

Joint Study on 10+3 Cooperation for Improvement of Supply Chain Connectivity (SCC)

-----Study on Impact of COVID-19 on SCC in APT Countries by CAITEC

Chinese Academy of International Trade and Economic Cooperation (CAITEC)

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Preface

This sub-report was prepared by the Chinese Academy of International Trade and Economic Cooperation (CAITEC) as one of the four background studies conducted for the Joint Study on 10+3 Cooperation for Improvement of Supply Chain Connectivity [https://asean.org/?static_post=joint-study-103-cooperation-improvement-supply-chain-connectivity]. The contents reflect the views of CAITEC only and respect the opinions of the other research institutions involved in the Joint Study.

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1. Introduction: current status and significance of SCC in apt countries

APT countries have a total population of over 2.2 billion and an economic aggregate of more than US\$23 trillion. They generally pursue the policies of free trade and market opening, and their trade, investment and economic ties are very close. According to the ASEAN statistics, in 2019, the bilateral trade volume between ASEAN and China, Japan and ROK reached US\$890.2 billion, accounting for 31.6% of ASEAN's total foreign trade; the total direct investment by China, Japan and ROK in ASEAN stood at US\$3.2 billion, making up 19.9% of the total foreign direct investment (FDI) in ASEAN. Progress in economic globalisation has shaped closely interconnected industrial and supply chains in the region, and there is still room for further cooperation on supply chain among APT countries.

1.1 Overview of current status of SCC in APT countries

The logistics Performance Index (LPI)^① is an index for the World Bank to assess the efficiency and quality of SCC across and within countries, which has been widely used in supply chain research. The following is a detailed analysis of the current status of SCC in APT region by applying the LPI.

1.1.1 APT countries as a group have above-average international logistics performance

The average LPI score of APT countries as a group was 3.18 between 2012 and 2018, well above the world's average level. Viewed from the six indicators of LPI, APT countries had the

^① The logistics performance index (LPI) is based on the surveys conducted by World Bank in partnership with academic and international institutions and private companies and individuals engaged in international logistics. Building on the first-hand information obtained from the questionnaire survey on global freight forwarders and express carriers, the LPI assesses the efficiency and quality of supply chain connectivity across and within countries. Since 2007, the LPI has been published biennially. The higher a country's LPI score is, the better its logistics performance is. The scores range from 1 (worst) to 5 (best). The index has covered 167 countries/regions as of 2018. It scores a country's logistics performance (1 is the lowest score; 5 is the highest score) and analyses countries through six indicators: 1. The efficiency of customs and border management clearance, including clearance time, application of paperless clearance, proportion of physical inspection and the number of import and export agents. 2. The quality of trade- and transport-related infrastructure, including the quality and density of logistics-related infrastructure, throughput capacity, automation of transportation equipment and connectivity of multimodal transport; 3. The ease of arranging competitively priced international shipments, including the number of international transport operators and the connectivity of international transport. 4. The competence and quality of logistics services, including the number of logistics operators, the level of industrial standardization, the rate of good delivery of goods and customer experience. 5. The ability to track and trace consignments, including goods tracking capability, traceability of goods, advanced information equipment and temperature control of cold chain transportation. 6. Timeliness, including the frequency with which shipments reach consignees within the scheduled or expected delivery time. The LPI can not only describe the logistics conditions of the respondent countries, but also indicate the factors that lead to differences in logistics performance among different countries. It has won more and more attention of policy makers of countries, and has been widely used in trade facilitation reform and supply chain improvement. Moreover, global logistics is frequently referred to as "physical internet" and is an important component of global supply chain network. The quality and efficiency of logistics network connectivity greatly affect the quality and efficiency of supply chain connectivity. Although the LPI index uses the word "logistics", it concerns supply chain in the perspectives of index design and achievement application, and is also widely applied in analyzing and evaluating supply chains.

highest performance in timeliness, with an average score of 3.54, while they had relatively low performance in infrastructure and customs efficiency, with average scores of 3.07 and 2.98, respectively. Their scores were in the middle of the pack in terms of ease of arranging international shipments (3.15); logistics quality and competence (3.14); and tracking and tracing consignments (3.22).

1.1.2 Individual APT countries have very different international logistics performance

Among all APT countries, Singapore ranked the highest with a mean score of 4.05, while Myanmar got the lowest mean score of 2.34, indicating a rather large gap. Singapore and Japan had overall high logistics performance and took a leading place in all indicators. ROK, China, Thailand and Malaysia all scored above the regional average (3.18), while other ASEAN countries scored below the average.

Table 1 Aggregated international LPI results of APT countries (2012-2018)

Indicator Country	Aggregated results			Customs		Infrastructure		International shipments		Logistics quality and competence		Tracking and tracing		Timeliness	
	Mean Score	Mean Rank	% of highest performer	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Singapore	4.05	5	96.6	4.00	2	4.14	5	3.72	8	4.08	4	4.05	8	4.34	3
Japan	3.99	7	95.3	3.91	5	4.19	4	3.61	14	4.03	8	4.03	9	4.24	9
ROK	3.65	23	87.3	3.43	24	3.75	23	3.43	29	3.63	26	3.75	23	3.96	24
China	3.6	27	86.1	3.28	30	3.73	24	3.57	18	3.58	27	3.63	28	3.86	29
Thailand	3.36	34	80.2	3.13	37	3.17	41	3.40	32	3.29	35	3.38	35	3.75	36
Malaysia	3.34	35	79.9	3.06	38	3.30	33	3.43	30	3.34	34	3.32	38	3.60	46
Vietnam	3.16	45	75.5	2.86	51	2.92	54	3.15	45	3.17	40	3.23	44	3.60	47
Indonesia	3.08	51	73.6	2.69	62	2.81	61	3.08	51	3.07	48	3.23	45	3.59	49
The Philippines	2.91	64	69.6	2.62	70	2.67	71	3.20	39	2.80	64	3.01	58	3.11	83
Brunei	2.78	73	66.5	2.70	61	2.59	77	2.74	84	2.64	84	2.82	75	3.18	78
Cambodia	2.66	89	63.5	2.47	94	2.26	120	2.87	69	2.50	106	2.64	93	3.13	82
Laos	2.48	120	59.2	2.37	111	2.23	128	2.52	116	2.45	114	2.48	119	2.77	130
Myanmar	2.34	139	55.9	2.21	137	2.11	145	2.22	155	2.28	133	2.33	135	2.86	120
Average	3.18	-	75.9	2.98	-	3.07	-	3.15	-	3.14	-	3.22	-	3.54	-

Note: Some of the Chinese data only refer to those in China's mainland, not including Chinese Taiwan, Hong Kong or Macao. "% of highest performer" refers to the ratio of a country's LPI score to that of the highest ranked country.

Source: World Bank.

1.1.3 International logistics performance of Indonesia, Vietnam, Laos, and Cambodia improved significantly

A comparison of international LPI scores in 2010 and 2018 shows that most of the countries in APT countries enjoyed improvement in logistics performance to different degrees. For example, LPI score of Indonesia increased by 14.13%; Vietnam, by 10.47%; Laos, by 9.76%; Cambodia, by 8.86%; Thailand, by 3.65%; China, by 3.44%; and Japan, by 1.51%. Several countries, however, encountered a drop in LPI, including Philippines (-7.64%), Malaysia (-6.40%), Singapore (-2.20%), Myanmar (-1.29%) and ROK (-0.82%). Overall, the mean international LPI score of APT countries only registered a 0.03 increase from 2010 to 2018.

Table 2 Comparison of international LPI Scores of APT countries in 2010 and 2018

LPI Country	2010		2018		2010-18 Changes	
	Mean Score	Mean Rank	Mean Score	Mean Rank	Mean Score	Mean Rank
Singapore	4.09	2	4	7	-0.09	-5

Japan	3.97	7	4.03	5	+0.06	+2
ROK	3.64	23	3.61	25	-0.03	-2
China	3.49	27	3.61	26	+0.12	+1
Thailand	3.29	35	3.41	32	+0.12	+3
Malaysia	3.44	29	3.22	41	-0.22	-12
Vietnam	2.96	53	3.27	39	+0.31	+14
Indonesia	2.76	75	3.15	46	+0.39	+29
The Philippines	3.14	44	2.9	60	-0.24	-16
Brunei	-	-	2.71	80	-	-
Cambodia	2.37	129	2.58	98	+0.21	+31
Laos	2.46	118	2.7	82	+0.24	+36
Myanmar	2.33	133	2.3	137	-0.03	-4
Average	3.16	-	3.19	-	+0.03	-

Note: Some Chinese data only refer to those in China's mainland, not including Chinese Taiwan, Hong Kong or Macao.

Source: World Bank.

During the nine years from 2010 to 2018, countries with high logistics performance encountered low or slow development, while countries with low logistics performance such as Indonesia, Vietnam, Laos and Cambodia made remarkable progress. Among them, Indonesia's logistics services rose by 25.51% and traceability by nearly 20%. Vietnam's infrastructure and logistics services have both grew by nearly 18%. Laos greatly improved its customs efficiency, infrastructure, logistics services and traceability, with an increase range of 18.78%~25.13%. Cambodia made significant progress in international transport arrangements and timeliness, up 27.4% and 11.27%, respectively. The notable progress of these countries helps improve the uneven development of logistics performance and further strengthen SCC in the region.

1.2 APT countries still face difficulties and challenges in SCC

In terms of physical connectivity, APT countries develop unevenly in logistics infrastructure, including roads, railways, ports and air transport facilities, which causes difficulties in cross-border logistics transportation. The cross-border infrastructure for land transport needs to be improved as many sections are impeded. Compared with the highway, the railway infrastructure has an even lower connectivity level, and the road infrastructure linking to ports is also a weak area. Many countries have formulated infrastructure development plans, but they are confronted with financing difficulty in implementation.

