation of laws

Explanation and impact of problem

Before making a transaction, a taxpayer will consider the taxes induced by the transaction. It is especially crucial for those making large and complicated transactions

⁶¹ Activities in Group B shall receive an additional three-year corporate income tax exemption on revenue in the case that they: 1. Utilize automation or robotics systems to promote the adoption of modern machinery for manufacturing/services; the cap on corporate income tax exemption on the revenue of the project shall not exceed 50% of the investment capital (excluding cost of land and working capital). 2. Utilize machinery with linkages to the domestic automation industry for manufacturing less than 30 percent of the total value of the automation system; the corporate income tax exemption cap will be raised to 100% of the investment excluding land cost and working capital. 3. Submit their application by December 31, 2020.

⁶² Q&A for Investing in Thailand (May 31, 2021). Invest Taiwan. https://investtaiwan.nat.gov.tw/showBusinessPagechtG_Contact05?lang=cht&search=G_Contact05&menuNum=111

to have a clear, straightforward advance tax ruling report in order to accurately calculate costs. Thailand's Revenue Department only offers tax rulings for past transactions. Thus, one is unable to receive a tax ruling before a transaction occurs, leaving investors uncertain what will happen before investing. There have also been issues where the tax collector gives an evaluation, yet the legal basis adopted by the tax collector is unclear, leaving manufacturers at a loss for what to do and therefore less willing to invest.

Solutions

We suggest the Ministry of Finance's Revenue Department provide enterprises with a clear, unambiguous advance tax ruling report to help enterprises or investors make a more complete pre-evaluation, which will reduce the uncertainty regarding investment taxes and make enterprises more willing to invest in Thailand. Additionally, tax collectors can consider including the legal basis for their tax assessments for the enterprises to reference, as well as give a consistent explanation of similar laws⁶³.

(3) Extend startup incentives and have clearly-stated reward measures

Explanation and impact of problem

A five-year tax loss carryforward is a crucial investment incentive that startups enjoy in Thailand. It is absolutely essential to their success. Startups can easily be operating at a loss in their early years. Thus, like Thailand, many countries provide relevant incentives to startups, with some like Singapore, Malaysia, and Hong Kong extending incentive plans indefinitely. In addition, while Thailand takes some extra measures to provide incentives, the measures are not defined clearly, causing government agencies to conclude that a company does not qualify for the incentive. If one were to apply for a subsidy for research expenses, they would need to get the approval of the National Science and Technology Development Agency (NSTDA), which takes six months on average to make a decision. The nebulous definition of these incentives forces enterprises to spend time waiting for an examination that will eventually result in them not receiving the incentive.

⁶³ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 50

Solutions

With regards to tax loss carryforward, we suggest Thailand emulate other countries and extend the period to eight or ten years (like Japan). This will make Thailand more competitive amongst other countries with regards to this incentive and further attract more foreign investments. Additionally, the Thai government must define its incentives more plainly to resolve any uncertainty from investors and thus encourage investment⁶⁴.

VI. Infrastructure Issues

1. Survey results

In this study, we compiled the infrastructure issues with which Taiwanese firms investing in Thailand may be concerned. The results of this survey show that the statement Taiwanese firms agree with the most is that there is a relative lack of infrastructure or the fees are too high. Of the 45 respondents, 18 (40%) agreed with that statement. As for the other statements, 31.11% of the 45 respondents believe electricity supply infrastructure is lacking or the fees are too high. 24.44% think communications infrastructure is lacking or the fees are too high. 24.44% think transport infrastructure is lacking or the fees are too high. 22.22% say water supply infrastructure is lacking or the fees are too high. In summary, the research shows Thailand could prioritize improving the electricity supply and ICT infrastructure, especially outside the city and industrial zones. Thailand could also focus domestic investments on water supply and transport infrastructure.

⁶⁴ European Association for Business and Commerce (EABC) (2020), *European Business Position Paper 2019-2020*, pp. 50-51

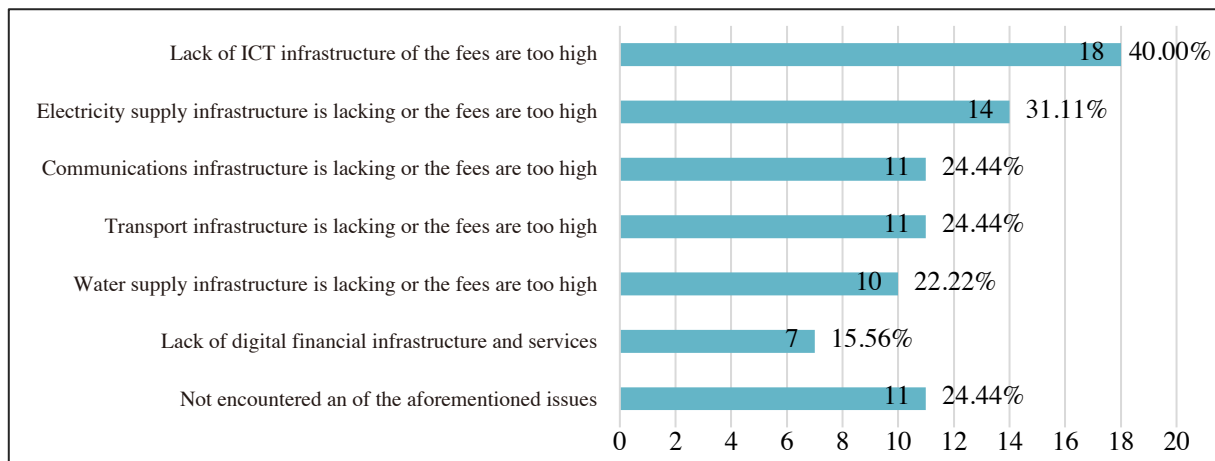


Figure 2-6 Survey results: Infrastructure issues

2. Overall explanations and solutions

(1) Employ public-private partnerships to boost power of local Taiwanese firms in reinforcing infrastructure

Explanation and impact of problem

Infrastructure plays a vital role in Thailand's economic development. Thailand has had a rapidly-developing economy and its infrastructure urgently requires an upgrade and expansion. The Thai government has placed special attention on promoting the transportation links between different economic departments and industrial bases. It has spared no effort in improving domestic infrastructure.

In the Global Competitiveness Report published by the World Economic Forum, Thailand placed 71st out of 141 economies in overall infrastructure quality in 2019, falling 11 places from 2018. Thailand has much room to improve, especially when compared to Singapore in 1st and Malaysia in 35th. According to the results of Figure 2.3, Thailand's efficiency of seaport services, electricity access, exposure to unsafe drinking water, and reliability of water supply all declined in the global ranks, and reflect the same concerns as Taiwanese firms (like electricity, drinking water, and transportation). The Thai government can refer to this information to inform its decision on implementing measures to improve domestic infrastructure development.

Table 2-3 Evaluation of Thailand's infrastructure in the WEF Global Competitiveness Report: 2018-2019

Index component	2019 rank	2018 rank	2018 to 2019 rank change
	40/141	38/140	-2
Road connectivity	54/141	55/140	+1
Quality of road infrastructure	55/141	55/140	-
Railroad density	55/141	54/140	-1
Efficiency of train services	75/141	91/140	+16
Airport connectivity	9/141	9/140	-
Efficiency of air transport services	48/141	48/140	-
Liner shipping connectivity	35/141	39/140	+4
Efficiency of seaport services	73/141	68/140	-5
Electricity access	2/141	1/140	-1
Electricity supply quality	31/141	32/140	+1
Exposure to unsafe drinking water	107/141	105/140	-2
Reliability of water supply	60/141	56/140	-4

Note: Gray background indicates drop in ranking

Sources: WEF: *The Global Competitiveness Report 2018* and *The Global Competitiveness Report 2019*, compiled by the research team

In regards to information, communication, and networks, in the World Economic Forum's 2020 Networked Readiness Index, which measures the degree of readiness to exploit opportunities offered by information and communications technology, Thailand placed 51st out of 134. When compared to the ranking of the two ASEAN member states of Singapore (1st) and Malaysia (34th), it is clear there is still room to improve⁶⁵. If we consider the "Thailand 4.0" policy, which plans to build 5G to propel the country's digital transformation, thereby attracting foreign investments, making Thailand both more competitive and a digital hub amongst ASEAN members, the Thai government should be accelerating efforts to improve its internet access and the quality of its network infrastructure if they wish to achieve their goal. With regards to ICT, Thailand vastly increased its 5G network coverage following COVID-19. Huawei assisted Thailand in building a good number of 5G base stations. Healthcare

⁶⁵ World Economic Forum Networked Readiness Index, <https://networkreadinessindex.org/wp-content/uploads/2020/12/Thailand.pdf>

in the major cities also began using 5G to provide telehealth services⁶⁶. The two largest telecommunications service providers, Advanced Info Service (AIS) and True Corp, followed up by deploying 5G networks near hospitals in 2020⁶⁷. However, Taiwanese firms have expressed that the quality and price of software infrastructure such as the internet in minor cities is in need of a change. Improving communications infrastructure remains a task that demands immediate action so as to create a working environment better fitted for investments from foreign investors.

Solutions

While upgrading infrastructure is an urgent task, there are still budgetary concerns. To further accelerate the development of infrastructure and implement domestic infrastructure projects, the Thai government has made a commendable effort to use public-private partnerships (PPP). For example, the PPP Strategic Plan 2017-2021, launched in 2017, listed 23 departments that allow PPPs to participate in infrastructure projects. It covers 55 projects and has reached a total of US\$51 billion in investments. The State Enterprise Policy Office (SEPO) has recently launched a new PPP Strategic Plan (2020-2027) that stresses the construction of infrastructure is a national priority that will open up new business opportunities for Thailand and foreign investors. In the PPP model, Thailand can consider redoubling efforts to harness the power of Taiwanese firms in Thailand and use channels from Thai-Taiwanese business associations to set up investment cooperations that fit each enterprise. These cooperations will help bolster various infrastructure projects to make Thailand an operations powerhouse for advanced manufacturing in the ASEAN and Asia Pacific region.

In addition, for networks and ICT, we suggest the Thai government take the time now to improve the network coverage and technical quality of the internet in minor cities, as well as lower prices. Keeping in step with the Thailand 4.0 policy and incrementally updating 5G networks will more effectively facilitate Thailand's digital transformation.

⁶⁶ Huawei on a 5G roll in US ally Thailand, Asia Times, <https://asiatimes.com/2022/01/huawei-on-a-5g-roll-in-us-ally-thailand/>

⁶⁷ Thailand leads ASEAN in 5G rollout due to pandemic, Nikkei Asia, <https://asia.nikkei.com/Spotlight/5G-networks/Thailand-leads-ASEAN-in-5G-rollout-due-to-pandemic>

Chapter Three Promoting Thai-Taiwanese Industry Cooperation

Taiwan and Thailand have enjoyed a steady trade relationship the past few decades, with their industries closely linked together. Located at a transport hub for Southeast Asia, Thailand has a bounty of natural resources and a younger population. Taiwanese firms had an early foothold as a vital manufacturing base in the region. With its sights now set on spurring long-term economic growth, the Thai government announced in the “Thailand 4.0” policy in 2016 it would adopt the Bio Circular Green Economic Model (BCG) to promote national economic growth. The Taiwanese government has continued to push the New Southbound Policy in hopes of enhancing exchange with other countries on a variety of aspects. The recent US-China trade/technology war and the COVID-19 pandemic have highlighted the importance of Taiwan staying connected to Southeast Asian nations. Thus, if Taiwan and Thailand can play to each other’s competitive advantages in their upstream and downstream sectors, they can learn to foster a closer relationship in the global supply chain where they can work to help each other. In one regard, Thailand can upgrade its industrial structure to make it more competitive on the world stage. Thailand can also become an important partner with Taiwan as it expands into the Southeast Asian market to create a win-win situation.

To promote the development of industrial cooperation between Thailand and Taiwan, this study takes a special look at the current bilateral economic development needs and advantages through which Thailand and Taiwan can help each other. The five topics are: cooperation in smart manufacturing, cooperation in smart healthcare, cooperation in agricultural and biotechnological industry applications, circular and green economic cooperation, and cooperation in the electric vehicle supply chain. Consideration of the areas of cooperation can be prioritized for relevant policies and used as a reference for the government and enterprises of Thailand and Taiwan. A detailed explanation is below.

I. Smart Manufacturing

1. Overview of smart manufacturing in Thailand

Smart manufacturing is part of the development of smart cities as described by the Thailand 4.0 policy. Smart manufacturing is defined as using advanced manufacturing technologies and the new generation of information technology which includes the Internet of Things (IoT), big data, cloud computing, and artificial intelligence to make every aspect of the manufacturing process highly customizable and more intelligent to adapt to the ever-changing needs of external markets⁶⁸.