In terms of institutional connectivity, customs efficiency that is directly related to supply chain needs to be raised. For instance, some countries have not yet established a single window system for international trade, and connectivity of countries' single windows need to be strengthened. Meanwhile, restrictions on trade in services in areas of transportation and cross-border mobility of people also hinder SCC in many ways. Regarding the access for foreign investment, the low transparency of approval system and administrative inefficiency constrain international industrial cooperation and slow down SCC development. Incompatible standard system in the fields of logistics, trade and cross-border e-commerce has also been a bottleneck in regional SCC.

The outbreak and fast spread of COVID-19 has posed new challenges to SCC in APT countries. The shock of pandemic has disrupted logistics in the short term, caused a shutdown of many enterprises, and sent international trade into severe contraction. The mounting uncertainty in supply and demand makes SCC in the region face a breakdown risk. It is, therefore, urgent to establish a regular mechanism in response to the pandemic, explore much-needed solutions, and enhance SCC resilience. Some countries have, on the grounds of national security or

increasing supply chain resilience, pushed shift of supply chains, or even cut off supplies virtually against certain individual countries, leading to a rising risk of trade and investment protectionism and inflicting a severe impact on SCC. In the long term, if situation goes worse, some multinationals may reevaluate their networks of global industrial chain and take regionalized and decentralized production and industrial chains as an alternative. This means inevitable adjustments and evolution of global industrial and supply chains and will have a profound impact on SCC in APT countries.

1.3 Significance of SCC in APT countries amid COVID-19

APT region boasts the most dynamic economy in Asia and even in the world, and amid today's ongoing pandemic, the region's performance is considered satisfactory in terms of COVID-19 containment and economic recovery. On April 14, 2020, the Special ASEAN plus Three Summit on COVID-19 was held, during which all parties agreed to sustain SCC within the region and beyond by making the supply chain more resilient, sustainable, and less vulnerable to shocks. The Special AEM plus Three Consultations on COVID-19 Response was held on June 4, 2020, which clearly stated that APT countries should steadily upgrade the industrial and supply chains and continue to build a free, stable and fair environment for trade and investment. Improving SCC in APT countries, therefore, is a key step to implement the leaders' instructions. It not only helps improve the supply chain resilience and ensure economic recovery in the region, but also plays an important role in boosting confidence in global recovery and promoting the attainment of Sustainable Development Goals (SDGs).

First, improvement of SCC in APT countries helps strengthen the resilience and sustainability of supply chain, and promotes regional economic integration. The outbreak of COVID-19 and the containment measures by countries have brought great uncertainty to industrial and supply chains. Unilateralism and protectionism measures taken by some countries have further disrupted the global landscape of supply chain, and multinational companies are developing regionalized and localized supply chains at a faster pace. Improvement of SCC in APT countries helps strengthen collaboration and information sharing, increase transparency, and reduce trade and investment barriers, recover and improve the efficiency of logistics and customs clearance as soon as possible, and sustain connectivity of supply and industrial chains in the region. It could also raise supply chain's resilience and capacity to ward off risks and ensure its security by developing a digital and intelligent supply chain. Moreover, improvement of SCC means APT countries can expand convergence of interests, consolidate the win-win industrial chain and division of labor in East Asia, provide feasible paths and successful practices for Regional Comprehensive Economic Partnership (RCEP) and other regional integration processes, and inject impetus to the building of East Asia economic community.

Second, improvement of SCC in APT countries will re-energize the world economy and promote the attainment of SDGs. According to a report released by Organization for Economic Co-operation and Development (OECD) on September 16, the global economy is expected to shrink by over 4.5% in 2020, the worst recession since World War II. APT region has a total population of over 2.2 billion and an economic aggregate of more than US\$23 trillion, both of which account for more than a quarter of the world. Through improving SCC, APT countries can optimize and connect their supply chains, foster new economic drivers, and create new impetus for global economy. Improved SCC is also of great significance for a free, friendly and efficient environment for trade and investment, and will be a boost to countries' confidence in economic recovery in the post-COVID-19 era. It also plays a role in constructing

infrastructure that is able to avert risks, developing inclusive and sustainable industries, reducing inequality within and among countries, and achieving the SDGs.

Third, improvement of SCC in APT countries may serve as a reference for future development of international economic and trade rules. In the battle against COVID-19, the important role of next-generation information technologies has been highlighted, including big data, cloud computing, and artificial intelligence; the restructuring of global industrial and supply chains has been accelerated; and the improvement of international economic and trade rules has become an urgent need. Enhancing SCC in APT countries requires all parties to improve consultation and coordination in areas of customs clearance, mutual recognition of qualifications, harmonization of standards, as well as certification and accreditation. It will push forward the alignment of relevant rules and standards and then advance the introduction of harmonized regional supply chain rules recognized by all parties. These efforts will serve as a reference for improvement of Global Supply Chain (GSC) rules in the post-COVID-19 environment, help the less developed ASEAN member states (AMS) participate in the making of regional supply chain rules, and provide successful practices for the less developed countries to integrate into the system of GSC.

2. China's policy environment for improving SCC amid COVID-19

The GSC system has fallen into a breakdown crisis due to COVID-19, as it is highly dependent on the free flow of factors and resources. In response to current problems in GSC, Chinese government has issued a host of policies and measures.

2.1 Making full effort to ensure global market supply and safeguarding security and stability of GSC

As the GSC is closely linked, even a minute malfunction in the chain could paralyze both upstream and downstream enterprises. China, as an important link in the GSC, has adopted effective measures to sustain a stable and smooth GSC while doing a good job in containing epidemic and resuming work and production domestically.

2.1.1 Supporting key entities in the GSC to resume work and production

In order to minimize the severe impact on GSC resulting from COVID-19, China has surmounted difficulties and made the utmost effort to restore normal economic activities. For example, a multi-tiered cooperation mechanism for resumption of work and production was set up to enhance coordination and connection across departments and regions. Priorities were given to the key enterprises in supply chain to ensure their resumption of operation. The partner enterprises also got strong support from the government so that enterprises of all sizes could restart production and achieve synergies between upstream and downstream industries and among production, supply and marketing links. The Chinese government has actively assisted foreign-invested enterprises (FIEs) in purchasing medical supplies in China and help them overcome difficulties in production, technology and personnel. China's Ministry of Commerce (MOFCOM) has taken the lead in establishing a coordination mechanism for foreign trade and investment to help FIEs resolve practical difficulties and resume work and production. Some provinces and cities have stepped up their supports for multinationals to safeguard GSC stability. For instance, Guangdong province has made full use of the "Governor-Multinational Corporations Fast Track Mechanism" to strengthen integrated services from the

four areas of logistics, labor force, raw materials and medical supplies. Huizhou Municipal Government of Guangdong Province has launched special services for 115 ROK enterprises and addressed difficulties encountered by LG Electronics, Bohai Electronics, Starion and Nanotech as well as their supplier partners in restoring production through coordinated efforts. It has also promoted the building of a legal service platform to help FIEs solve production problems caused by COVID-19, such as order reduction, logistics delays and rising risks of breaching contracts and other law issues in operation. Suzhou National Hi-Tech District in Jiangsu Province arranged charter flights for senior executives of the Japanese enterprises to return to work and provided protective supplies for all enterprises in the district.

2.1.2 Redoubling efforts to provide medical supplies to other countries in the world

As COVID-19 hits more countries around the world, there are growing demands for medical supplies. China has been doing its utmost to help countries in need, without imposing any restriction on exports of medical supplies. It has set up a special fund on COVID-19 cooperation worth 2 billion yuan (283 million U.S. dollars), and provided medical supplies for more than 150 countries and international organizations. In addition, it has strived to overcome the chokepoints in demand and supply, logistics and transportation services, customs clearance of exports, certification standards and other aspects, aiming to bridge the gap in global supply.

First, great effort has been made to increase the production and supply of medical products. The Chinese government has rolled out a slew of policies and measures in finance, taxation, insurance and social security to enhance coordination among medical products administration agencies in order to accelerate procedures for reviewing and approving applications for producing medical supplies in times of emergency. With all its strength, the Chinese government has supported supplies of production equipment and raw materials and transport services throughout the supply chain. From March 15 to September 6 in 2020, China exported 151.5 billion face masks, 1.4 billion protective suits, 230 million goggles, 209,000 ventilators, 470 million testing kits, and 80.14 million infrared thermometers, strongly supporting the global fight against COVID-19.

Second, strict management has been exercised over exports of medical products. Measures have been taken to strengthen quality control, regulate export activity, and crack down on violations like production, sales, and exports of counterfeit and substandard medical supplies such as the five key types^① of protective equipment including surgical face masks. In order to ensure that epidemic-control materials are transported to countries and regions in urgent need in the shortest possible time, for those medical supplies that have obtained foreign certification or registration, procedures for customs declaration are simplified.

2.1.3 Introducing policies to stabilize foreign trade to help overseas markets improve response ability

While supporting enterprises to resume work and production to fulfill overseas orders, the Chinese government has issued a series of policies to stabilize foreign trade in a bid to improve the response ability of overseas markets and meet the needs of international markets in a timely manner.

First, China continues to intensify support for stabilizing external trade. The supportive policies include providing stable credit supply to enterprises in order to ensure an unbroken capital

^① The five key types of protective equipment include test reagents, surgical face masks, protective suits, ventilators and infrared thermometers.

chain in foreign trade and regulating and making good use of export credit insurance and export tax rebates to help enterprises prevent and defuse risks and cut costs. Meanwhile, industrial organizations such as chambers of various industries are encouraged to provide enterprises with a range of services, including legal services, exhibition services, and matchmaking services between supply and demand sides.