The recent pandemic, digital restructuring, and Thailand's local smart manufacturing policies have dramatically increased Thailand's domestic demand for smart electronics, leaving plenty of room for development in related industries⁶⁹. If we look at the automation and robotics industries, Thailand, like many other developed countries, has been experiencing falling birth rates that have given rise to a labor shortage and aging population. Thus, Thailand has devoted itself to developing these two industries. Automated manufacturing and robotics are suitable for highly repetitive and labor-intensive work. Industries that rely primarily on industrial robotics are automobiles and electronics. Thailand's BOI has indicated the food processing industry is also in need of automation and robotics. According to a study by the SCB Economic Intelligence Center, Thai companies in 2017 still employed two million workers for the repetitive, labor-intensive tasks involved in producing electronic components for automobiles and in the food and beverage industry. These industries thus have great potential for development.

2. Overview of smart manufacturing in Taiwan

Smart manufacturing in Taiwan originated as one of the smart machinery industries described in the 5+2 Industrial Innovation Plan of 2016. The plan pushed Taiwan's machinery industry away from precision machinery and towards smart

⁶⁸ What is the Core of Smart Manufacturing and Industry 4.0? It's Not Technology, It's Integrative Thinking (includes examples of smart manufacturing) (October 9, 2021). FineReport. <https://www.finereport.com/tw/success/industry4-0.html>

⁶⁹ Smart E&E Industry. Thailand Board of Investment. https://www.boi.go.th/index.php?page=business_opportunities_detail&topic_id=117532

machinery that used robotics, IoT, big data, cyber-physical systems, lean production, 3D printing, and sensors. This smart machinery was later integrated into various industries to form smart manufacturing, which has clear advantages through its broad solutions, industrial knowledge applications, and competitive differentiation. Taiwan has set its sights first on aerospace, intelligent machinery, metal transport, electronic information, green energy, 3C products, food, textiles, and plumbing hardware and hand tools⁷⁰. The policy aims to turn Taiwan into “Asia’s hub for high-end manufacturing”. The current administration is investing a great deal of effort in making small and medium enterprises more capable of digitization, helping to upgrade smart applications in manufacturing, creating benchmarking enterprises in smart machinery, bolstering talent development, and having a smart manufacturing consulting team offer free consultation, diagnostics, and technical support to small and medium enterprises⁷¹.

Research has shown nearly 90% of Taiwanese industries have either delved into or are interested in AI. There are five mainstream applications of AI, which are: 1) Optimizing operation of industrial robotics, such as using deep learning for 3D models; 2) Improving supply chain management and manufacturing plans, and optimizing the manufacturing process, such as through smart scheduling; 3) Improving workers’ health, safety, and efficiency, such as through parameter analysis of factory environments and pipelines; 4) Improving production equipment, such as through predictive management; and 5) improving quality control, such as analyzing the causes of product defects⁷².

3. Thai-Taiwan smart manufacturing collaboration

The Thailand 4.0 policy’s promotion of the new industries of robotics and automation will bring about more advanced technology that will enhance 10 major industries such as domestic food processing and automobiles. As such, Thailand’s traditional manufacturing industry will be facing a transitional period. Smart

⁷⁰ Industrial Innovation - Smart Machinery (Sep 1, 2021) Executive Yuan. <https://www.ey.gov.tw/achievement/E922CA92C2BAE4E>

⁷¹ Stimulating the Smart Machinery Industry - Making Taiwan “Asia’s Hub for High-end Manufacturing”. Executive Yuan. <https://www.ey.gov.tw/Page/5A8A0CB5B41DA11E/1af112a3-80a1-4f45-bc46-f1ca48d16a30>

⁷² Wei, Chris (Mar 9, 2021). Unraveling the Current State and Investment Demands of Taiwan’s Smart Manufacturing Development in 2021. Market Intelligence & Consulting Institute. <https://mic.iii.org.tw/industry.aspx?id=412>

manufacturing will play an indispensable role in this transition. It will be used increasingly more often in the foreseeable future in robotics equipment and smart solutions. If we take food processing as an example, Thailand has a booming food processing industry thanks to an abundance of agricultural products. By taking into consideration recent labor costs, hygiene awareness, manufacturing efficiency, and policy goals, businesses in Thailand have started using automation and smart manufacturing equipment, with some using smart solutions for the whole factory. Moreover, Thailand's policies and rapid inter-industrial automation development have led electronics exporters to also begin implementing technology such as robotic arms, automated guided vehicles, and IoT. This will shift Thailand to factories using lights-out manufacturing, which will certainly become more widespread in the future⁷³.

On the Taiwan side, many industries have already incorporated smart manufacturing into their operations under the implementation of relevant policies. Both Thailand and Taiwan operate under an industrial structure that prioritizes small and medium enterprises. Thus, Taiwan's experience transitioning to smart solutions for its small and medium enterprises can serve as a reference for the Thai government in how it pushes its own restructuring. For a more specific way in which Thailand and Taiwan can cooperate, we suggest the two can host more joint exchange seminars on smart technology. Taiwanese businesses can share their experience in smart solutions and successfully introducing smart manufacturing through these seminars, while also evaluating the feasibility of these solutions when applied to Thailand's industry. This will help expedite Thailand's smart restructuring and open up a healthy channel of communication between the two sides.

II. Smart Healthcare

1. Overview of smart healthcare in Thailand

The Thai government values the development of the healthcare industry. Thailand's healthcare expenditure and number of hospitals stand out amongst members of ASEAN. According to statistics, Thailand had 1,047 public healthcare

⁷³ Taiwan External Trade Development Council (2018), "Taiwan: Thailand 4.0's Partner in All Things Smart". <https://www.trademag.org.tw/page/newsid1/?id=733165&iz=6>

institutions and 349 private healthcare institutions in 2017, with a healthcare expenditure that totaled 3.7% of Thailand's GDP. Private hospitals are mostly internationally-accredited healthcare institutions that serve foreigners. Examples include Bumrungrad International Hospital, Samitivej Hospital, and Bangkok Hospital. Together, they are the top three five-star international hospitals of Thailand. Thailand also has the most JCI accredited hospitals amongst ASEAN members, with 61 of its 1,396 hospitals having attained that standard. That is far more than the ASEAN countries of Malaysia with 16, Vietnam with 5, Indonesia with 30, and the Philippines with 5.

With its great number of hospitals, relatively low medical costs, and robust tourist industry, the Thai government recognizes the potential of its medical services to be integrated into other fields. As early as 2004, Thailand had already formulated the national industrial development plan which aimed to turn Thailand into the “medical hub of Asia” within ten years. The 2016 economic development plan dubbed “Thailand 4.0” continued to prioritize investment in and development of the healthcare industry, and announced it wishes to make “Thailand a hub of wellness and medical services” by 2025. This has led Thailand to have a flourishing medical tourism industry. The number of foreigner patients receiving medical treatment in Thailand rose at a compound annual growth rate of 8.52% from 2010 to 2018. Before the outbreak of the COVID-19 pandemic, there were between two and three million people who came to Thailand each year for treatment. In the meantime, Thailand is facing an issue of an aging population. The Thai research organization Krungsri Research predicts the senior population of Thailand in 2040 will exceed 20 million people, constituting 33% of the total population. The aging population is causing an increasingly greater demand for long-term care and related equipment⁷⁴.

National policies helped give birth to Thailand's vigorous healthcare industry. If we also consider the growing domestic and foreign demand for Thailand's healthcare services, Thailand's healthcare industry must take steps to improve further if it wishes to continue providing high-quality services. Thus, by including smart healthcare as a

⁷⁴ Overview and Demands of Thailand's Medical Industry (Nov 5, 2020). Ministry of Health and Welfare's New Southbound Policy Office. <https://nsp.mohw.org.tw/cp-1085-92-d678a-1.html>
 Wei Mao-Kuo (Jan 21, 2020). Bright Prospects for Thailand's Market in Medical Equipment. ITRI College Online. <https://college.itri.org.tw/special-topic-learning-4/82-new-technology/442-%E6%B3%B0%E5%9C%8B%E9%86%AB%E6%9D%90%E5%B8%82%E5%A0%B4%E5%89%8D%E6%99%AF%E7%9C%8B%E5%A5%BD.html>

part of a smart city in Thailand 4.0, AI, big data, and robotics will raise the healthcare standard while decreasing the use of labor, and in doing so, allow medical personnel to put more time and effort into caring for their patients. The COVID-19 pandemic in 2020 further accelerated the development of Thailand's smart medical treatment. Medical tourism was deeply impacted by the tourism industry taking a hit and the subsequent drop in tourists. Thailand currently offers telehealth services for Thai and foreign patients. For example, Samitivej Hospital launched a virtual hospital mobile application, while Bumrungrad Hospital offers teleconsultation and remote patient monitoring for long-distance care for patients with arrhythmic heart conditions⁷⁵. Thailand still needs other smart healthcare innovations in addition to these remote medical services in order to create a safer, more efficient healthcare environment. Only in doing so can Thailand's healthcare industry return to pre-pandemic levels and even grow to greater heights than before.

2. Overview of Thai-Taiwan healthcare collaboration

Healthcare collaboration with Thailand led by the Taiwanese government started in the One Country, One (Medical) Center plan from the 2018 New Southbound Policy. The plan uses Taiwan's first-rate expertise in the health sector to get relevant industries to venture outside Taiwan. The countries prioritized in the early stages were Indonesia, India, Vietnam, Thailand, the Philippines, and Malaysia. One hospital is in charge of making the comprehensive plans for one nation. Each hospital works on six major projects: medical personnel training, bridging gaps in the medical industry, providing Taiwanese firms with health consultation services, creating a culturally-friendly medical environment, drafting medically-related legislation and conducting market investigations, and providing data integration services. Changhua Christian Hospital is responsible for Thailand⁷⁶.

In 2010, Changhua Christian Hospital began implementing a joint plan under its name with hospitals in Thailand. They later undertook the Taiwanese government's "One Country, One Center" initiative for Thailand in 2018 and set up smart healthcare demo sites. From 2018 to the present day, Taiwan has held numerous

⁷⁵ Country Commercial Guides. <https://www.trade.gov/country-commercial-guides/thailand-medical-equipment>

⁷⁶ "One Country, One Center" Gives New Energy to Medical-Industrial Collaboration in New Southbound Policy (Jun 1, 2018) Ministry of Health and Welfare. <https://www.mohw.gov.tw/cp-3795-41446-1.html>

smart healthcare seminars in Thailand and participated in Thailand's healthcare expos. Examples include: From July 10 to 12, 2019, Changhua Christian Hospital and the Taipei Computer Association led sixteen of Taiwan's top smart healthcare manufacturers to Bangkok for the "2019 ASEAN Medical Devices" expo⁷⁷; the Taipei Economic and Cultural Office in Thailand and Changhua Christian Hospital held joint English webinars on "The Response to COVID-19 in Taiwan and Smart Healthcare Technology"⁷⁸.

3. Collaboration opportunities for Thai-Taiwan healthcare

To achieve its aspiration of becoming the "medical hub of Asia", Thailand's healthcare industry is most in need of medical equipment, which includes importation and R&D manufacturing. Next up is to improve the overall quality of healthcare services, including healthcare monitoring systems and telehealth services. Taiwan and Thailand have collaborated on healthcare for many years now. Thailand values the application of ICT in the healthcare sector. Examples include smart watches, smart ambulances, care robots, and wireless smart operating rooms, all of which are areas in which Taiwan and Thailand can work together in manufacturing or developing. Moreover, Thailand's cloud system for patient records is not widespread, a possible inconvenience for patients seeking treatment or transferring to other hospitals. To tackle this issue, Thailand will build a cloud database that will compile patients' records over different hospitals and merge data with other government departments in hopes of increasing the efficiency of hospital visits and transfers. We believe if Thailand can work together with Taiwanese businesses, it will increase the efficacy of its healthcare and further its goal to become the "medical hub of Asia"⁷⁹.

Lastly, the 2020 pandemic further cemented that Thailand's smart healthcare is a crucial area of development. It also opened up new opportunities for cooperation with Taiwan. In Taiwan's fight against COVID-19, they emphasize hospital sanitization and personnel access control. For example, Taiwan uses a computer system to allow

⁷⁷ Collaboration in Thai-Taiwanese Healthcare Innovations, Making the Healthcare Industry Smart (Jul 11, 2019). A Look at Thailand. <https://visionthai.net/article/taiwan-thailand-smart-medical-cooperation-revolution/>

⁷⁸ Taipei Economic and Cultural Office in Thailand and Changhua Christian Hospital joint English webinars on "The Response to COVID-19 in Taiwan and Smart Healthcare Technology" (Apr 24, 2020). Taipei Economic and Cultural Office in Thailand. <https://www.roc-taiwan.org/th/index.html>

⁷⁹ Li Wen-chieh (Sep 24, 2019). Taiwan's Smart Healthcare Catching Interest, Helping Thailand Become a "Medical Hub of Asia" Taiwan News. <https://www.taiwannews.com.tw/ch/news/3783423>

patients who need to self-isolate to be able to contact medical personnel and have their situation monitored at any time. With regards to hospital sanitization, Taiwanese hospitals use ultraviolet germicidal irradiation, bleach, and automatic robotics for object and document transport to maintain a clean hospital environment and reduce labor usage⁸⁰. Taiwan's aforementioned experiences fighting the pandemic and the technology they employed can not only lighten the burden of medical personnel, it can also lower the risk of infection in hospitals in the post-pandemic era. Thailand's healthcare system provides telehealth and remote patient monitoring, but if they can learn from Taiwan, they can create a safer, more efficient hospital environment. This will, in turn, alleviate the worries of patients seeking treatment at a hospital and put Thailand closer to its goal of becoming the "medical hub of Asia".