Second, China works to develop new forms and modes of foreign trade. The Chinese government fully taps the advantages of cross-border e-commerce and other new business modes in application of high information technology (IT), fast response, and quick integration of factors. A total of 46 new integrated pilot zones for cross-border e-commerce have been set up to overcome chokepoints in industrial and supply chains related to foreign trade. The 127th China Import and Export Fair (Canton Fair) was held online. It provided 24-hour online promotion, matchmaking of suppliers and buyers, online negotiation and other services, creating an online foreign trade platform for quality products and specialties, and enabling business persons to place orders and do business at home.

2.2 Building a strong and resilient consumer market and promoting GSC recovery

Consumption has become a major driving force for China's growth and brought the benefits of development to the world. The country is working to expand domestic demand and boost GSC recovery.

2.2.1 Raising people's spending power

China has taken steps to improve people's spending power by raising their ability in increasing income and building up their income expectations from capital market. Local governments have introduced policies to expand consumption according to their own conditions. For instance, big cities like Beijing and Shanghai have provided residents special shopping coupons to encourage consumption.

2.2.2 Pushing forward upgrading of consumption

Targeted policy measures have been launched to power the traditional consumption markets of automobiles, household appliances and furniture. For example, a raft of incentive measures were adopted to stabilize and expand automobile consumption, which include supporting the purchase of new energy vehicles, relaxing curbs on the purchase of traditional cars by increasing purchasing quotas, and launching the program of trading-in old vehicles for new ones. Underpinned by new business forms and models, China has accelerated the quantity and quality improvement of new forms of consumption to support their robust growth.

2.2.3 Actively expanding imports

China actively expands the imports of consumer goods. The upcoming third China International Import Expo (CIIE) would further promote the development of cross-border e-commerce retail imports and bring more quality imported goods into the Chinese market. China's moves to expand imports will not only benefit its own consumers but also drive global growth.

2.3 Promoting trade and investment liberalization and facilitation and creating enabling environment for SCC

Trade and investment liberalization and facilitation are the foundation for the free flow of global factors and resources. Following the principle of open and win-win development through cooperation, China strives to sustain an open global cooperation environment and provide good institutional guarantee for SCC improvement.

2.3.1 Staying committed to opening up wider to the world

First, China continues to promote higher-standard opening up. Efforts will be made to fully implement a management system of pre-establishment national treatment plus a negative list, and reduce items on the negative list to cut back on market access restrictions for foreign investment. The revision of the Catalogue of Encouraged Foreign Investment Industries will be accelerated to facilitate foreign investors to develop their supply chains in China. The Chinese government will promote the building of pilot free trade zones and free trade port, shorten the negative list for foreign investment and create a high-standard platform for opening up. Since the establishment of the China (Shanghai) Pilot Free Trade Zone in 2013, the number of such zones has increased to 18, and more than 260 best practices developed by these pilots have been applied nationwide. China hosted the 2020 Global Trade in Services Summit, fulfilling its commitment to high-standard opening up and boosting the world economic recovery with concrete action.

Second, China is committed to creating a transparent, fair and open environment. The implementation of the Regulations on Optimizing the Business Environment has been fully advanced to create a market-oriented, law-based and internationalized business environment. Great effort has been made to ensure the strong enforcement of Foreign Investment Law of the People's Republic of China, which provides that domestic and foreign-invested enterprises shall be given equal treatment. The Rules have been revised to improve the working mechanism for treating complaints from foreign investors, make the process more efficient, and enhance the protection of the legitimate rights and interests of foreign investors.

2.3.2 Deepening multilateral and regional economic cooperation

Progressing with the trend of regionalization and localization of GSC, China continues to deepen economic and trade cooperation with relevant countries and regions.

First, China will accelerate the establishment of a network of high-standard free trade agreements, advance the signing of RCEP, and push forward the negotiations on the China-EU Investment Agreement, China-Japan-ROK FTA, China-Cambodia FTA, etc. The 17 FTAs that China has signed with 25 countries and regions so far have served as important platforms and mechanisms for improving SCC.

Second, China actively carries out cooperation dialogue. It promoted the convening of China-ASEAN Special Foreign Ministers' Meeting on Coronavirus Disease (COVID-19) and the Special ASEAN Plus Three Summit on COVID-19. The Chinese government always stresses the importance of deepening regional trade and investment cooperation, promoting industrial partnering and cooperation and expanding sub-national economic cooperation. It has developed a dedicated arrangement to guide the Joint Study on "10+3 Cooperation for Improvement of SCC". It is also pushing to launch "fast Lane" among APT countries to maintain

necessary people-to-people exchanges and smooth logistics for economic and trade cooperation in the region.

2.3.3 Creating a free and enabling environment for international trade

High cost and complicated procedures have become bottlenecks limiting trade growth since the outbreak of COVID-19. China has taken measures like cutting tariffs and removing barriers to solve such problems and safeguard the GSC stability.

First, China is committed to improving trade facilitation. It has advanced the work related to the WTO Trade Facilitation Agreement that came into force in 2017. For instance, it has guided businesses to apply for paperless import and export licenses and facilitated them in inspection and quarantine and customs clearance. It also requires governments at all levels and industrial associations to provide more public services, including updating and publishing information about country-specific trade and investment environment and country-specific guide for overseas investment and cooperation in a timely manner. Local governments and industrial and trade organizations are encouraged to establish public service platforms and provide businesses with legal, information, and promotion services related to international trade.

Second, China works with the international community to reduce trade barriers caused by the epidemic. It has issued ministerial joint statements with the economic and trade authorities of Singapore, Brunei, Laos, Myanmar, the United Arab Emirates, Chile, Uruguay, Canada, New Zealand, Australia and Nauru, affirming the importance of refraining from the imposition of export controls or tariffs and non-tariff barriers and of removing trade restrictions on essential goods, especially medical supplies at this time, so as to ensure sound SCC amid COVID-19.

2.4 Resolving chokepoints in logistics channels and promoting efficient and seamless connectivity of GSC

A logistics system with strong transport capacity and efficient connectivity is of great importance for reducing cost and raising efficiency of GSC. Focusing on improving logistics performance, China has made great effort to resolve chokepoints in logistics channels and ensure unimpeded and efficient transport routes, aiming to achieve effective connectivity of GSC.

2.4.1 Ensuring smooth transport channels for foreign trade

First, increase air freight capacity. Through the Green Channel services for international air freight, the Chinese government has supported airlines to open more all-cargo flights and use passenger planes for transporting cargoes, and given them preferential treatment in terms of traffic rights and take-off/landing slots. The policies for facilitating international freight routes have been well implemented to encourage airlines to maximize freight capacity to meet the growing need of transporting various supplies.

Second, ensure high international shipping capacity. The leading shipping enterprises have been mobilized to keep the major trade routes uninterrupted. The operation of ports along the trunk lines and liner enterprises are under close track so that they can resume the suspended liners and routes once the demand for transporting foreign trade goods is rising.

Third, maintain the smooth flow of international road freight. Efforts were made to facilitate the entry and exit of transport vehicles for crucial protective supplies, key construction

projects and supplies for production and daily life. These vehicles enjoy fast track services in inspection and release and other customs procedures. The problems arising from customs clearance, inspection of vehicles and personnel, and cargo handling are timely solved through coordinated efforts.

Fourth, promote the high-quality development of the China Railway Express (CR Express) to Europe. The railway enterprises were well organised to increase the frequency and coverage of freight trains between China and Europe, and these trains could enjoy preferential arrangement in carrying and loading goods and adding extra carriages. The coordination work for China-Europe freight trains is enhanced by effectively connecting goods sourcing and transporting to enable a sound microcirculation of the CR Express trains to Europe.

2.4.2 Cutting logistics costs for imports and exports

First, reduce charges for imports and exports. The Chinese government has fully implemented policies for cutting charges and fees, including aggressively exempting port development fees for imports and exports, cutting harbor dues, port facility security fees and ship-source oil pollution compensation funds. Domestic liner companies are guided to appropriately adjust the price structure of shipping charges by lowering the proportion of shipping surcharges in total freight charges, while international liner companies are urged to cut shipping charges accordingly.

Second, strengthen oversight over ports and shipping market. Port enterprises and relevant agencies were required to publish the lists and catalogues of port service fees and charges, and violations of relevant rules and laws would be investigated and punished. The competent authorities shall regulate shipping surcharges by domestic liner companies and require the international liner companies to report their freight rates and accept inspection in accordance with the law.

Third, encourage close cooperation between port and shipping enterprises and foreign trade companies. The government has guided the China Ports and Harbors Association and the China Shipowners' Association to play the role as a bridge in enhancing communication and coordination with foreign trade-related associations, and has encouraged port and shipping companies to establish long-term and stable cooperation relations with foreign trade companies.

2.4.3 Improving transport facilitation to create favourable conditions for foreign trade

First, push forward the building of the single window system for international trade. Efforts will be made to promote the joint boarding and inspection, further simplify supervision procedures for imports and exports, and improve oversight over maritime affairs, pilotage services and customs clearance procedures. The aim is to establish an intensive, efficient and well-functioning new mode of customs clearance and inspection for ships, and move faster to apply single window to the entire chains of shipping and trade.

Second, improve the facilitation of international road transport. China is carrying out in-depth policy analysis and evaluation of accession to the European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) and advancing the alignment of Chinese laws and standards with the relevant international transport facilitation agreements.

3. Data gathering and methodology

3.1 Collation and analysis of data

The World Bank's LPI is an index to assess the efficiency and quality of SCC across and within countries, which has been widely used in supply chain research. CAITEC makes a detailed analysis of current status of SCC in APT region by applying the LPI.

CAITEC has also collected and summarized China's major moves to promote SCC amid COVID-19. These include relevant documents issued by Chinese central government to ensure stable industrial and supply chains and related policies for facilitating flow of people, transportation, trade, logistics and investment.

3.2 Online survey to and in-depth interviews with enterprises

In order to have a comprehensive and deep understanding of SCC performance in APT countries and impact of COVID-19 on SCC in the region, CAITEC, with the support of MOFCOM and China's Mission to ASEAN, as well as the economic and commercial offices of Chinese embassies in Japan, ROK and ten AMS, conducted online questionnaire surveys to Chinese overseas investment enterprises that do business with Japan, ROK and AMS and had in-depth interviews with them from July to August 2020. When preparing the questionnaire, CAITEC referred to the template provided by KIEP and made some modifications in combination with the question list in the TOR and the actual conditions of China. Focusing on the TOR's question list, CAITEC had in-depth interviews with the enterprises in the form of one-to-one teleconference.

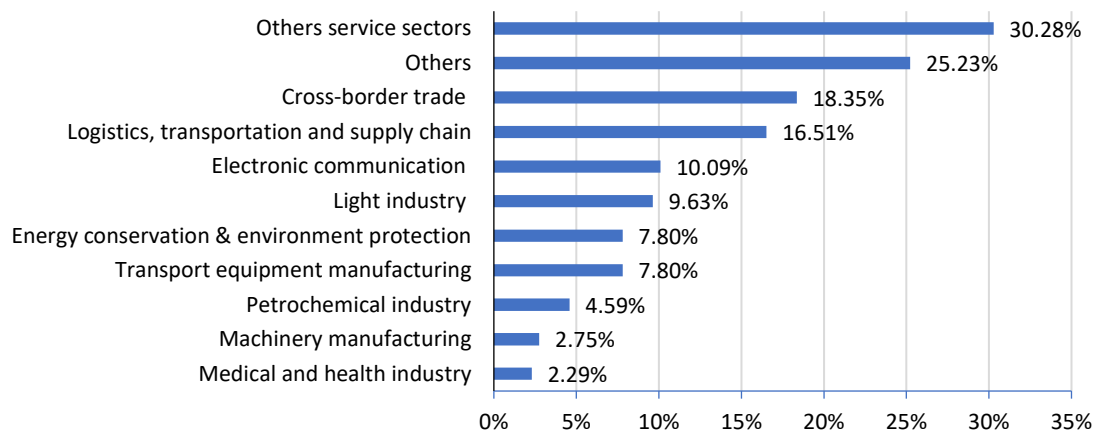
4. Empirical analysis: analysis of impact of COVID-19 on SCC in APT countries

4.1 Basic information of the survey

4.1.1 Information of the questionnaire

CAITEC received questionnaire responses from 218 Chinese overseas investment enterprises that have trade and investment ties with Japan, ROK and ASEAN countries. The results show that among all the respondents, manufacturing enterprises as a group has the biggest share of 34.86%, involving electronic communication, light industry, transportation equipment manufacturing, energy conservation and environmental protection, petrochemical industry, machinery manufacturing, medical and health industry, etc. In addition, enterprises from other service sectors, namely project contracting, financial, taxation, and consultation services, account for 30.28%, while those engaged in cross-border trade (including e-commerce) make up 18.35% and in logistics, transportation and supply chain, 16.51%.

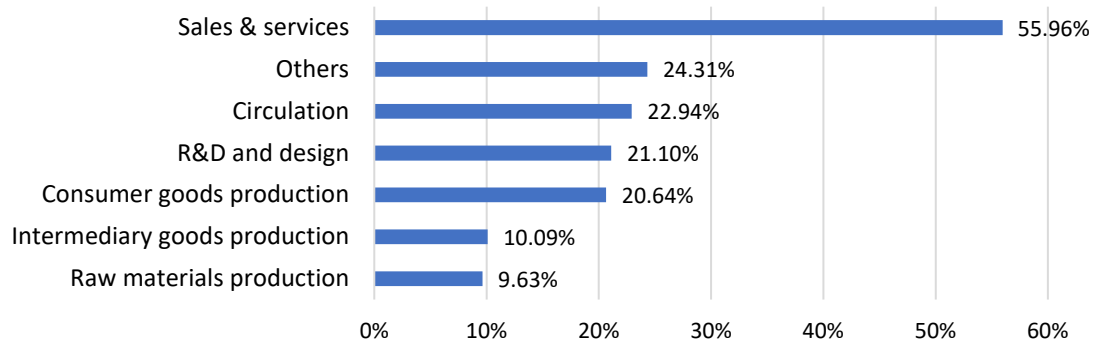
Figure 1 Industries where respondent enterprises belong



Note: Other service sectors include project contracting, financial, taxation, and consultation services; cross-board trade includes e-commerce among others; electronic communication includes intelligent manufacturing among others; light industry includes food processing, household appliances, textile, clothing, building materials, and metal products; energy conservation & environment protection include environmental protection and new energy among others; and transportation equipment manufacturing include rail transit, automobile and components energy among others.

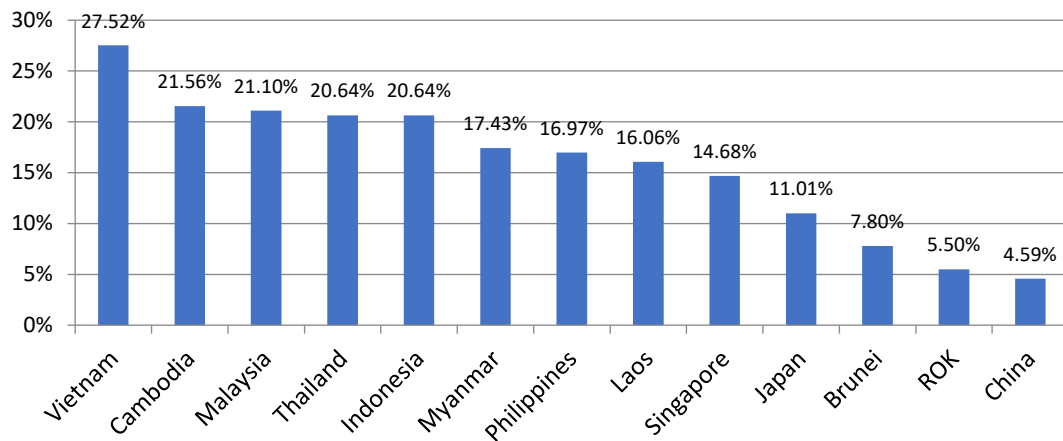
From the perspective of global value chain (GVC), most of the respondents are in the middle or low ends. Specifically, 55.96% of them are engaged in sales services; 22.94% are in the circulation area, and 40.37% are specialized in production, including production of consumer goods, intermediary goods and raw materials. Only 21.10% of the respondents, engaged in R&D and design, are at the high end of GVC.

Figure 2 GVC segments where respondent enterprises belong



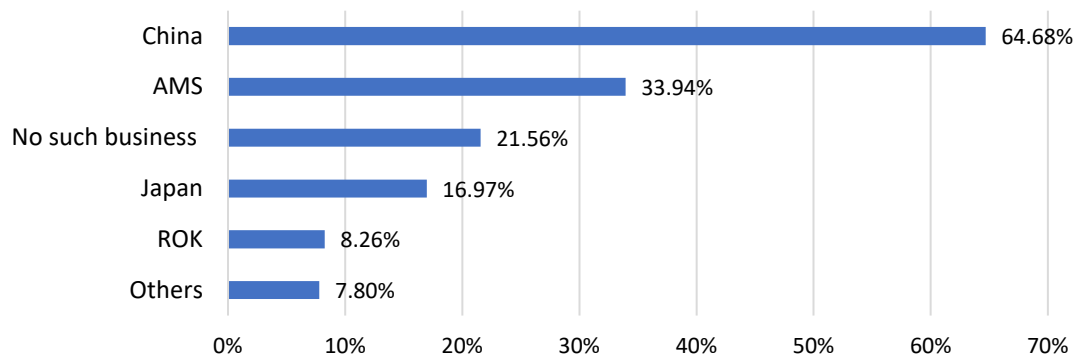
Vietnam is the respondents' most important partner in APT region in terms of trade and investment, registering a share of 27.52%. Cambodia (21.56%), Malaysia (21.10%), Thailand (20.64%), and Indonesia (20.64%) are also the major trade and investment partner countries.

Figure 3. Trade and investment partners of respondent enterprises in APT region



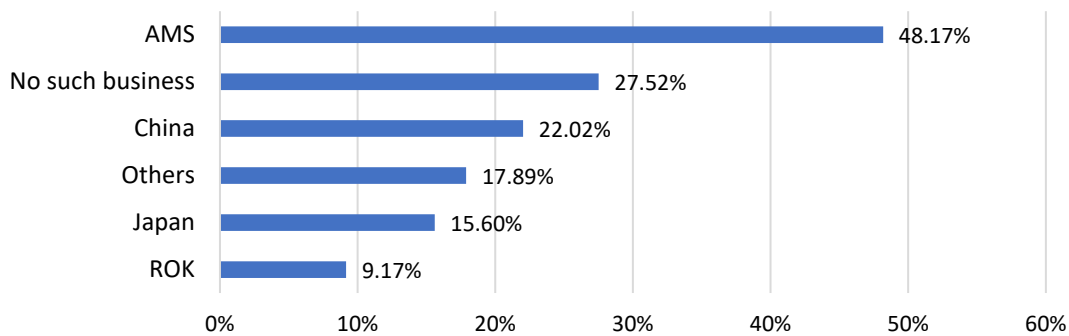
In terms of the top two import sources, China is the most important source for the respondents to obtain raw materials or components, as 64.68% of the respondents import raw materials or components mainly from China. ASEAN came to the second, as 33.94% of respondents import such goods from AMS, mainly from Thailand and Malaysia. The respondents import a relatively small quantity of raw materials or components from Japan and ROK. Other important sources include the United States (1.84%) and Australia (1.38%).