III. Agriculture and Biotechnology Applications

1. Development of Thailand's agriculture and biotechnology value-added applications: an overview

With a highly competitive agriculture sector, Thailand is one of the major exporters of agricultural products. As a primary supplier in the global marketplace, the rice plant represents the single most important crop in Thailand. Others major categories of agricultural exports include chicken, durian, cassava and tapioca, cane sugar, rubber, aquatic products, and their associated processed products (such as canned tuna and frozen shrimp), making Thailand an important source of agricultural products and foods for the global and ASEAN regional markets. In terms of policy promotion, the Thai government has prioritized high-efficiency agriculture in its Thailand 4.0 initiative, and directed the agricultural sector to develop high-value added approaches and smart technologies. As Thailand's socio-economic backbone, the agricultural sector is being transformed into smart agriculture from a traditional one under the government's leadership. The Thai government regards such reform processes as key to its aim of further enhancing the added value and production efficiency in the agriculture sector.

⁸⁰ Lee Kwo-Whei (May 13, 2020). How a Smart Hospital Responds to and Manages the COVID-19. Overseas Medical Mission Center CCH. <https://www.youtube.com/watch?v=g2syWlaaP0c>

Thailand has undergone decades of research and development in the biotechnology sector. Backed by its solid infrastructure, the country has continued to enhance its R&D capabilities. Furthermore, with its strategic location at the center of Southeast Asia, Thailand has attracted many established global biotechnology corporations to set up operations here, including Johnson & Johnson and Novartis. Thailand has acquired a respectable level of development capacity in the face of the latest trends in biotechnology. At the present stage, the bioeconomy represents a new economic growth model of Thailand 4.0, under which the country will continue to strengthen its development and capability in agriculture and biotechnology. Special emphasis will be placed on the concepts of inclusivity, productivity and green growth, thereby transforming Thailand from a middle-income nation into a high-income economy with the distinctive status of becoming a biotechnology hub in the ASEAN region.

Agriculture is closely associated with the development of biotechnology industry, and Thailand's thriving agriculture sector and its biodiversity have laid a solid foundation for value-added biotechnology applications. Furthermore, Thailand's hot and humid climate allows the survival of a large variety of flora, fauna and microorganisms in a tropical ecosystem. Thailand's rich biodiversity boasts 15,000 plant species, which account for 8% of the world's total⁸¹. In addition, Thailand has rich and abundant farmland, from which inexpensive agricultural raw materials can be purchased directly; the country's farmland represents an important source for the development of biotechnology. If Taiwan seeks to establish a complementary relationship with Thailand on this basis and bring together the two countries' advantages while fulfilling the economic growth models of Thailand 4.0, both countries will have a great deal of leeway for cooperation in agriculture and also in agriculture-based biotechnology applications.

2. Thailand-Taiwan cooperation in agriculture and associated biotechnology value-added applications

Taiwan's agriculture is principally supported by small-scale farmers. Limited by the availability of land, the country's agricultural development focuses on seedling

⁸¹ Convention on Biological Diversity: <https://www.cbd.int/countries/profile/?country=th#facts>

research, planting technique, and high-quality agriculture. The development of compact mechanized agricultural equipment and automation facilities is also an indispensable factor contributing to the country's agricultural competitiveness. However, faced with climate change and the long-standing problem of the inadequate and aging farm workforce, the use of smart technology to develop innovative agriculture lies now at the heart of Taiwan's policies to transform the country's agriculture, which aligns with Thailand's objectives to upgrade its agriculture sector via intelligent technology. Cooperation in agricultural technology between Taiwan and Thailand began in 1969 with the Thailand Royal Project. Through various international mechanisms, Taiwan and the Thailand Royal Project Foundation have jointly promoted technical cooperation in developing a variety of crops, fruits, and flowers over four decades. With their history of collaboration in agriculture, the two countries have laid a firm foundation for furthering their partnership in the future. Against this background, we recommend that Thailand and Taiwan continue to deepen their cooperation in agriculture and biotechnology value-added applications.

(1) Collaboration on smart agriculture

With the gradual growth of Thailand's overall economy, the workforce in the agriculture sector has been declining in numbers over the years. Agricultural labor accounted for 48.79% of Thailand's total employment in 2000 and subsequently fell to 31.43% in 2019, which indicates that Thailand will likely face labor shortages in agriculture for the foreseeable future. For this reason, improving productivity is among the most important issues for the country's agriculture sector. Currently, the Thai government is actively promoting the transformation towards smart agriculture and is also planning the development of automation technology and innovative scientific research equipment, as well as investing in high-efficiency management modes. In the past, to support its Productivity 4.0 policy, Taiwan selected phalaenopsis (moth orchids), seedling, mushroom, rice, farming equipment, aquaculture, poultry (waterfowl), traceable agricultural products, fresh milk, and marine fisheries as pilot industries in implementing the country's smart agriculture. This included the introduction of advanced technologies such as wireless sensor networks (WSNs),

smart devices, Internet of Things (IoT), and big data analytics⁸². As a result of such implementations, the productivity of Taiwan's agriculture sector improved. Therefore, if Thailand chooses to incorporate Taiwan's experience and take advantage of the technological achievements that can resolve the same problems arising from its own industries, the agricultural transformation policy in Thailand may enjoy a higher degree of success.

(2) Collaboration on circular agriculture

The development of circular agriculture is in line with the Bio-Circular Green Economy (BCG) initiative currently being implemented in Thailand. The core of a circular economy lies in the transformation from traditional linear production (manufacturing, production, disposal) to circular production (resources, products, renewable resources, products) so as to alleviate the burden on the natural resources in the production process. By incorporating the concepts of circular economy into agriculture, maximizing the value of natural resources in the production process, transforming related agricultural wastes into renewable resources, and reducing excessive dependence on the natural resources, it is possible to establish a new pattern of sustainable development for the agriculture sector in Thailand.

Taiwan has been successful in developing a variety of applications in the area of circular agriculture, including fertilizers (such as agricultural waste directly covering the soil or mixing it with other materials to produce organic fertilizers or planting soil), feed (such as peanut vines, soybean vines, pineapple peels as raw materials for feed, and waste from shrimp and fish processing as feed additives), energy (such as agricultural waste as boiler fuel or refined biomass energy), enzymes (such as extracting proteases from pineapple stems and peels, and producing cellulases from straw and corn stems via microbial fermentation), and other products, such as handicrafts and health food⁸³. Based on these practices in Taiwan's agricultural circular economy, we recommend that Thailand and Taiwan continue with the exchanges on circular agriculture, and that Taiwan shares its success in this area with

⁸² Yang, C.-K. and Shih, Y.-Y. (2016), Towards Taiwan's *Agriculture 4.0 via Smart Technologies*. *Agriculture: Policies and Current Affairs*, Issue 289.

⁸³ Chang, T.-C (2017), Sharing the Fruits of Promoting Agricultural Circular Economy at the 50th Anniversary of Taiwan-Germany Agricultural Cooperation and International Seminar on Circular Agriculture. *Agriculture: Policies and Current Affairs*, Issue 299.

Thailand. For example, the traditional practice of burning straw by Thai farmers, which affects surface bacterial flora and causes air pollution, may be replaced with the Taiwanese practice of using microbial bacteria to directly decompose straw, the product of which becomes organic fertilizer. This not only solves the air pollution problem but also improves soil fertility⁸⁴. This example suggests a great deal of leeway for cooperation between Thailand and Taiwan in circular agriculture.

(3) Collaboration on value-added applications in agriculture and biotechnology

Applications in biotechnology represent an important avenue for developing high-value agriculture. Affected by the COVID-19 pandemic recently, consumers worldwide are paying increasing attention to their health. As the population aged 65 and over in highly developed countries have been growing in numbers over the years, the demand for health foods and vitamins is also rising due to the need to enhance one's immunity and maintain physical functions. As a tropical country, Thailand has access to abundant sunshine all year round, and its climate favors the growth of a variety of herbs endemic to the country, such as *Pueraria mirifica* and *Butea superba*. With Thailand's vast agricultural land and abundantly accessible raw materials, the country is uniquely suited to developing agricultural and value-added biotechnology industries such as health and functional foods.

For applications in food biotechnology, Taiwan continues to develop upstream raw and peripheral materials, and the country endeavors to enhance its products' features with added value through technological research. This strategy is employed as a bargaining chip and advantage for the country's incorporation into the global value chain. Faced with the increasing global demand for biotechnology applications in health and nutritional products, Taiwan's manufacturers are now focusing more on establishing diversified cooperation with international partners in the following perspectives: the selection of raw materials, functional requirements, product types, collaboration on physical and digital distribution channels, and even marketing strategies. With the large variety of plants and agricultural raw materials available

⁸⁴ Taipei Economic and Cultural Office in Thailand (2019), *Burgeoning Taiwan-Thailand agricultural cooperation to lead to a mutually beneficial future*. Press Release published Oct 16, 2019 (accessed on Jan 5, 2022).

in Thailand, we recommend thoroughly evaluating the potential for collaboration between Thailand and Taiwan in food biotechnology. According to a survey conducted in Taiwan, as far as Southeast Asian countries are concerned, forming partnerships with Thailand is highly expected among Taiwanese companies engaged in food biotechnology application⁸⁵. A significant opportunity exists for both countries if we combine Thailand's rich supplies of raw materials and Taiwan's technological advantages in the food biotechnology industry.

Finally, many biotechnology companies in Taiwan have already invested in agricultural biotechnology (including plant seedlings, animal vaccines, biofertilizers and agricultural pesticides), recycling, biotechnology cosmetics and specialty chemicals, and environmental protection (including biomass energy and biodegradable materials). These companies have amassed considerable experience and made tremendous progress. Thailand may benefit from these extended applications in agriculture when the country plans its agricultural transformation and innovation. With Thailand's diverse agriculture and natural resources, it is recommended that both Thailand and Taiwan thoroughly assess the conditions and possibilities for cooperation.

IV. Circular and Green Economy

1. Development of Thailand's circular economy

The concept of environmental, social, and corporate governance (ESG) in sustainable management is an emerging issue that has prevailed in industrial development in countries around the world in recent years. The “environmental” aspect of ESG covers climate change, natural resource shortages, pollution, and waste management. The “social” aspect includes labor, human rights, and community relations. The “corporate governance” aspect refers to enterprise risk management and supply chain management.

The circular economy under the ESG concept is an important indicator for the Thai government in formulating national policies. Thailand's greenhouse gas accounts for only 0.72% of global emissions, but the country ranks among the top

⁸⁵ *Biotechnology Industry in Taiwan*, 2021 (Biotechnology Industry White Paper). Industrial Development Bureau, Ministry of Economic Affairs.

ten countries most affected by climate change. An important part of the Bio-Circular-Green Economic Model (BCG), circular economy runs in parallel with Thailand 4.0, a strategic policy initiative that has been announced by the Thai government. The initiative also includes a five-year multi-phase project to achieve carbon reduction and transition to a high-value-added knowledge industry chain.

The significance of a circular economy is to establish a sustainable and renewable industrial chain, so that waste can be recycled and reused through biological and industrial technologies, thus reducing waste from mining and at the same time achieving the recycling concept of waste elimination. Due to the country's rapid economic development, Thailand is also facing increasing pressure on waste disposal. The government has announced the Draft Waste Electrical and Electronic Equipment Action Plan, 2022-2026, and the Alternative Energy Development Plan, 2015-2036, to accelerate the benefits of Thailand's circular economy policy by controlling and converting waste into resources and promoting renewable energy so as to improve the quality of the country's environment and its economic efficiency.

Thailand has also actively invested in developing green economy in recent years. In 2021, Prime Minister Prayut Chan-o-cha announced at the 26th United Nations Climate Conference that Thailand planned to achieve carbon neutrality by 2050 and net-zero greenhouse gas emissions by 2065. According to a report in "Thailand Investment Review" (TIR), the Thai government set up the Thailand Carbon Neutral Network (TCNN) in 2021 to enable more private enterprises to participate in the carbon credit market and to invest in green energy technologies such as energy efficiency improvement, renewable energy, waste management, and conservation of plant species. In addition, Thailand has prompted private enterprises in the country to join the Thailand Carbon Credit Exchange Platform, jointly developed by Thailand's Greenhouse Gas Management Organization (TGO) and the Federation of Thai Industries⁸⁶. Through technological support and cooperation of the private sector, Thailand hopes to achieve the policy objective of carbon neutrality by 2050 through measures such as the TCNN and the TGO.

For the BCG model, Thailand has proposed four industrial strategies through its policies: 1) to promote the sustainability of biological resources via balanced protection

⁸⁶ Thailand Board of Investment (2019), "Circular Economy Shaping A Sustainable Future", Thailand Investment Review, https://www.boi.go.th/upload/content/TIR5_2019_5e2e95134a76b.pdf, (accessed on Jan 6, 2022).

and utilization; 2) to create value for products and services based on biodiversity and cultural diversity that can strengthen communities and grassroots economies via proper use of resource, creativity and technology; 3) to enhance the competitiveness of Thailand's BCG industry through knowledge, technology and innovation focused on green manufacturing; and 4) to enhance resilience and adaptability to global changes⁸⁷. By adopting the advantages offered by Taiwan's experience and technologies, ample room for cooperation between the two countries can be created.

2. Current status of Taiwan's circular green economy

A circular economy represents one of Taiwan's six core strategic industries. In the past, Taiwan has had great success in resource recycling and waste recycling and reuse, which are the two foundations of circular economy. Through the amendments to the Waste Disposal Act, Regulations of the Recycling, Clearance and Disposal of General Waste, as well as Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste, rules regarding the handling of waste are stipulated in these regulations, ranging from classification, procedures and responsible units for waste disposal, and the fees levied on garbage bags, to the construction and operation management of waste incinerators. The amended versions of these regulations promulgated in 2021 have also incorporated the landfill restoration standards for waste treatment terminals into the scope of the regulations⁸⁸.

As the transparency of regulations improved and citizens' awareness of environmental protection was raised, Taiwan's nationwide recycling rate reached 49.46% in 2016 and grew to 61.35% in 2020⁸⁹. Cities across Taiwan have also enjoyed success in implementing recycling schemes. For example, in Taichung City, the photovoltaic panel-based solar power plant constructed on the land restored from Wenshan Landfill Phases I & II achieves the highest level of carbon reduction among all landfills in Taiwan⁹⁰; this solar power plant is the largest of its kind in the country

⁸⁷ Small and Medium Enterprise Administration, Ministry of Economic Affairs (2021), *Thailand: Bio-Circular-Green Economy (BCG)*. Green Environmental Information: <https://green.pidc.org.tw/detail.php?lang=tw&type=3&id=96> (accessed on Jan 5, 2022).

⁸⁸ Executive Yuan (2021), Amendments to the Regulations of the Recycling, Clearance and Disposal of General Waste. Law Bank: <https://www.lawbank.com.tw/news/NewsContent.aspx?NID=175454.00> (accessed on Jan 5, 2022).

⁸⁹ Executive Yuan (2021), Recycling and Waste Disposal, Environmental Protection. <https://www.ey.gov.tw/state/4AC21DC94B8E19A8/aea35f1b-0fe3-4ca9-8ab9-6579fd30a8f3> (accessed on Jan 5, 2022).

⁹⁰ Economic Development Bureau, Taichung City Government (2018), *Mayor Lin of Taichung City on circular economy innovations at Sustainable City Forum*. Press Release <https://www.economic.taichung.gov.tw/861099/post> (accessed on

when it was completed. Kaohsiung City also has planned to establish a circular economy demonstration zone in the future – a new material recycling industrial park. The draft proposal and the environmental impact assessment were completed in February 2021. It is expected that in the future, the industrial park will form the basis of a circular economy industrial zone that will help reduce pollution from the city's petrochemical and steel industries.

3. Cooperation opportunities: Circular green economy between Thailand and Taiwan

(1) Exchange on Thailand-Taiwan waste recycling technology

The recycling rates in Thailand are generally lower than the targets set by the government due to the limited availability of technology. For plastic waste, the recycling rate was 17.6% in 2018, less than the 22% standard set by the government in the National Plastic Waste Management Roadmap 2018-2030⁹¹. In Thailand, over three million tons of plastic waste is discarded annually, and the proliferation of plastic containers from takeout and delivered meals during the COVID-19 pandemic has exacerbated the problem. The amount of plastic waste dumped in the capital city of Bangkok surged by 62% in April 2021 compared with the same period in 2020, reaching 3,432 metric tons, with plastic food containers accounting for most of such plastic waste⁹².

Nowadays, many Taiwanese companies possess the technologies for recycling and reuse and provide products for this purpose. For example, plastic bottles can be recycled to make breathable, environmentally friendly fabrics and a series of other products; recycled plastic bottles can be turned into reusable protective clothing to combat the pandemic⁹³; recycled tires can be reprocessed into renewable fuels, eco-friendly carbon black, steam and steel wire; and used lighting equipment can be made into eco-friendly recycled tubelights. Collaboration between Taiwan and Thailand

Jan 5, 2022).

⁹¹ The World Bank (2021), "Market Study for Thailand: Plastics Circularity Opportunities and Barriers," <https://www.worldbank.org/en/country/thailand/publication/market-study-for-thailand-plastics-circularity-opportunities-and-barriers> (accessed on Jan 6, 2022).

⁹² Lin, H.-J. (2020), *Household plastic waste proliferates while tourist areas produce less garbage amidst lockdown in Thailand*. Public Television Service News. <https://news.pts.org.tw/article/480043> (accessed on Jan 5, 2022).

⁹³ CNA (2021), *Turning plastic bottles into protective clothing against pandemic: Eco-friendly endeavor by Taiwanese company in Thailand*, Nov 15, 2021. <https://www.cna.com.tw/news/aopl/202111150257.aspx> (accessed on Jan 5, 2022).

on recycling and reuse technologies will provide impetus to both countries when they upgrade their circular economy industry chains, which may include Taiwanese circular economy vendors investing in Thailand and Thai manufacturers visiting Taiwan.

(2) Establishing exchange on circular energy resource integration in industrial zones

Energy resource integration lies at the very heart of establishing energy and its supply, recycling and reuse; it also includes a network to integrate energy from power generation plants using recycled energy. By designing a circular economy's industrial symbiosis value chain, the integration of energy resources in industrial parks can expand the connection of energy resource recycling in industrial parks so as to achieve the goals of an energy resource exchange network. The Port of Kaohsiung in Taiwan was a success story in this regard. China Steel's steel mill located in the Linhai Industrial Park within the Port of Kaohsiung generated a large amount of by-product energy from its steel manufacturing process. On the other hand, petrochemical plants also located in Linhai Industrial Park required a great deal of thermal energy. China Steel therefore decided to integrate its resources with other plants in the Park and was able to sell the energy generated from steam, which created enormous economic benefits while at the same time reducing carbon dioxide emissions. Based on this experience, Thailand and Taiwan may engage in bilateral cooperation, starting with the countries' leading corporations, to establish a model for the integration of recycled energy resources in industrial parks. Taiwan can provide Thailand with the know-how from its experience with China Steel at the Port of Kaohsiung and collaborate with Thailand on establishing an energy resource integration park, representing a whole new chapter for sustainable development.

(3) Bilateral exchange on carbon inventory procedures and documentation

The environmental impact of climate change has prompted global corporations to adopt new measures in response to international environmental regulations. Taiwanese and Thai companies are essential members of the global supply chain, and

cooperation in green economy technologies represents a major advantage for both countries. In particular, to help the industry comply with international greenhouse gas reduction regulations, countries around the world are gradually increasing their requirements for greenhouse gas inventory, emission calculations, documentation of inventory operations, setting emission reduction plans, and preparing inventory reports. These governments expect to help their industries be fully prepared for greenhouse gas control and complete the tasks associated with greenhouse gas inventory ahead of schedule so that other countries may benefit from their practices. In Taiwan, relevant government agencies have provided carbon inventory guidance to a number of domestic manufacturers⁹⁴. If Taiwan and Thailand are able to share their carbon inventory-related experience in the future, companies from both countries can become models to other economies who wish to fulfill international greenhouse gas reduction requirements.

V. Electric Vehicle (EV) Supply Chains

1. Development of the EV Industry in Thailand

(1) Thailand plans to become a global EV and EV battery production base

With the technologies that have emerged in the wake of global warming in recent years, Thailand has implemented several preferential policies to promote the development of the electric vehicle (EV) industry and the associated value chains to transform and upgrade the country's transportation industry, as well as to move towards net-zero carbon emissions. As an example, in the "Thailand 4.0" economic reform initiative proposed by the Thai government in 2016, electric vehicles (next-generation vehicles) are one of the key target industries; the objective is to create a global production base for electric vehicles and EV batteries in Thailand. The plan calls for the country to be equipped with the capacity of producing 250,000 electric cars, 3,000 electric buses, and 53,000 electric motorcycles annually by 2025. The country's 2018 Eastern Economic Corridor (EEC) project also provides tax and non-

⁹⁴ Industrial Development Bureau, MoEA (2022), Industrial Energy Saving and Carbon Reduction Information Web 2022. https://ghg.tgpf.org.tw/?aspxerrorpath=/Reduction/inventory_docAppl (accessed on Mar 28, 2022).

tax incentives to encourage corporations to develop electric vehicles.

In 2020, Thailand established the National Electric Vehicle Policy Committee (NEVPC), an organization dedicated to promoting EVs. The committee has formulated the country's national EV roadmap to transform the automotive supply chain, aiming to produce zero-emission vehicles (ZEVs) and build up the technological capacity for modernized mobility. This blueprint is a development plan with three phases. In the first phase (2021-2022), the Thai government promote electric motorcycles nationwide and support the required infrastructure development. The second stage (2023-2025) principally concerns the realization of cost advantages through economies of scale so that the EV and EV battery industries will have an opportunity to grow. In the third phase (2026-2030), known as the 30/30 policy, the object is to increase EV production to 30% of the country's total vehicle production⁹⁵.

Overall, the above roadmap covers not only the production and use of electric vehicles but also the development plans for battery manufacturing and supply, the supporting infrastructure comprising charging stations and power grid management, and the development of relevant safety standards and regulations necessary for comprehensive integration. The Thai government also announced on a subsequent occasion that the country would accelerate the development of its EV production and the supporting infrastructure. The target of the new EV policy is for all vehicles produced in Thailand to be electric by 2035, with a total production target set at 18.41 million vehicles. Compared with the previous plan, the target for all-electric vehicle production has been moved up five years. The volume target for 2030 has also been expanded significantly, from 750,000 to 6.22 million vehicles⁹⁶.

In terms of supporting infrastructure, Thailand is preparing to use electric vehicles as a mainstream mode of transportation for the citizens. The goal is to develop a smart grid and an intelligent EV charging system and implement a vehicle-to-grid (V2G) power system. This will ensure that power distribution is efficient enough and able to support the use of electric vehicles. For example, government agencies, such as the Electricity Generating Authority of Thailand (EGAT), have

⁹⁵ Thailand unveils roadmap to 30% EV production in 10 years, The Nation Thailand, <https://www.nationthailand.com/blogs/tech/40000851>

⁹⁶ Clear EV plan is a must, Bangkok Post, <https://www.bangkokpost.com/opinion/opinion/2091151/clear-ev-plan-is-a-must>

collaborated with the state-owned petroleum corporation PTT Public Company Limited to develop V2G templates via a cloud platform that compiles the charging activities of electric vehicles at distribution service stations. The Ministry of Energy has also been monitoring the charging rates of electric cars to ensure reasonable costs. Digital infrastructures that are competitive will also support Thailand's status as an EV industry hub, where technologies such as IoT, cloud and artificial intelligence are expected to play a key role in vehicles' driving capabilities. In the meantime, Thailand continues to invest in its broadband network infrastructure and efficient telecommunications systems with a view to becoming a country with the fastest Internet access in the world.

Electric vehicles are one of Thailand's policy objectives to achieve zero carbon emissions between 2065 and 2070. However, concerning its plan to promote the use of electric vehicles and phase out traditional fossil fuel-based vehicles, several obstacles remain. These include the higher prices of electric vehicles, comparatively low vehicle mileage on a single charge, the limited availability of charging stations, and the demands from parts suppliers during the transition period.

(2) Overview of Thailand's EV Industry

Thailand is the largest automobile manufacturing country and exporter in Southeast Asia. Affected by the COVID-19 lockdowns and work stoppages, automobile sales and production have dropped significantly. In 2020, automobile sales were down 21.4%, and production declined by 29.1%⁹⁷. A total of 2.2 million vehicles were produced and the automotive sector employed more than 850,000 workers. Thanks to the government's continuous efforts to implement EV-related policies and investment incentives, sales of electric vehicles in 2020 grew by 38.9%, of which battery electric vehicles experienced the most robust growth: up by 83.7% over the previous year⁹⁸.