Figure 4 Major import sources of respondent enterprises



In terms of the top two export destinations, ASEAN is the leading export market, as 48.17% of the respondents take AMS as their major export destination. Vietnam (14.22%) and Indonesia (12.39%), in particular, are the most important destinations among ASEAN countries. China is the second largest export market, with 22.02% of the respondents selling their products mainly to the Chinese market. The respondents export a relatively small quantity of products to Japan and ROK. Other important destinations include the United States (8.71%) and Australia (3.21%).

Figure 5 Major export destinations of respondent enterprises



4.1.2 Information of the interviews with enterprises

CAITEC conducted in-depth interviews with 33 domestic and overseas enterprises through virtual meetings to identify the risks and main constraints faced by the SCC in APT countries and examine the impact of COVID-19 on supply chain.

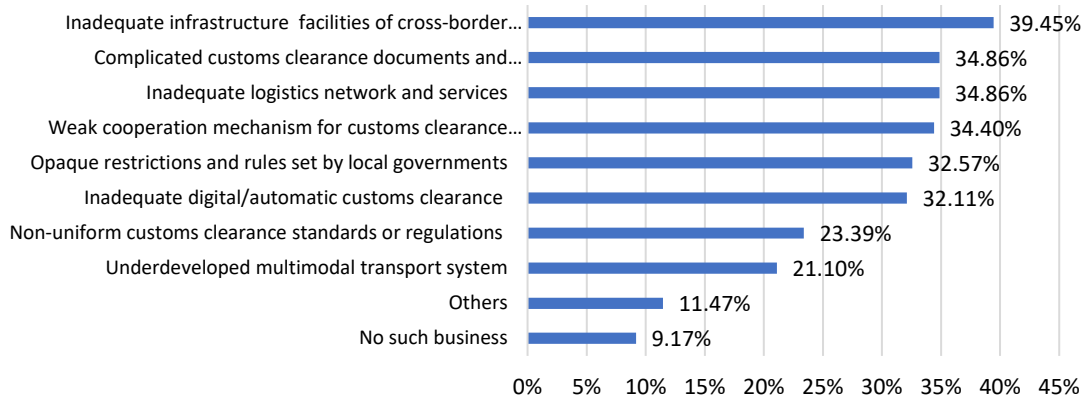
The interviewed enterprises (interviewees) are highly representative as they broadly operate in APT countries and involve a wide range of industries. All of them are Chinese enterprises, of which six are parent companies in China and 27 are Chinese companies' overseas subsidiaries, including three ones in Japan, ROK, Thailand, Vietnam and Indonesia, respectively, and two ones in Malaysia, Laos, Brunei, Myanmar, Cambodia and Singapore Indonesia, respectively. Their business covers light industry, electronic communications (including intelligent manufacturing, etc.), energy conservation and environmental protection (including environmental protection and new energy), contracted projects, petrochemical industry, logistics and supply chain, transportation equipment manufacturing, construction, overseas industrial parks, etc.

4.2 Main results of the survey

4.2.1 Inadequate cross-border infrastructure facilities and local policy systems are major barriers to SCC in APT countries

The survey shows that inadequate or inefficient infrastructure facilities of cross-border customs clearance and transportation (39.45%) and underdeveloped local logistics network and services (34.86%) present big challenges to SCC in the region. The respondents think that the construction of railways, highways, ports and other infrastructure facilities cannot meet the demand in some countries; the overall throughput capacity needs to be improved; the logistics from ports to hinterland is impeded; the rail-sea and road-sea transportation modes are at a low level; the IT application is lagging; and the traditional large ports are facing the problems of congestion and low efficiency. For example, Thailand's Laem Chabang Port, a key shipping hub in Indochina Peninsula, encounters serious congestion and badly needs capacity expansion, partly because enterprises in the nearby Thai-Chinese Rayong Industrial Zone have a large demand for logistics and transportation, and partly because it handles some ships from international transit routes between Myanmar and Cambodia. According to some respondents, the world-class ports in Japan and ROK should upgrade their IT and customs clearance facilities as they have been put into operation for a long time.

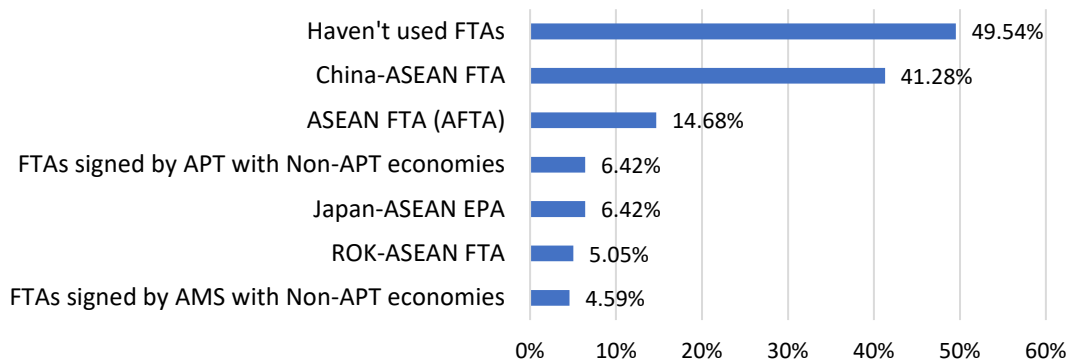
Figure 6 Major barriers to SCC in APT countries



The inadequate local policy systems also restrict SCC in the region. The respondents identify multiple barriers in this regard, such as complicated customs clearance documents and procedures (34.86%), weak cooperation mechanism for customs clearance among local departments (34.40%), opaque restrictions and rules set by local governments (32.57%) and inadequate digital customs clearance (32.11%). Some ASEAN countries have seen slow progress in building the single window system for international trade and rather low efficiency in customs clearance. Moreover, policy communication factors such as non-uniform customs clearance standards or regulations in the region (23.39%) also bring the customs clearance efficiency down. For example, APT countries have not realized mutual recognition of the import certifications of steel and some other products, resulting in hidden trade barriers and making it difficult for enterprises to enter local markets. Inconsistent transit transportation procedures and complex reloading requirements in APT countries have greatly limited cold chain transportation and caused serious economic losses to businesses.

In addition, the survey shows that the respondents have a limited knowledge of the FTA preferential policies and their application, which also negatively affects SCC in the region. At present, a total of 15 FTAs signed between APT countries and 70-plus FTAs signed by APT countries with non-APT economies are in force. However, according to the survey, nearly half (49.54%) of the respondents have not yet used the FTA preferential policies, and the rest mainly make use of the China-ASEAN FTA (41.28%) and the ASEAN FTA (14.68%). The utilization rate of other relevant FTAs is rather low. Some respondents say that their knowledge about the FTA preferential policies, such as tariff cut, access for investment and trade and investment facilitation, is mainly from self-study and the channels provided by trade associations. The local governments have not done much to introduce or disseminate knowledge about the available FTAs.

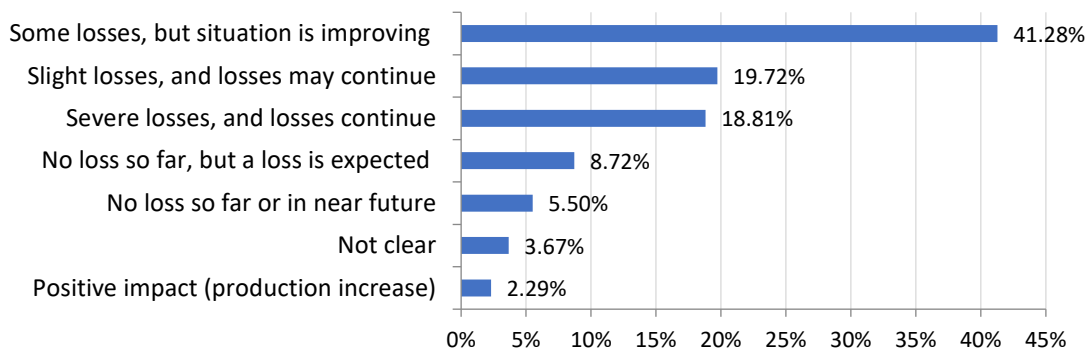
Figure 7 Use of FTAs by respondent enterprises



4.2.2 COVID-19 has had negative impact on the supply chain of most of respondents, with manufacturing enterprises bearing the brunt

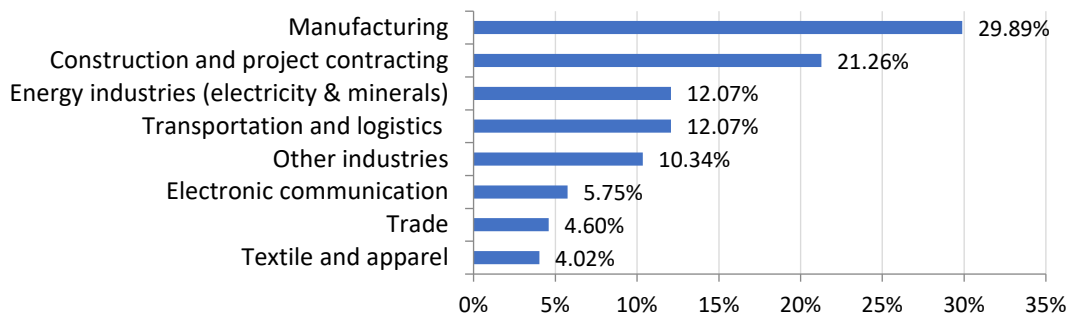
The outbreak and wide spread of COVID-19 has had severe impact on both the regional and global economies. According to the survey, about 80% of the respondents suffered losses in supply chain caused by COVID-19. Specifically, 41.28% of the respondents have seen recovery of production and operation; 19.72% have been lightly affected by the epidemic, but their losses may continue; 18.81% were heavily hit and the losses continues. In addition, 8.72% of the respondents that have not yet reported a loss believe that they are likely to be affected negatively. Nevertheless, some enterprises have felt positive impact – 2.29% of the respondents have expanded production since the epidemic outbreak, mainly the enterprises in e-commerce, household appliances, express delivery and logistics.

Figure 8 Impact of COVID-19 on respondent enterprises



The survey shows that manufacturing enterprises are hardest hit by COVID-19. Among the 174 enterprises that report losses, nearly one third are from the manufacturing industry, due to a long industrial chain and the need to import raw materials and equipment. Factors such as efficiency decline and cost rise of logistics, as well as restrictions on labors, have also acutely impacted the production of manufacturing enterprises. The epidemic has also taken a heavy toll on construction and engineering industries (21.26%), energy industries such as electricity and minerals (12.07%), and transportation and logistics industries (12.07%).

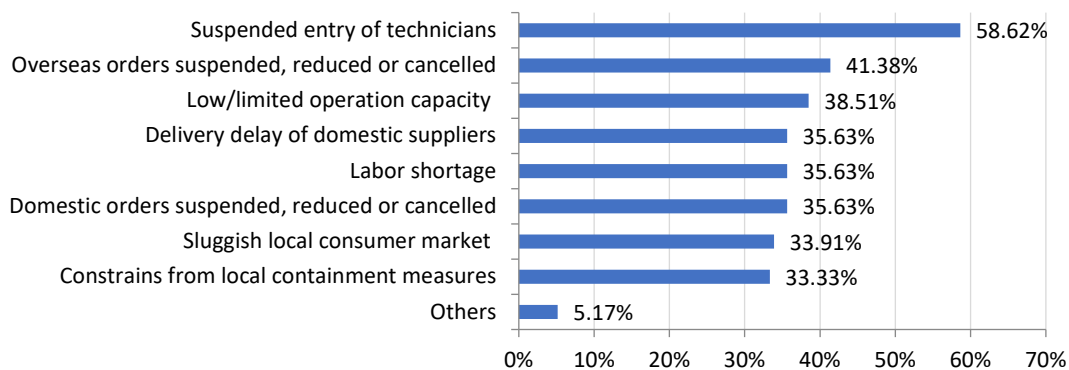
Figure 9 Impact of COVID-19 on industries



4.2.3 COVID-19 has reduced mobility and orders, bringing severe challenges to enterprises' operation

According to the survey, operation difficulties are mainly caused by impeded movement of people. The challenges include suspended entry of technicians (58.62%), low operation capacity (38.51%) resulting from working from home and related reasons, and shortage of workers (35.63%) due to home isolation or getting unable to work. The strict visa approval and customs inspection measures taken by countries to contain COVID-19 spread have restricted people-to-people exchanges and raised running costs. For example, as many ASEAN countries have imposed strict control measures in response to Covid-19, the technical experts and related personnel could not get back after exiting these countries, which has adversely affected project operation. The Japanese ports will cancel landing visas of the crew if their cargo ships visited hard-hit countries and regions in the past 14 days. Moreover, most countries in the region require nucleic acid testing and 14-day quarantine for entry. As testing results and quarantine are not mutually recognized by countries, people who move across borders will be put under quarantine twice and accept multiple tests, which has led to great inconvenience and cost increase.

Figure 10 Main factors affecting enterprises' operation amid COVID-19

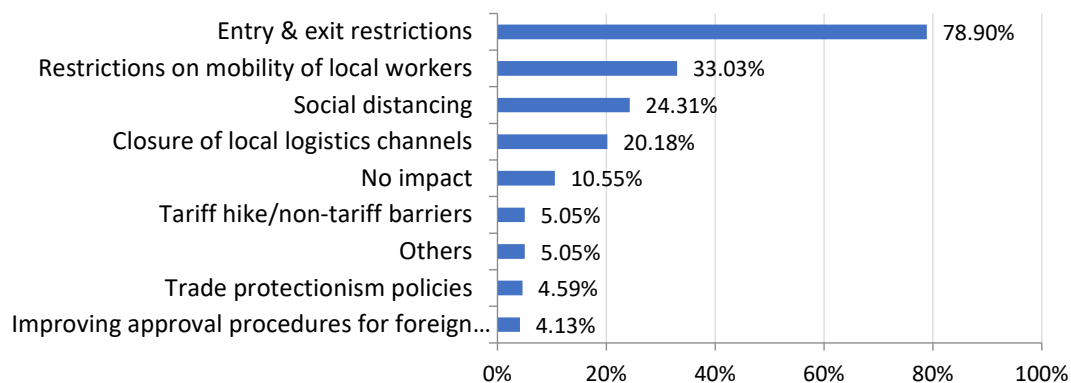


The supply side is recovering steadily while the demand side is making its way slowly. Respondents believe that the decrease in orders from both home and abroad has notable negative effects on their supply chains. The economic growth and consumer demand of major importers such as the EU and the United States were suppressed. Most of the respondents are conservative about the expectations of future market demand and keep cautious about expanding production. Containment measures like lockdowns have increased the transportation time of raw materials, spare parts and other means of production and prolonged project construction period. Some enterprises are even exposed to the risk of

supply disruption of raw materials accompanied with the cost rise. The factors adversely affecting the respondents' supply chains also include sluggish local consumer markets because of dropped consumers' purchasing power or tourist visits, as well as necessary measures to reduce contagion by local governments, including complicated standards and operating procedures.

Containment policies adopted by local governments have inflicted harm on enterprises' supply chains. Nearly 80% of the respondents feel that restrictions on mobility have the most severe impact on their supply chains. For example, restrictions on mobility of local workers (33.03%), social distancing (24.31%), and closure of local logistics channels (20.18%) and other essential restrictions on people's movement and traffic are also extracting a sizable toll on enterprises' activity. In contrast, trade and investment measures, such as tariff hike/non-tariff barriers (5.05%), trade protectionism policies (4.59%) and improvement on approval procedures for foreign investment (4.13%) have limited impact on enterprises. Some of the respondents feel that the production shutdown required by local governments has brought certain difficulties to their operation. Some countries cut government budget or procurement demand while giving people subsidies to sustain their livelihood, leading to some negative effects on project contractors.

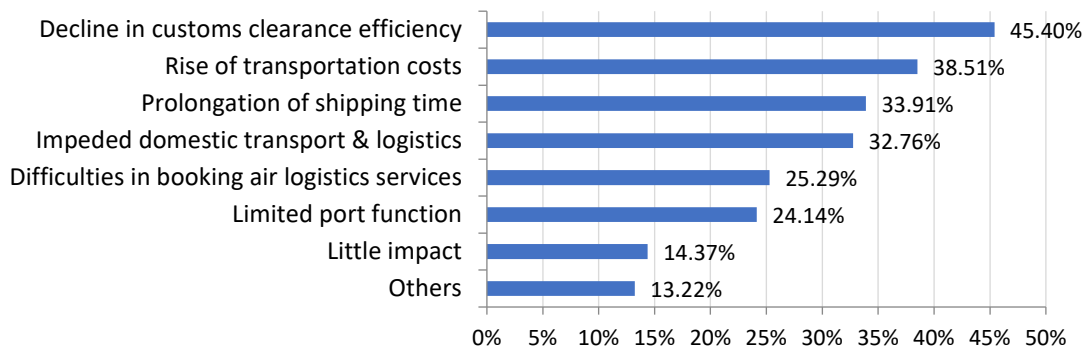
Figure 11 Impact of containment policies by local governments on enterprises' supply chains



4.2.4 The impact of COVID-19 on enterprises' supply chain mainly includes lower customs clearance efficiency, higher transport costs and longer transport time

According to the survey, 45.40% of the respondents believe that the decline in customs clearance function and efficiency has been the primary factor affecting their supply chain. Since COVID-19 outbreak, all countries have adopted strict border control measures. For example, some countries check transit vehicles one by one. Some impose great lockdowns when the situation gets severe, resulting in a sharp decrease in customs clearance efficiency. Some have implemented strict quarantine procedures to ships, disturbing the normal operation of ports. The prolonged non-productive berthing time of ships has led to port congestion and affected the transportation timeliness. The impact of the epidemic on supply chain is also reflected in the rise of air, land and sea transportation costs (38.51%), the prolongation of shipping time (33.91%), the blocked domestic transportation and logistics (32.76%), difficulties in booking air logistics services (25.29%), and limited port function (24.14%). As the air and sea routes in the region have not yet been fully restored, the freight rate has risen, the logistics cost of enterprises has increased to a certain extent, and the timeliness of transportation cannot be guaranteed.