Consumer confidence in the long-term advantages of electric vehicles has continued to grow due to substantial investment by the Thai government and

⁹⁷ *Automobile and Motorcycle Industry Yearbook, 2021*. Industry, Science and Technology International Strategy Center (ISTI), Industrial Technology Research Institute (ITRI).

⁹⁸ Thailand Automotive Outlook, 2021, Research and Markets.

international investors. With an ever-increasing awareness of the need to protect the environment, Thailand's use of electric vehicles has enjoyed significant growth. According to a survey by Frost & Sullivan, among the six ASEAN countries consisting of Indonesia, Malaysia, Singapore, Thailand, the Philippines and Vietnam, Thai consumers have a higher level of awareness and demand for electric vehicles compared with other countries in that group. An increasing number of Thai consumers now have a better understanding of EV technology, and the number of consumers who are worried about electric vehicles being unable to reach their final destination or a charging station before running out of power continues to decline. About 43% of Thai respondents who do not yet own an electric vehicle are considering purchasing one within the next three years, and they cite their motivation for purchasing an electric vehicle as the desire to reduce carbon emissions⁹⁹.

Thailand is the largest electric car market in Southeast Asia. According to the Electric Vehicle Association of Thailand (EVAT), registered electric vehicles in various categories increased from 103,702 in 2017 to 231,682 in October 2021. Among them, 93.6% were passenger cars, 6.21% were motorcycles, and the remaining were tuk-tuks, buses, and trucks. Broken down by vehicle type, the vast majority were gasoline-electric hybrids (82.71%), with the rest being plug-in hybrids (12.93%) and battery (pure-electric) (4.37%). The number of charging stations in Thailand has also increased with public and private sector investment. As of September 2021, Thailand had 693 charging stations with 2,285 charging outlets from 12 service providers across the country (774 of which were fast chargers and the remaining were normal chargers).

Driven by the timetable of global energy saving and carbon reduction as well as the 2050 net-zero carbon emission targets, the automobile industry has accelerated its transformation from producing internal combustion engine-based vehicles to electric vehicles; and low-carbon transportation has become an international trend. In the post-pandemic era, where COVID-19 vaccines are readily available, and the global economy has stabilized, the EV industry is expected to grow at an even more rapid pace, which will attract more vendors to invest in the development of electric vehicles

⁹⁹ Clear EV plan is a must, Bangkok Post, <https://www.bangkokpost.com/opinion/opinion/2091151/clear-ev-plan-is-a-must>

and associated parts, charging facilities and application services.

2. Opportunities for cooperation in EV development between Thailand and Taiwan

Due to technological advancements and growing awareness in environmental issues, the EV industry's prospects are promising. According to the 2021 edition of the International Energy Agency's *Global EV Outlook*, despite the 16% decline in global automobile sales due to the COVID-19 pandemic compared with the previous year, the EV market managed to grow at a robust pace, with the number of registrations having increased by 41% in 2020, which indicates that the global demand for electric vehicles show no signs of slowing down.

Thailand is the 11th largest automobile production base globally and the largest among ASEAN countries. Thailand enjoys advantages in supply chain integration concerning certain categories in the automobile, electrical appliance and electronics industries. However, as Thailand begins the transformation of its automotive sector from internal combustion engine models to electric vehicles, the local supply chain will likely bear the brunt of the growing pains when it comes to technology and talent. Currently, the production capacity of Thailand's electric motorcycles remains dependent on foreign capital, and most electric motorcycles assembled in Thailand are done with imported parts¹⁰⁰.

The development of the next generation of electric vehicles will focus on battery technology and advanced automotive electronics. The former includes wireless charging, all-solid-state lithium batteries, and fuel cells to improve the performance of electric vehicles; the latter includes autonomous assisted driving, Internet of vehicles (IoV), and vehicle sharing. These new technologies will bring more application possibilities to electric vehicles¹⁰¹. Taiwanese manufacturers have now invested and participated in the EV industry chain, ranging from materials, parts and components in the upstream to systems integration services downstream. In particular, Taiwan is known for its expertise and advantages in IC design and semiconductor

¹⁰⁰ Thailand Car Makers Ramp Up Electric Vehicle Production Capacity in Thailand, Investment Board Says, BOI, https://www.boi.go.th/index.php?page=press_releases_detail&topic_id=125377

¹⁰¹ Lin, M.-W. (2020), Challenges and Opportunities for Global Electric Vehicle Development. *Journal of Petroleum*, Vol. 56, No. 1, 2020.

manufacturing. Helping non-conventional automakers to develop new models, supplying systems and critical components to global automakers, and human-machine interface business opportunities derived from software and hardware integration, as well as the development of novel application service systems, among others, are all possible areas of cooperation between Thailand and Taiwan as we advance.

(1) Production of EVs and key components

According to Thailand's national EV roadmap, which requires all public vehicles purchased in 2025 and beyond to be electric with zero carbon emissions, it is possible that traditional fossil fuel-based buses for inter-city transportation and ferries serving the Chao Phraya River and major canals will soon be phased out. The demand for electric buses and electric boats is expected to emerge gradually over the next few years. In addition, with Thailand's booming logistics industry, commercial vehicles such as electric trucks and light electric vehicles can help businesses reduce costs and minimize the impact of transportation on the environment. This is a potential opportunity for the development of electric vehicles to take off.

In terms of Thailand-Taiwan cooperation, Taiwan's Foxconn partnered with Thailand's PTT Public Company Limited to establish an open platform focusing on the production of electric vehicles and key components, to help Thai automakers accelerate their pace in EV production and sales both in Thailand and in other ASEAN countries, as well as provide instant services to the EV industry in Thailand¹⁰². The two partners also created a vertically integrated EV production base via a joint venture, including manufacturing and production systems, supply chain management and engineering R&D centers¹⁰³. In addition, Taiwan-based Jinpao Precision Industry entered the electric motorcycle market in Thailand and joined forces with Thai motorcycle manufacturer Newsomthai (NST) to establish the electric motorcycle manufacturer I-MOTOR and the indigenous electric motorcycle alliance under the auspices of the Thai Ministry of Energy. Jinpao also collaborated with a subsidiary of Thai gasoline station operator Banchak Corporation to develop charging stations for

¹⁰² *PTT and Foxconn Announce Together Venture on Electric Vehicle Production Platform*. Foxconn Press Center. <https://www.honhai.com/en-us/press-center/events/ev-events/612>

¹⁰³ *PTT and Hon Hai [Foxconn] Celebrate Milestone with a Joint Venture to Establish a Fully Integrated Electric Vehicle Production in Thailand, Ready to Promote the Country as ASEAN's EV Hub*. Foxconn Press Center. <https://www.honhai.com/en-us/press-center/events/ev-events/679>

electric motorcycles, as well as participated in formulating relevant electric motorcycle energy regulations under the guidance of Thailand's Ministry of Energy. Based on the developments described above, integration into the supply chain of Thailand's international EV brands, if achieved, could be instrumental in expanding EV sales in Thailand and the global marketplace and conducive to fostering a closer connection between Thailand and Taiwan's EV supply chains.

(2) Charging infrastructure

The EV infrastructure in Thailand is currently undergoing a period of rapid growth. Several state-owned enterprises¹⁰⁴ in Thailand have invested in household and public EV charging facilities and services, although most EV charging stations are still being developed by private companies. In addition, many green energy startups have also entered the fray, mainly selling and installing home charging devices and systems for residential and commercial zones. Most of these startups import devices from other countries and provide installation services. With the popularity of electric vehicles rising and the associated technology constantly advancing, there is a continuing demand for a faster and smarter charging infrastructure. It is worth noting that as each charging service provider develops its own software applications or platforms; therefore, there are potential business opportunities for system interconnectivity and interoperability in the area.

Currently, Taiwan's Delta Electronics and the Thai subsidiary of Japan's Mitsubishi Motors have joined forces in developing the EV-related charging business in Thailand. They have also been working with Thailand's Provincial Electricity Authority to provide a mobile application service that enables EV drivers to locate charging facilities. The charging piles, chargers, network communications, and control components required by the EV industry are products in which Taiwanese vendors excel. For example, Pegatron Corporation, Delta Electronics, Fortune Electric, Phihong Technology, and SINBON Electronics have become part of the supply chain of Tesla, BMW, Mercedes-Benz, Audi and ChargePoint¹⁰⁵, with ChargePoint being

¹⁰⁴ Including the Electricity Generating Authority of Thailand (EGAT), Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA)

¹⁰⁵ Tang, T.-C. and Lin, T.-L. (2021), Taiwan vendors respond to global EV charging pile shortages. <https://www.mirrormedia.mg/story/20210901ind006/>

the largest charging station operator in the US. As Thailand currently plans to build a charging and battery-swap station infrastructure, there is ample room for cooperation between Taiwan and Thailand.

(3) Battery technologies

Organized by the Thai government, Thailand Energy Storage Technology Alliance (TESTA) aims to promote the advancement of energy storage technologies and ensure that the fruits of their research efforts are successfully commercialized, especially in lithium-ion batteries. The battery testing center located on the outskirts of Bangkok is slated to become the largest, most advanced lithium-ion battery testing center among all ASEAN countries. Companies participating in the battery market in Thailand include Germany's FEV Group (battery and fuel cells), Mercedes-Benz (batteries for Mercedes plug-in hybrid electric cars), Thai power-generation and public utilities company Global Power Synergy Plc (semi-solid-state batteries), and energy vendor Energy Absolute (lithium-ion battery). Apart from the battery types described above, major Thai corporations are also seeking breakthroughs in new battery technologies, including next-generation anode/cathode materials and designs, to reduce both the costs of producing batteries and the impact on the environment.

Research and development of battery technologies in Taiwan is on par with the efforts of major manufacturers in Japan and South Korea, and the quality of lithium batteries produced in Taiwan is more stable than those manufactured in China. There have been collaborative efforts between Taiwan and Thailand on the development of battery technologies. One such case is the partnership between Amita Technologies and Thailand's Energy Absolute (EA), which set up an EV battery factory in Thailand based on the niche high-safety polymers STORA for lithium batteries, the objective of which is to support EA Group's terminal application system strategies such as electric vehicles and green power generation in Southeast Asia¹⁰⁶. Another example is that Taiwan-based Jinpao Precision Industry participated in formulating the Energy Vehicle Association of Thailand's (EVAT) battery specifications. In the future, battery-swap stations for electric motorcycles will be able to provide customized solutions that

¹⁰⁶ You, L. and Lin, L.-C. (2018), Asian Silicon Valley: Entering the Southeast Asian EV market with green, safe transportation. *Industrial Technology*. Issue 321, Aug 2018.

fulfill the needs of customers of other motorcycle brands¹⁰⁷. These examples show that Taiwan and Thailand have already enjoyed a solid foundation for cooperation in EV battery technologies. Going forward, as the demand for electric vehicles continues to grow, there will be room for further deepening of battery production and technological cooperation between the two countries.

¹⁰⁷ Wang, Y.-L. (2021), Business opportunities for electric motorcycles in Thailand up for grabs! Jinpao and NST's joint venture I-Motor to introduce battery-swap stations in 2022. *Business Next*. <https://www.bnext.com.tw/article/65759/jpp-imotor-jv-thailand-ev-scooter>

Chapter Four Conclusion and Suggestions

I. Course and Overview of Taiwanese Investment in Thailand

For four decades, bilateral economic and trade relations between Taiwan and Thailand have grown increasingly close, with Taiwanese firms investing in Thailand since the 1960s. In the 1990s, the Taiwanese government launched the “Southern Policy” to facilitate Taiwanese firms in expanding their footprint overseas, particularly to South East Asia, and contribute to the take-off and development of the region’s industries. As a result, Taiwan-to-Thailand investments reached their first peak from the late 1980s to the mid-1990s.

In recent years, Taiwan-Thailand investment ties have grown even closer as driven by Taiwan’s “New Southbound Policy” and the relocation of supply chains amid US-China trade war tensions. According to the Thailand Board of Investment (BOI), as of December 2020, the number of approved investments from Taiwan totaled 2,535 cases, representing a value of approximately US\$16 billion. This figure did not include Taiwanese investments entering Thailand through third parties, such as the Cayman Islands, Singapore, and China, which means that it was likely understated, rendering an incomplete picture of Taiwan-to-Thailand investments. In addition, a conservative estimate would suggest there are over 5,000 Taiwanese firms in Thailand, given that such data did not account for a significant number of those registered under the name of their Thai partner instead of as a Taiwanese firm or factory, or whose Taiwanese ownership fell below 50%. In other words, the statistics might have overlooked certain Taiwanese investments in Thailand. Meanwhile, from the perspective of investment objectives, Taiwanese businesses have gradually shifted from eyeing Thailand as a potential manufacturing base to targeting its domestic demand and neighboring markets; incentives on production costs, such as human and land capital, have become secondary.