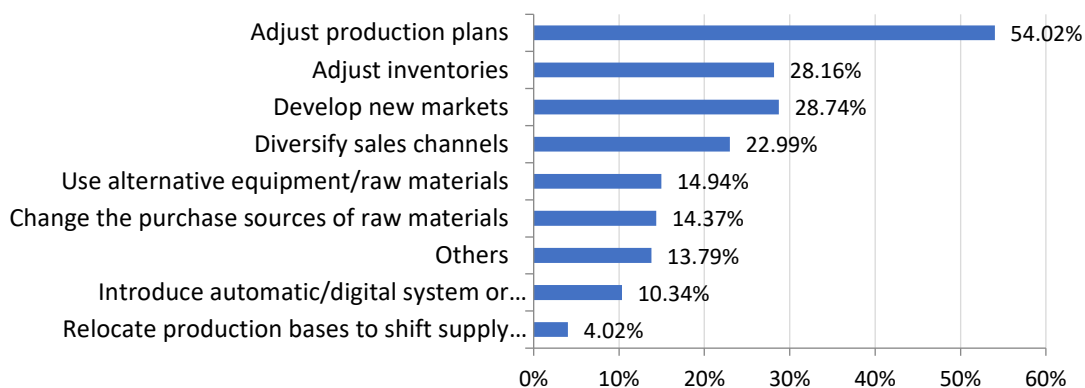
Figure 12 Supply chain segments affected by COVID-19



4.2.5 The respondents mainly adopt measures of adjusting production, sales and purchasing plans in response to COVID-19, and most of them have no plans of relocating production bases

In order to ease losses to supply chain and overall development, more than half of the respondents have adjusted their production plans. Other countermeasures include developing new markets at home and abroad (28.74%), building diversified sales channels like online sales (22.99%), using alternative equipment/raw materials (14.94%), changing the purchase sources of upstream raw materials (14.37%), and introducing automatic/digital system or equipment to improve production efficiency (10.34%). Faced with ongoing risks from COVID-19, some respondents would consider taking the strategy of localization and diversification to improve supporting ability of local supply chain. This include shortening physical distance between suppliers and customers and creating localized, short-distance and diversified networks of supply chain. The focus is to shorten the supply chain process, optimize the system, and improve the flexibility and efficiency of operation, thus building safe, agile, efficient and intelligent supply chains. To fend off the potential risks, the respondents will adjust production plans and inventories, explore new markets and sales channels, use alternative raw materials and raise production efficiency. Enterprises in different industries have different strategies to respond to potential challenges in supply chain. For example, transportation equipment manufacturers and service suppliers mainly focus on developing new markets, while machinery manufacturers and enterprises in light industry tend to diversify their sales ways by starting online sales and other new modes. Enterprises engaged in logistics, transportation and supply chain are more possibly to introduce automatic/digital system or equipment to raise efficiency in production and operation management.

Figure 13 Major measures by respondent enterprises in response to COVID-19

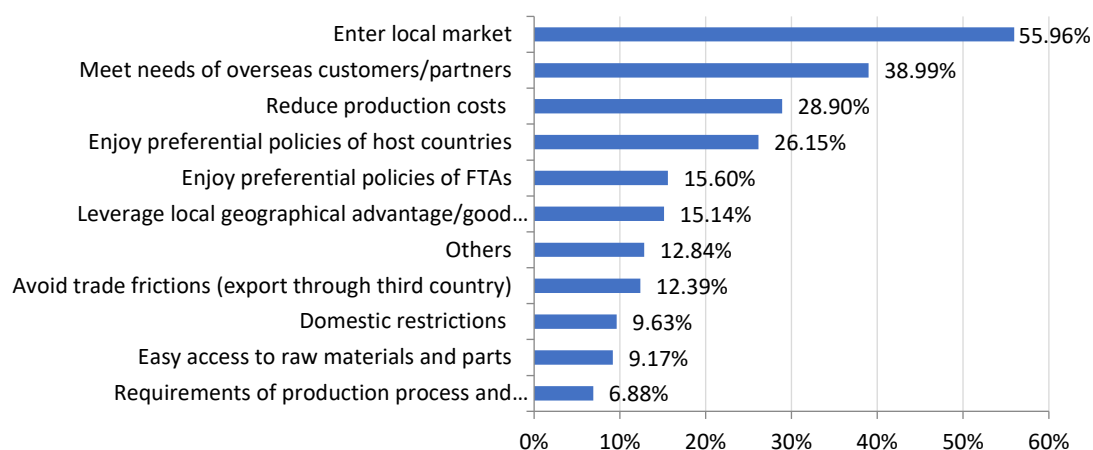


According to the survey, the respondents mostly think that the epidemic has not brought fundamental changes to local investment environment, and they have not yet considered restructuring supply chain by relocating production bases. Most of the respondents have established a broad business network in APT region, deeply participated in local economy, and accumulated rich and stable customer resources. Although hit by COVID-19 and facing challenges like anti-dumping barriers imposed by EU and the United States and rising local labor cost, they still have high expectations for local economic growth and market prospects. Despite restrictions on mobility of people and materials and difficulties in supply chain, 97.25% of the respondents say that they will not relocate production bases even if COVID-19 continues for a long time. They are planning to make up for the losses by altering production plans and exploring new markets.

4.2.6 Market and cost are the key considerations for enterprises to develop overseas supply chain

China is one of the world's major outbound investors, while East Asia is an important destination for outward investment by Chinese enterprises. According to the survey, the main reasons for respondents to develop their supply chains in APT region are entering local market (55.96%) or meeting the needs of overseas customers or partners (38.99%), that is, their investment is largely driven by the market. Enterprises engaged in cross-border trade, logistics and transportation, and project contracting are the major players. Some respondents build overseas supply chains for reducing production costs (28.90%) and enjoying preferential policies in host countries (26.15%), most of which are in labor-intensive industries such as the textile and apparel industry.

Figure 14 Key considerations for enterprises to develop supply chains and conduct trade and investment overseas



From the perspective of industrial development, it has been a general trend that enterprises in labor-intensive industries like textile, apparel and food processing sectors relocate their production bases in ASEAN countries such as Vietnam, Myanmar and Cambodia. On the one hand, labor cost in China is rising, and the Yangtze River Delta and Pearl River Delta regions in the country are encountering the problem of labor shortage. Chinese enterprises have begun to invest and build factories in ASEAN countries where labor resources are plentiful and labor cost is low. On the other hand, by developing supply chains in ASEAN countries such as Vietnam, Cambodia and Myanmar, enterprises can enjoy preferential treatment in major export markets such as the EU, the United States and Japan and thereby reduce export costs. Against the backdrop of China-US trade tensions, some enterprises have already moved their

production bases to ASEAN countries in order to stave off potential risks. Photovoltaic enterprises have relocated part of their production bases to Vietnam or other ASEAN countries to avoid paying high anti-dumping and countervailing duties on Chinese photovoltaic products imposed by the EU and the United States. Nevertheless, most of the respondents still import raw materials and manufacturing equipment from China or advanced economies like the United States, the EU, Japan and ROK.

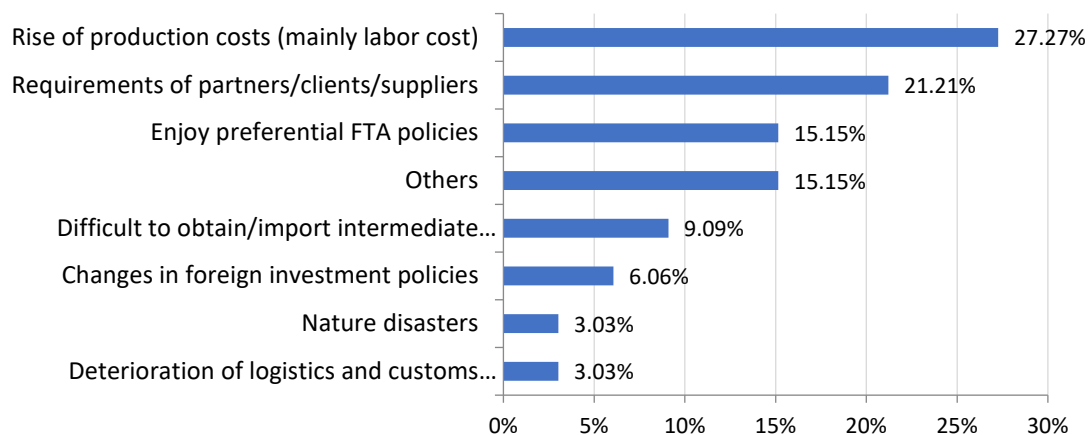
Enterprises in the IT industry seek lower costs and higher security and stability of supply chain when establishing their supply chain networks. Some high-tech enterprises build a self-sufficient supply chain for those products with core technology such as key components and chips, while purchasing general-purpose components globally. This strategy enables them to expand supply sources and reduce costs. Generally, enterprises in this industry hope to hedge potential risks through differentiated and diversified development of supply chain.

The project contractors value more social environment and construction cost in host countries. As the engineering projects require long construction time and large turnover of funds, contractors pay more attention to the political, economic, and legal stability of host countries. They also take the overall cost into account, including skill and wage of local labor force, as well as supply, quality and prices of raw materials and machinery equipment, etc.

4.2.7 Cost rise is the primary driver for enterprises to relocate production, while high relocation cost is the biggest obstacle to such a move.

Thirty-three respondents, mostly in light industry and logistics and transportation sectors, have relocated their production bases or have a relocation plan. Rise of production costs (27.27%), mainly labor cost, is the major drive force for relocation. Due to the heavy blow struck by sluggish local consumer market and weak demand amid COVID-19, some enterprises cannot afford the increased costs and have to move to the regions with lower costs. Requirements of partners or customers (21.21%) is another reason for relocation, mostly those engaged in light industry and cross-border trade. These industries are hit hard by the epidemic as they require high mobility. In addition, 15.15% of the respondents relocate production bases for enjoying preferential FTA policies; 9.09% consider doing so due to difficulties in obtaining/importing intermediate materials and 6.06% for changes in foreign investment policies.