Investments from Taiwanese businesses also complement Thailand’s policy

targets to promote local industrial development. In 2020, Thailand's approved investments from Taiwan accounted for 6.2% of its total foreign direct investment (FDI) at THB 15.64 billion, making Taiwan the 5th largest foreign investor in the country. A majority of those investments were aligned with the target industries of Thailand's investment promotion policies, which included the electrical appliances and electronics, petrochemical and chemical, medical, automotive and components, agriculture and food processing, and digital industries. Moreover, the approved Taiwanese investments were expected to further promote peripheral industries as they opted for local raw materials.

Although inbound foreign investment to Thailand was hit by the COVID-19 pandemic in the short term, investor confidence eventually recovered as the country rolled out relevant fiscal support, the Bubble and Seal policy, and effective approaches to increase its vaccination coverage. In addition, based on existing studies and evaluations across international institutions, Thailand enjoys several investment advantages that are fundamental for the country to get over the pandemic slump in the mid-to long term. These advantages include: 1) It is strategically located at the heart of Southeast Asia's transportation systems; 2) it has a comprehensive transportation network; 3) its business environment has continued to advance; 4) it has been actively developing its trade agreement network, and hence could benefit under the market radiation effect of regional economic integration; 5) it offers a free and open investment environment; and 6) it enjoys abundant natural and agricultural resources. Moreover, Thailand ranks 5th among ASEAN countries for cumulative total foreign investment over the past ten years with a value exceeding US\$80 billion, demonstrating the country's attractiveness to foreign investors worldwide.

Thailand's investment environment has clearly improved and is attractive to others. However, this study found that Taiwanese businesses operating in Thailand still face obstacles related to regulatory and administrative issues, trade, investment, labor, human resource, taxes, and infrastructure. Therefore, we hope that the Thai government can take note of the opinions of Taiwanese businesses gathered in this study and help remove such obstacles. It would help boost their business efficiency and competitiveness in Thailand, bringing even more potential Taiwanese firms and foreign investors to the country. On the one hand, this could strengthen the ties

between both countries' industries; on the other hand, it can positively contribute to Thailand's recovery in the post-pandemic era. Based on our findings, we propose the following issues of concern and suggestions to serve as a reference for the Thai government in adopting policy initiatives that help resolve business barriers and increase the investment efficiency of Taiwanese firms.

II. Issues of Concern to Taiwanese Investors and Suggestions

Prior to this white paper, the World Taiwanese Chambers of Commerce (WTCC) had previously provided the Thai government with a list of recommendations for improving the investment environment in “The White Book for Business Investment in Thailand” published in 2017. We would like to express our sincerest gratitude to all Thai government agencies for considering our recommendations and implementing relevant measures. In particular, they have not only referred to our recommendations, but turned them into policy actions, as well. This white paper has consolidated the relevant measures implemented by the Thai government with reference to the 2017 edition of “The White Book for Business Investment in Thailand” in Table 4-1.

Table 4-1 The White Book for Business Investment in Thailand 2017 outcome review: Improvement measures implemented by the government of Thailand

Issues	Suggestions	Improvement Measures of the Thai Government
(1) Legal system and procedural issues		
(i) Legal system	<ul style="list-style-type: none"> • Increase the availability of official English versions of laws and regulations and strengthen regulatory transparency. • Strengthen product quality standards to prevent poor-quality products from entering the Thai market. 	<ul style="list-style-type: none"> • Improvements on official English versions of laws and regulations: <ul style="list-style-type: none"> ✓ A number of English regulatory documents has been published on Thailand BOI's website, such as the Investment Promotion Act 1977 (amended thrice in 1991, 2001, and 2017). However, due to the large number of documents, many of the released English versions are not official translations; they only serve to offer a general idea of the regulations to audiences with little to no knowledge of the Thai language. ✓ Thailand BOI has added an English website to offer services on relevant application procedures to all business entities in Thailand. • Thailand continues to strengthen its product quality standards: <ul style="list-style-type: none"> ✓ Industrial products such as civil engineering and construction materials, consumer goods, electrical and electronic products, fluid engineering equipment, food, thermal conductivity engineering products, pharmaceuticals, paints, machinery and vehicles, and chemical products are among the ten areas involving more than 100 industrial products that are subject to certification by the Thailand Industrial Standards Institute (TISI) to gauge the quality of imported products.
(ii) Administrative procedures	<ul style="list-style-type: none"> • Streamline the certification application process for industrial goods to speed up certification. 	<ul style="list-style-type: none"> • No relevant information is available at this time.
(2) Labor		
(i) The definition of "work"	<ul style="list-style-type: none"> • Clarify the definition of "work." 	<ul style="list-style-type: none"> • No relevant information is available at this time.
(ii) Visas and work permits	<ul style="list-style-type: none"> • Eliminate the rule requiring notification from foreigners every 90 days of residence. • Extend the time limits on work permits and liberalize restrictions on work location. • Streamline the procedures for obtaining visas and work permits. 	<ul style="list-style-type: none"> • Improvements on the rule requiring notification from foreigners every 90 days of residence: <ul style="list-style-type: none"> ✓ Thailand launched the SMART Visa in 2018, which extended the time for foreigners to notify the Immigration Bureau from 90 days to one year.

Issues	Suggestions	Improvement Measures of the Thai Government
(3) Human resources		
(i) Skilled labor and specialized talent training	<ul style="list-style-type: none"> • Strengthen basic technical and vocational education and raise a skilled labor force. • Strengthen the training of talent in specialized fields. 	<ul style="list-style-type: none"> • Improvements on skilled labor and specialized talent training: ✓ Thailand cooperates closely with Taiwanese businesses in training their labor force through efforts such as establishing the Thai-Taiwan (BDI) Technology College, Delta IA Lab, Delta IA Academy, and Thailand-Taiwan AI College.
(4) Trade		
(i) Tariffs and customs	<ul style="list-style-type: none"> • Promote Thai-Taiwan economic and trade cooperation to reduce bilateral tariff barriers. • Promote facilitation of customs clearance and reduce administrative and transaction costs for imports and exports. 	<ul style="list-style-type: none"> • Improvements on tariffs and customs-related procedures: ✓ Thailand passed an amendment to the Customs Act in 2017, which removed the discretionary power of the Customs Department to increase tariffs on imports, and reduced the incentives given to customs officials. ✓ The Thai Customs Department has conducted a public consultation on customs penalty and incentive mechanisms in 2019 for possible legal amendments, and is expected to announce new amendments to the Customs Act in 2021.
(5) Government procurement		
(i) Information on government procurement and participation in electronic bidding	<ul style="list-style-type: none"> • Provide official English versions of government procurement information and promote the facilitation of foreign firms' participation in electronic bidding. 	<ul style="list-style-type: none"> • No relevant information is available at this time.
(6) Investment		
(i) Limitations on investment in the service sector	<ul style="list-style-type: none"> • Liberalize the Foreign Business Act to reduce restrictions on investment and operations in part of the service sector by foreign firms to promote liberalized development of the service sector. 	<ul style="list-style-type: none"> • Improvements: ✓ Thailand's Ministry of Commerce annually reviews the Foreign Business Act's (FBA)'s List 3 of restricted activities for foreigners. In 2019 and 2020, it removed four types of business activities from List 3, including: telecommunication services (for operators without their own telecom networks), financial centers, aircraft maintenance, and software development, all of which are now permitted under the Type 1 license, to further reduce the barriers to foreign investment.

Issues	Suggestions	Improvement Measures of the Thai Government
(ii) Investment application procedures	<ul style="list-style-type: none"> Simplify the timetable for general investment to set up a company, making it easier for Taiwanese firms to participate in commercial opportunities in the Thai market. 	<ul style="list-style-type: none"> Improvements: <ul style="list-style-type: none"> ✓ The Thai Ministries of Commerce and Labor have promised to introduce a one-stop service to speed up the business registration process; implement the new Factory Act (which would remove factory operating license requirements); and implement the Licensing Facilitation Act to smoothen the government licensing application process for businesses.
(iii) Restrictions on ownership of land and structures held by foreign investors	<ul style="list-style-type: none"> Relax the restrictions on the maximum period allowed for foreigners or foreign companies to rent land and structures to incentivize them to make long-term investments. 	<ul style="list-style-type: none"> No relevant information is available at this time.
(iv) Financing small and medium enterprises (SMEs)	<ul style="list-style-type: none"> Reduce the barriers for SMEs to raise capital and help strengthen their competitiveness. 	<ul style="list-style-type: none"> The Thai government has proposed a number of measures to assist SMEs in financing, but there are still many barriers and areas for improvement. Measures such as facilitating access to alternative financing, promoting e-finance transactions to reduce the existing SME financing gap in the market, and facilitating access to financial services for SMEs are also part of the goals included in the Policy Guidelines for the Specialized Financial Institutions with regards to SMEs, 2016-2020.
(v) Investment guarantees	<ul style="list-style-type: none"> Strengthen guarantees for the rights and interests of Taiwanese firms that invest in Thailand. 	<ul style="list-style-type: none"> No relevant information is available at this time.
(7) Taxation		
(i) Withholding tax rate on firms' domestic service activities	<ul style="list-style-type: none"> Lower the withholding tax rate on firms' domestic service activities to reduce the situations of overpaid income taxes and relieve the firms' operational burden. 	<ul style="list-style-type: none"> No relevant information is available at this time.
(ii) Advance tax rulings	<ul style="list-style-type: none"> Provide advanced tax rulings before transactions to facilitate the taxpayers in making an overall assessment of the impact of taxes on the transaction. 	<ul style="list-style-type: none"> No relevant information is available at this time.

Issues	Suggestions	Improvement Measures of the Thai Government
(iii) Tax reporting	<ul style="list-style-type: none"> Reduce reporting by SMEs on value-added tax, payroll, and withholding tax amounts to once per quarter to relieve their tax and administrative burden. 	<ul style="list-style-type: none"> No relevant information is available at this time.
(iv) Carry-forward period of net operating losses for tax purposes	<ul style="list-style-type: none"> Extend the time limits on the carry-forward period of net operating losses for tax purposes to incentivize new and additional investment. 	<ul style="list-style-type: none"> No relevant information is available at this time.
(8) Infrastructure		
(i) Basic hardware infrastructures	<ul style="list-style-type: none"> Improve infrastructures and their quality. 	<ul style="list-style-type: none"> Improvements in recent years: <ul style="list-style-type: none"> ✓ Taiwanese businesses generally report no problems with electricity supply infrastructure (at least in industrial areas where electricity supply is stable). However, the density of railroads, the efficiency of maritime transport services, the penetration rate of electricity, the level of water pollution, and the overall reliability of the water supply system may be the areas that the Thai government can consider when promoting initiatives to improve domestic infrastructure in the future.
(ii) Mobile communications network and its quality	<ul style="list-style-type: none"> Improve the mobile communications network and its quality. 	<ul style="list-style-type: none"> Improvements in recent years: <ul style="list-style-type: none"> ✓ Thailand's 4G network coverage has increased significantly in cities, but the quality and fees of software infrastructure for network communications outside of major cities still needs to be further adjusted.

From Table 4-1, it can be seen that Thailand has been actively improving its domestic investment environment, which deserves credit. However, as a result of the US-China trade war and the outbreak of the COVID-19 pandemic, the investment environment and the distribution of supply chains have changed significantly since the last White Paper. This means that both Taiwan and Thailand are now facing new investment challenges. Taking into account Thailand's Industry 4.0 and Bio-Circular-Green Economy (BCG) economic growth objectives, this white paper updates and consolidates Taiwanese firms' new concerns about investing in Thailand in recent years and offers suggestions to the Thai government on issues such as regulatory and administrative procedures, trade, investment, labor and human resources, taxation, and infrastructure, which are presented in Table 4-2 below.

A noteworthy achievement are the 26 years since the Agreement between the Taipei Economic and Trade Office in Thailand and the Thailand Trade and Economic Office in Taipei for the Promotion and Protection of Investments (hereinafter “the Agreement”) came into effect in 1996. During this period, not only have international investment agreements been continuously updated and developed, but Taiwanese investments in Thailand have also become more diverse. Therefore, there is a need to update the Agreement. In terms of significance, Taiwan was the fifth-largest source of foreign investment in Thailand by 2020 (after Japan, China, the Netherlands, and Singapore), suggesting that Taiwan’s investment plays a part in Thailand’s economic development. If the Taiwanese and Thai governments can jointly review and update the Agreement on subject matters such as expanding the scope of investment protection, further including national treatment, prohibiting performance requirements, and improving regulatory transparency to provide more comprehensive protection for investors on both sides, it will not only strengthen the rights and interests of existing Taiwanese firms in Thailand (and existing Thai firms in Taiwan) but will also promote investor confidence and encourage Taiwanese firms to invest in Thailand (and vice versa). Following the experience of both governments in signing the Agreement, the suggestions for updating it below may serve as a precursor to future cooperation between Taiwan and Thailand to further strengthen investor protection and deepen bilateral investment relations.

Table 4-2 Issues of concern to Taiwanese investors, with suggestions

Issues of Concern to Taiwanese Investors	Suggestions
(1) Legal system and procedural issues	
Strengthen legal reform and reduce regulatory ambiguity	<ul style="list-style-type: none"> • Short-term: Assign a dedicated unit in charge of service and consultation at the central level to explain the legal basis and reasons for relevant law enforcement and reduce individual discretionary space. • Mid- to long term: Establish a platform to gather suggestions on regulatory issues from the chambers of commerce across countries, evaluate the need for regulation amendments based on the suggestions, and publish the evaluation results.
Increase transparency of the legal reform consultation procedure	<ul style="list-style-type: none"> • Before promulgating a regulation: Reserve sufficient time for negotiations with foreign firms to strengthen the transparency of the consultation procedure. • After promulgating a regulation: Collect feedback from foreign firms to determine if the new regulation has resulted in any new problems or investment barriers following its enactment.

Issues of Concern to Taiwanese Investors	Suggestions
Streamline the certification process for imported industrial products	<ul style="list-style-type: none"> • Streamline application paperwork or speed up application reviews. • Evaluate the feasibility of signing a mutual recognition agreement (MRA) or other forms of binding mutual recognition channels.
Continue to increase the availability of official English versions of relevant documents	<ul style="list-style-type: none"> • Collaborate with Taiwan Desk to gather information on the current language-related roadblocks encountered by Taiwanese businesses when dealing with legal or application documents and continue to increase the availability of official English versions of relevant documents.
(2) Trade issues	
Reduce tariff barriers on both sides to strengthen bilateral trade and economic relations	<ul style="list-style-type: none"> • The Thai government can evaluate the feasibility of signing a free trade agreement (FTAs) or economic cooperation agreement with Taiwan.
Enhance transparency of customs-related regulatory procedures	<ul style="list-style-type: none"> • Establish clear and consistent customs protocols and regulations. • Establish a dispute resolution mechanism between Thai Customs, importers, and exporters, such as a communication and negotiation platform for customs-related affairs.
Publish clear and transparent technical guidelines for customs affairs	<ul style="list-style-type: none"> • Publish clear technical guidelines for customs affairs. • Impose a high-value penalty only in cases of clear intent to defraud to avoid abusing the customs reward-penalty mechanism with reference to the Revised Kyoto Convention (RKC).
Relax government procurement restrictions for foreign businesses	<ul style="list-style-type: none"> • Thailand is encouraged to actively prepare to join the Agreement on Government Procurement (GPA). • Enhance current limitations on the e-GP platform in areas such as language, regulations for company registration, and restrictions on investments based on country of origin.
(3) Investment issues	
Accelerate process for relaxing sectoral and ownership restrictions on foreign investment	<ul style="list-style-type: none"> • Further open up the service sector for foreign investment, such as financial, insurance, and modern services. • Relax the restrictions on foreign firms' participation in specific sectors and ownership ratios.
Relax restrictions on the period allowed for foreign investors to rent land and structures	<ul style="list-style-type: none"> • Relax the restrictions on the maximum period allowed for foreign persons or companies to rent land and structures.
Renew bilateral investment protection agreement	<ul style="list-style-type: none"> • We recommend that Taiwan and Thailand renew their bilateral investment protection agreement.
Expand scope for the application of investment incentive measures	<ul style="list-style-type: none"> • Expand the scope of industries eligible for investment incentive measures to cover the supplementary industries in the supply chain of target industries and those that have significantly contributed to Thailand's economy, such as the manufacturing and technical/supplementary service industries.
Reduce financing barriers for SMEs	<ul style="list-style-type: none"> • Provide more preferential loans to SMEs to establish Thailand as a financing-friendly environment for them. • Promote partnerships between private banks in Thailand and local banks in Taiwan, through which they can share and consolidate credit information to reduce the risk of approving loans to Taiwanese SMEs.

Issues of Concern to Taiwanese Investors	Suggestions
(4) Labor and human resources issues	
Strengthen specialized talent training and talent exchanges between Taiwan and Thailand	<ul style="list-style-type: none"> • In addition to participating in cooperative education programs, a company should also be subsidized for employee education and internship programs. • The Thai government may utilize the Taiwan-Thailand Education exchange service platform, established by the Taipei Economic and Cultural Office in Thailand, for talent exchanges.
Expand SMART visa's scope of eligibility	<ul style="list-style-type: none"> • In addition to offering SMART visas to targeted industries, the BOI can also consider including other industries that are not covered by SMART visas, but prove to be important subcontractors forming the industrial cluster (such as automotives and smart electronics).
Streamline work permit application procedure	<ul style="list-style-type: none"> • Speed up the procedure for issuing work permits to Taiwanese employees.
Establish clear definition of "work" and relax the work permit application requirements for business travelers	<ul style="list-style-type: none"> • Relax the requirements for business travelers applying for visas on arrival.
The 4:1 ratio for employing Taiwanese interns	<ul style="list-style-type: none"> • Relax the 4:1 Thai-to-foreign employee ratio for Taiwanese companies to employ interns in Thailand, thereby promoting their long-term operation there.
Requirements for Thai firms to have a minimum paid-up capital of THB two million per work permit issued	<ul style="list-style-type: none"> • Relax the requirement for Thai firms to hold a minimum paid-up capital of THB two million as collateral for each work permit.
(5) Taxation issues	
Lower tax rate, streamline procedures, and expand coverage of investment incentives	<ul style="list-style-type: none"> • We recommend lowering the withholding tax rate to 1.5%. • We recommend reducing reporting from once per month to once per quarter.
Provide clear and consistent explanations to advance tax ruling reports and relevant laws	<ul style="list-style-type: none"> • Provide firms with clear advance tax ruling reports. • The reports issued by tax officers can consider including relevant legal bases and provide consistent explanations to the same laws applied.
Extend incentives for startups	<ul style="list-style-type: none"> • We recommend Thailand extend the "time limits on the carry-forward of net operating losses" from eight years to ten years by referring to the examples of other countries (such as Japan).
(6) Infrastructure issues	
Further utilize the capacity of local Taiwanese businesses to strengthen infrastructures through public-private partnerships	<ul style="list-style-type: none"> • Thailand can consider further tapping into the capacities of local Taiwanese businesses and establishing investment cooperation with suitable firms through the Thai-Taiwan Business Association (TTBA)'s matchmaking services to strengthen various types of infrastructures.
Accelerate upgrades on cyberinfrastructure, its quality, and extend internet coverage	<ul style="list-style-type: none"> • Implement 5G update phases to facilitate Thailand's digital transformation more effectively.

III. Promoting the Development of Thai-Taiwan Cooperation

1. Cooperation in smart manufacturing

(1) Thailand 4.0 policy strives to promote emerging industries such as machinery and automation, which will in turn drive the development of ten key industries, including food processing and automotive, to achieve added value through advanced technology. As a result, Thailand's traditional manufacturing sector will need to undergo a transformation, of which smart manufacturing is an essential component, and the demand for related machinery equipment and solutions will rise.

(2) With the promotion of relevant policies, many industries in Taiwan have adopted smart manufacturing. In particular, Thailand and Taiwan both have an industrial structure dominated by SMEs. In this case, the Thai government may use Taiwanese SMEs' experience in smart transformation as a reference to promoting industrial transformation in Thailand. To be specific, we suggest that Taiwan and Thailand can hold more relevant cooperation and exchange forums, where Taiwanese businesses can share successful cases of smart industrialization solutions and smart manufacturing, while evaluating the feasibility of implementing similar solutions in Thai industries. This will help accelerate the smart transformation of Thai industries and foster positive interactions between the two economies.

2. Cooperation in smart healthcare

(1) To implement its vision of becoming the Medical Hub in Asia, Thailand is experiencing a strong demand for importing medical devices, as well as boosting research and development (R&D) and manufacturing. It will also need to improve the overall quality of its medical services. In particular, Thailand places great emphasis on the application of ICT in the medical field, such as smart watches, smart ambulances, nursing robots, and wireless smart operating rooms. These are all the items that Taiwan can collaborate with Thailand in the future in terms of production and R&D.

(2) Establish a cloud-based electronic medical record system. Currently, a cloud-based medical record system has not yet been widely adopted in Thailand, causing

inconvenience among the public in seeking medical treatment and referrals. In order to improve access to medical treatment and referral efficiency, Thailand will establish a cloud database to integrate medical records between hospitals, as well as work with other government agencies to integrate citizen information. In this case, by cooperating with Taiwanese firms, Thailand will be able to improve the efficiency of its medical treatment and move ahead with the development of Medical Hub in Asia.

(3) Taiwan's experience in combating the COVID-19 pandemic and in the use of technology can help Thailand create safer and more efficient hospitals. During the pandemic, Taiwan relied heavily on technology for hospital cleaning and staff access control. By applying these experiences of technology use in Taiwan, Thailand will be able to establish a safer and more efficient hospital environment that can relieve patients' concerns about visiting a hospital, thereby bringing Thailand one step closer to becoming the Medical Hub in Asia.

3. Cooperation in agriculture and biotechnology applications

(1) Promote bilateral cooperation in smart agriculture. Thailand is actively promoting the smart transformation of its agricultural sector as it is paramount to increasing productivity. Meanwhile, Taiwan's policy has identified ten flagship industries for smart agriculture, which includes introducing wireless sensor networks, smart devices, the Internet of Things, and big data to develop cutting-edge technologies for smart agriculture. By exchanging successful experiences with each other, Thailand can introduce Taiwan's technological advances used to solve similar industry-specific problems to its own agricultural system. This will open up a great venue for bilateral cooperation in circular agriculture, which can be identified as one of the main themes of Taiwan-Thailand cooperation in agriculture.

(2) The development of circular agriculture aligns with Thailand's Bio-Circular-Green Economic Model (BCG). Whereas in Taiwan, the development of circular agriculture has diverse applications, including transforming agricultural waste into fertilizer, feed, energy, enzymes, handicrafts, and health supplements, demonstrating Taiwan's abundant experiences in this regard. Thailand also has abundant agricultural resources, and if waste such as coconut, durian peel, pineapple, and mango can be

further utilized to enhance their added value by applying Taiwan's circular agriculture technology, it will contribute to the development and upgrading of Thailand's circular agriculture.

(3) Due to the outbreak of the COVID-19 pandemic, consumers around the world have become increasingly aware of the need to boost their immunity, which leads to a rapid increase in demand for products such as health supplements and vitamins. As a country rich in botanical and agricultural resources, Thailand is well-positioned to tap into the industries like health supplements and functional food that develop agricultural and biotechnology value-added applications. Taiwan also enjoys advantages in food biotechnology, particularly in the application of raw material value-added technology. In addition, domestic health and nutrition product manufacturers are increasingly seeking diversified cooperation with their foreign counterparts. Together with Thailand's advantage in plants and agricultural raw materials, Taiwan and Thailand could create opportunities for bilateral cooperation in food biotechnology.

(4) Taiwan is home to many biotech companies that have accumulated a lot of experience and achievements in agricultural biotechnology (including plant seedlings, animal vaccines, bio-fertilizers, and pesticides), recycling, biotech cosmetics and specialty chemicals, and the environmental sector (including biofuel and biodegradable materials). Consequently, Thailand can take these extended agricultural applications as examples of agricultural transformation innovation. It would also be beneficial for Taiwan and Thailand to thoroughly assess each other's conditions and evaluate the potential for cooperation.

4. Cooperation in circular and green economy

(1) Taiwan and Thailand can conduct exchanges in resource recycling technology. Currently, due to technological and recycling rate limitations, Thailand's recycling rate is below its set policy target. Meanwhile, Taiwanese companies are equipped with recycling products and technology. If both countries can share their recycling technology, such as having Taiwanese firms invest in Thailand and exchange experiences there, or Thai companies visiting Taiwan, it could strengthen the circular

supply chain on both sides.

(2) Exchange experience in establishing circular integration of energy resources in industrial areas. The Kaohsiung Port is an exemplary case in Taiwan, where the steel mill of China Steel Corporation located at the Kaohsiung Linhai Industrial Park Service Center was able to sell recovered heat steam to generate economic benefits while reducing CO₂ emissions. In Thailand, many large private enterprises have also invested in the industrial upgrading of circular economy technologies. Both Taiwan and Thailand can consider establishing an energy resource integration park together with large industrial companies spearheading the cooperation, which will open a new chapter for Thailand's sustainable development.

5. Cooperation in electric vehicle (EV) supply chains

(1) As the 11th largest automotive manufacturing base in the world and the largest in ASEAN, Thailand enjoys advantages in integrating the supply chains of the automotive, electrical appliance, and electronics sectors. In recent years, in response to global warming and the development of new technologies, Thailand has launched the Thailand 4.0 policy and its corresponding Eastern Economic Corridor Development Plan in order to promote the transformation and upgrading of the transportation industry and move towards net-zero emissions. Both of these undertakings provide tax and non-tax incentives to attract companies to invest in the development of electric vehicles (EV). Thailand strives to become the global EV manufacturing center and attract suppliers of core EV technologies to set up their factories in Thailand.

(2) The EV industry is an integrated industry with high technical barriers and is capital intensive. In the development of the EV industry, Taiwan has advantages in IC design and semiconductors with a robust ICT industry serving as the foundation. Taiwanese companies are involved in different parts of the supply chain from upstream materials and components to downstream system integration services; some of them in key EV components and charging industries have even entered the supply chains of international automakers. Other Taiwanese companies have also ventured into Thailand's EV industry, such as Foxconn, Jinpao Precision Industry, Delta Electronics, and Amita Technologies. Their investments span key EV components,

charging facilities, and batteries to help localize the EV supply chain in Thailand. Moving forward, both countries can cooperate to develop new products such as key systems for EVs, automotive electronics, and high value-added components to boost Thailand's self-production capabilities.

(3) On the other hand, with Taiwan's advantages in the ICT and semiconductor industries, we can assist EV manufacturers in developing vehicle models, supply systems and key components to global manufacturers, tap into human-machine interface business opportunities derived from software and hardware integration, and develop new application service systems, all of which are niche areas for Taiwan's EV-related industries and a direction for further cooperation between Taiwan and Thailand.

Appendices

Appendix 1: Brief Introduction to the World Taiwanese Chambers of Commerce (WTCC)

Many of our overseas compatriots are business owners. In the past, as there was limited assistance provided by existing Chambers of Commerce, the majority of Taiwanese businesses overseas operated in isolation. Thus, it was difficult for these businesses to develop and expand without collaboration with others. In order to better develop overseas Taiwanese businesses, the Taiwanese government took steps to establish individual chambers of commerce in major cities overseas, which formed the intercontinental alliance of Chambers of Commerce in North America, Asia, Europe, Africa, Latin America, and Oceania. All six intercontinental alliances together formed the World Taiwanese Chambers of Commerce (WTCC).

With the efforts of many overseas Taiwanese businesspeople, the Taiwanese Chambers of Commerce of North America (TCCNA) were established, followed by the Asia Taiwanese Chambers of Commerce (ASTCC), the Council of Taiwanese Chambers of Commerce in Europe (ETCC), and the Africa Taiwanese Chambers of Commerce (ATCC). In September 1994, the World Taiwanese Chambers of Commerce (WTCC) was officially inaugurated in Taipei City. After the inauguration of WTCC, the Taiwanese Chambers of Commerce in Latin America (TCCLA) was established in August 1995 and joined WTCC the following month; the Taiwanese Chambers of Commerce in Oceania was established and joined WTCC in 1998. At this point, WTCC officially covered the globe. WTCC's membership has been steadily increasing through generations of effort, giving a competitive edge to Taiwanese businesses in the world market. Currently, WTCC is one of the largest and most well-respected global NGOs, and has been assisting international Taiwanese businesses with assimilating into local mainstream society in different parts of the world.

WTCC's vision and goals are as follows: 1) to encourage cooperation among Taiwanese businesses overseas and their mutual expansion of the international market; 2) to promote exchange of technology and knowledge as well as facilitate

communication among Taiwanese businesspeople overseas; 3) to share information among Taiwanese businesspeople overseas in order to strengthen economic and trade cooperation in the region; 4) to elevate the status of Taiwanese businesspeople overseas to ensure their rights and interests are protected; and 5) to promote cultural exchange in each continent to increase mutual understanding and economic development.

Every year, WTCC elects its President, who will serve a one-year term and cannot be re-elected, while the Presidents of each Continental Chamber serve as ex officio Vice Presidents. In accordance with the regulations, the WTCC President has rights to appoint his/her own cabinet members, such as Secretary General and CFO, to be in charge of relevant matters on a voluntary basis. A total of 17 committees have also been created for various affairs; these include election affairs, public fund management, Taiwanese businesses in China, social events for women, social events in Taiwan, elite training, business opportunity promotion, discipline, international affairs, public relations, project management, education and culture, the Outstanding Overseas Taiwanese SMEs Award, expertise, internet, publishing, and legal regulations. WTCC has put forth great efforts to protect the rights and interests of Taiwanese businesspeople. It has also built a solid partnership with the Taiwanese government. Moreover, WTCC aims to improve diplomatic relationships and increase trading opportunities with each country where our members reside. In the future, WTCC will continue to help increase Taiwan's visibility in the international arena, and encourage overseas compatriots to invest in Taiwan, contribute to development and social welfare, and care for the disadvantaged in society. In recent years, WTCC has actively assisted Continental Chambers with establishing Junior Chapters so that the younger generation of Taiwanese businesspeople can be encouraged to join WTCC. The World Taiwanese Chambers of Commerce Junior Chapter (WTCCJC) was set up to support this initiative in October 2010 so as to help our pioneering members pass down the torch to younger generations and facilitate the sustainable development of WTCC.

Appendix 2: Brief Introduction to Asia Taiwanese Chambers of Commerce

In the 1990s, Taiwanese enterprises faced issues such as soaring land prices, labor shortages, and sharp appreciation of the New Taiwanese Dollar, forcing enterprises to invest outside Taiwan. As the government was promoting the Southern Policy, many Taiwanese enterprises invested heavily in the Philippines, Thailand, Malaysia, Indonesia, and other Southeast Asian nations. The investment of Taiwanese entrepreneurs in these countries ranks among the top three in each country. The increasing number of Taiwanese entrepreneurs in Southeast Asian countries has also attracted the attention of local governments. Therefore, countries such as Thailand, the Philippines, Malaysia, Indonesia, and Singapore have successively established the Taiwan Chamber of Commerce, the establishment of which allows Taiwanese enterprises' investment in these nations to receive investment information via official channels, serving as a bridge between investment target nations and the Taiwanese government. The Taiwan Chamber of Commerce has been recognized by Taiwanese entrepreneurs from all over the world and has been promoted by investment target countries' governments. Chambers of Commerce in Southeast Asian countries were established one after another from 1990 to 1992, but there was little interaction and exchange among these individual chambers. In view of this, the founding chair of the Thai-Taiwan Business Association, Mr. Seng Ching Yu, collaborated with presidents of the Chambers of Commerce in the Philippines, Malaysia, Singapore, Indonesia, and other countries to form the Asia Taiwanese Chambers of Commerce (ATCC).

In July 1993, the ATCC was established in Taipei, Taiwan with five initiatives, including 1) to promote the collaboration of Taiwanese entrepreneurs in Asian countries, pursue commercial and industrial development, and develop global markets; 2) to strengthen the contact, interaction, and collaboration between Taiwanese entrepreneurs in Asian countries, as well as facilitate business administration exchanges and academic or technological exchanges; 3) to provide various business and financial information for Taiwanese entrepreneurs in Asian countries, thereby strengthening regional economic and trade collaboration; 4) to enhance the international visibility of Taiwanese entrepreneurs and protect the rights and interests of Taiwanese

entrepreneurs in various countries; 5) to promote social and cultural exchanges in Asia so as to enhance mutual understanding and economic development.

The Asia Taiwanese Chambers of Commerce has a total of 12 members, including Thailand, the Philippines, Malaysia, Singapore, Indonesia, Japan, Hong Kong, Macau, Vietnam, Laos, Cambodia, and Brunei. There are also six observer members, including Bangladesh, India, Myanmar, Jeddah (Saudi Arabia), Guam, and East Timor. The Korean branch will also be established soon. The total number of members exceeds 27,000 enterprises. The ATCC has one chair (from one of the members), and the chairs from the other member countries are the vice chairs of the ATCC. There are also a standing council, a council, and a supervisory board. In addition, there are also committees to facilitate progress in the following areas: election affairs, public affairs, industrial functions, legal regulations, publishing, education and culture, finance, social events for Taiwanese businesses in China, ATCC development and promotion, disciplinary supervision, new-generation entrepreneurs, crisis management, long-term development, ASEAN affairs, etc. There is also dedicated personnel responsible for contacting member units and consultants. The Asia Taiwanese Chambers of Commerce (ATCC) is affiliated to the World Taiwanese Chambers of Commerce (WTCC). It is the best platform for exchanges, business opportunities, and investment promotion among its member countries. We at ATCC sincerely hope to provide exceptional service to members amidst the rapid development of ASEAN countries.

Appendix 3: Brief Introduction to Thai-Taiwan Business Association

Starting in 1988, following the government's "Southern Policy", more and more Taiwanese firms came to Thailand to invest. To foster a friendly and mutually beneficial relationship amongst themselves, these firms formed Taiwanese business associations in areas where Taiwanese businesses were most concentrated. Seng Ching Yu, then head of the Industry and Commerce Department of the Taiwanese Association of Thailand, took notice of the increase in investments by Taiwanese firms in Thailand. To meet this new demand, he believed it was necessary to push to be recognized as a juristic person in addition to establishing these business associations. He hoped to rally these Taiwanese firms to guarantee their rights in Thailand. After receiving avid support from Taiwanese firms, an association for all Taiwanese firms was formally established on October 20, 1992. Mr. Yu was selected as the founding chair of the board of directors. In April, 1993, this association was formally registered by the Thai government as a juristic person, and changed its name to the Thai-Taiwan Business Association (TTBA).

The founding principles of the TTBA include: 1) Promote operations and cooperation between Taiwan and Thailand in commerce, industry, and finance. 2) Assist TTBA members in complying with Thai laws when conducting business. Services include supplying information on industry and commerce, providing consultation, and handling various certification matters. 3) Strengthen and uphold the lawful rights and interests of members, including having representative members provide suggestions and comments to the Thai and Taiwanese government authorities, thus furthering the economic rights of Taiwanese investors investing and developing in Thailand to promote a meaningful commercial and economic relationship between Thailand and Taiwan. 4) Collect industrial and commercial statistics, legal information, market information, and information regarding social and economic development trends and policies. This includes analyzing domestic and foreign development and its impacts on investment to be provided to TTBA members in order to expand their knowledge and ensure businesses operated by members can adapt to social and economic trends. 5) Protect and advance trust and interpersonal

relationships between members and Taiwanese investors in Thailand and fight for the same legal rights enjoyed by investors from other countries. 6) Assist and expand business and investments by Thai entrepreneurs in Taiwan, including improving communication between Thailand's and Taiwan's industrial and commercial sectors. 7) Comply with the Thai government's economic development policies in inviting and encouraging Taiwanese entrepreneurs, located either in Taiwan or overseas, to come to Thailand to invest in the industrial, commercial, and financial sectors. 8) Actively promote TTBA affairs to encourage unity and mutual aid among members. Also create a healthy work environment and living conditions, so members can enjoy a good work-life balance. Organize meaningful activities that benefit society. 9) Assist and promote member participation in activities that are organized by industrial and commercial enterprises and are beneficial to Thailand. Encourage members to take it upon themselves to participate in charitable activities that serve the public and social interest, yet do not violate Section 22 of the Chamber of Commerce Act, B.E. 2509 (1966). 10) Assist members in establishing positive relations with foreign and domestic government agencies, so members can lawfully conduct business in accordance with government policies. 11) Hold frequent entertainment, fellowship, and sporting events for members that promote physical and mental health. 12) Upon reaching an agreement with its members, the TTBA can stipulate rules and regulations members must follow to ensure the smooth operation of the TTBA. 13) Support members in welfare matters that do not violate Section 22 of the Chamber of Commerce Act, B.E. 2509 (1966).

Since the formal registration of the TTBA as a juristic person in April of 1993, it has founded 15 fellowships, located in Samut Prakan, Pathum Thani, Chachoengsao, Thonburi, Lat Krabang, Chonburi, Bangkok, Ban Pong, Rayong, Asoy, Nakhon Ratchasima, Silom, Northern Thailand, Southern Thailand, and Phuket. The TTBA has a total of 3,000 member enterprises and 16 TTBA Youth Leagues. The TTBA has an executive committee to handle association affairs. Important members of the committee include the president, vice presidents, consultant members, chief supervisor, deputy supervisors, director, executive directors, supervisor, executive supervisors, secretary-general, deputy secretary-generals, treasurer, deputy treasurers, director-general, and other staff. There is also a board of directors, a board of

supervisors, and a team of advisors.

The TTBA leads the branches in serving the needs of Taiwanese firms. It also serves as a bridge of communication between Taiwanese firms and the Taiwanese and Thai governments, as well as a channel where they can discuss policy and investment promotion. The TTBA has provided a variety of functional services over the years, enabling stronger cooperation with Taiwanese firms and gaining visibility on the domestic and international stage. It is a testament to the great influence of the TTBA.