Figure 15 Main considerations for enterprises to relocate or plan to relocate production bases

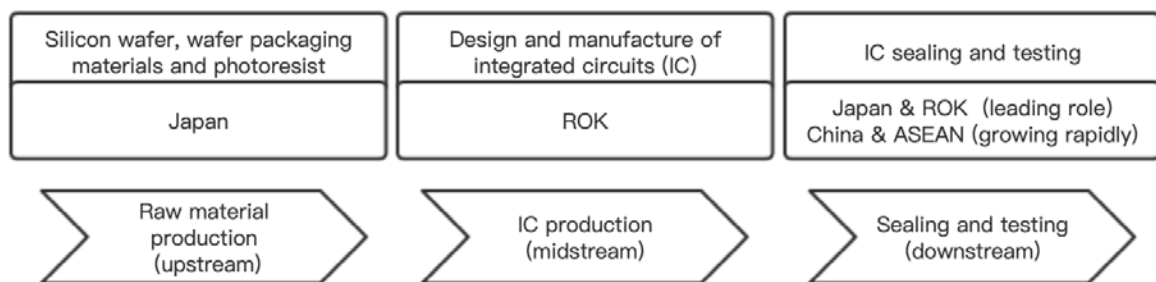


According to the survey, high relocation cost (32.11%), including money and time need for relocation, becomes the biggest obstacle for enterprises to move production bases (or production lines) to third countries or back to China. These enterprises have been running in host countries for many years, getting familiar with local environment and setting up some sales resources and channels. Relocation means rebuilding of sales networks and thus causes high sunk cost. The cumbersome and lengthy local legal procedures for relocation or withdrawal (16.06%) constitute another barrier to relocation. The production bases of most of the respondents are located in ASEAN, while the inefficient law enforcement and administration in some ASEAN countries have turned a hidden burden on the withdrawal of enterprises. The barriers also include inadequate supportive policies for enterprises back to China (9.17%) and unfavourable foreign investment policies or trade protectionism (7.34%) and weak SCC (1.83%) in relocation destinations.

4.2.8 APT economies are highly complementary in economy and the region is playing an increasingly important role in GSC

APT region is one of the world’s most dynamic and promising regions in economic growth. Economies in the region are highly complementary and have become an indispensable part in GSC. The survey shows that Japan and ROK are at the medium and high ends in the areas of advanced equipment manufacturing, new materials and next-generation IT, China has a mature and large manufacturing ecosystem, and ASEAN boasts booming emerging economies. Therefore, they have great potential in cooperation with each other. In 2018, APT region’s exports of spare parts and components amounted to US\$2.51 trillion, making up 31.66% of the global total. Take the semiconductor industry as an example. Upstream raw materials such as silicon wafers, wafer packaging materials and photoresist are mainly produced by the Japanese enterprises, while ROK is in the midstream for design and manufacture of integrated circuits (IC). In the field of IC sealing and testing, Japan and ROK are at the world's leading level, while China and Southeast Asian countries are both at a stage of rapid development. Semiconductor products are supplied to the downstream enterprises, namely, enterprises for assembly of complete electronic products in China and ASEAN countries. In this sense, APT region needs to further enhance SCC cooperation to create a mutually supporting and complementary supply chain ecosystem.

Figure 16 Division of labor in semiconductor industrial chain in APT region



Though governments of some developed countries outside of the region have introduced policies to re-shore their manufacturing sectors amid the epidemic, the dominant position of APT region in GSC cannot be replaced in the short term. The region has mature and large-scale manufacturing systems, strong industrial supporting capabilities and huge consumer markets. Its supply chain, based on highly specialized division of labor and broad collaboration, has great resilience and unique advantages in cushioning the impact of global public emergencies. According to the majority of the respondents in traditional labor-intensive and capital-

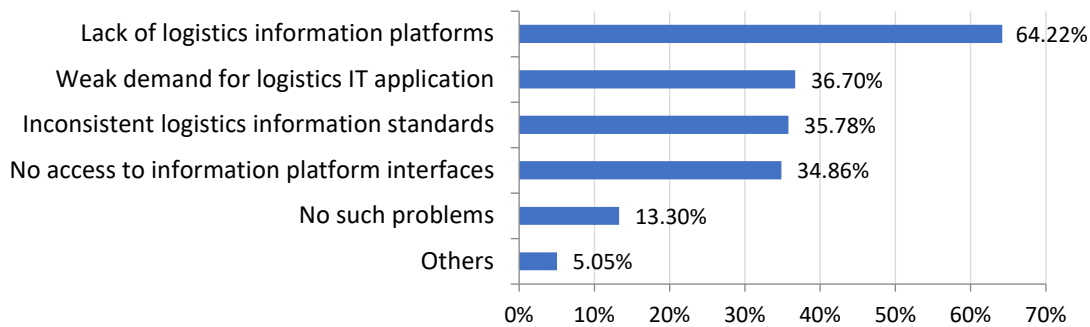
intensive manufacturing sectors, the raw materials, spare parts and components and other products in the upstream of supply chain are mainly provided by the Chinese factories, which will be transported to ASEAN for assembly and processing. The final products are sold to ASEAN, Europe, America, and China, Japan and ROK and other markets. For example, the locomotive parts used by rail transit manufacturers are shipped by sea from China's coastal regions to ASEAN countries for assembly and commissioning and then for use in local markets. Textile accessories are transported to Myanmar or other ASEAN countries through highways from China's Yunnan, or to Cambodia and surrounding countries by sea for producing and processing, and the finished products will be exported to Europe, America, Japan and other markets.

4.2.9 Digital supply chain is developing rapidly amid COVID-19, but the lack of logistics information platforms constrains information connectivity in APT region

The COVID-19 outbreak has provided an opportunity for the rapid development of digital supply chain. Enterprises are accelerating the networking and application of digital supply chain, as digitalization, IT application and automation are playing a more and more important role in their operation. In particular, digital supply chain is gaining robust momentum in the sectors that have a long industrial chain and require sophisticated production management, such as electronic communication, transportation equipment, and machinery manufacturing. Most of the respondents have developed automatic production or digital workplace, and some of them have built automatized or digital logistics. Cross-border e-commerce has also become one of the important ways for enterprises to conduct international trade. For example, businesses engaged in logistics and transportation and supply chain management have raised the efficiency of logistics information management through digital technology, reduced no-load rates of vehicles, and achieved cost cut and efficiency increase in cargo transport. Manufacturers of transportation equipment are actively developing digital supply chain and promoting the application of zero inventory management. Enterprises in light industry including light textile and household appliance sectors have further improved supply efficiency and cut procurement cost of materials and production equipment through developing e-commerce and building databases.

Despite the progress, digital supply chain in APT region still faces challenges. The survey shows that the biggest barrier to information connectivity in the region are lack of logistics information platforms (64.22%), followed by weak market demand for logistics IT application (36.70%), inconsistent logistics information standards (35.78%), and no access to information platform interfaces (34.86%). The backward network infrastructure and low IT application level in some ASEAN countries have affected the application and development of enterprises' digital supply chains. Moreover, the non-harmonized rules or standards for information exchange and data flow also hinder information connectivity in the region.

Figure 17 Challenges in logistics information connectivity in APT region



5. Summary of key findings

Building on the analysis of the above-mentioned questionnaire survey and interview results, CAITEC has the following key findings.

First, insufficient cross-border infrastructure facilities and inadequate local policy systems are major barriers to SCC in APT countries. In some ASEAN countries, the construction of railways, highways, ports and other infrastructure facilities cannot meet the demand; the overall throughput capacity needs to be improved; the logistics network is underdeveloped; and the rail-sea and road-sea transportation modes are at a low level. The ports in Japan and ROK need to upgrade their IT and customs clearance facilities. Other factors holding back the supply chain include complicated customs clearance procedures, weak cooperation mechanism for customs clearance, opaque restrictions and rules set by local governments and inadequate digital customs clearance in some ASEAN countries. In addition, the absence of local governments in introducing or disseminating knowledge about the available FTAs and the low utilization of FTAs by enterprises also constrain SCC in the region.

Second, COVID-19 has adversely affected the supply chains of 80% of the respondents. About 40% of the respondents have seen recovery of operation. Manufacturing enterprises that need to import raw materials and equipment and export products were hardest hit by COVID-19, followed by construction and engineering industries, energy industries such as electricity and minerals, and transportation and logistics industries, etc. The strict visa approval and customs inspection measures taken by countries to contain the spread of COVID-19 have restricted mobility and led to the shortage of management and technical personnel and workers, taking a toll on the operation of enterprises. The impeded logistics channels and the prolonged customs clearance time for transportation of raw materials, spare parts and components and other means of production have acutely affected project construction. The supply side is recovering steadily while the demand side is making its way slowly. The sluggish market demand and reduced orders have brought severe challenges to enterprises' supply chains. The impact of the epidemic on supply chain is also reflected in the decline in customs clearance efficiency, the rise in air, land and sea transportation costs, the prolongation of shipping time and the blocked domestic transportation and logistics. In order to mitigate the losses to their supply chain and overall development, more than half of the respondents have adjusted their production plans. Other countermeasures include developing new markets, adjusting inventories, building diversified sales channels, etc. The vast majority of the respondents have no plans of relocating production bases. Faced with ongoing risks from COVID-19, some respondents would consider taking the strategy of localizing and diversifying supply chains.

Third, market and cost are the key considerations for enterprises to develop overseas supply chain, including entering local markets, meeting the requirements of overseas customers or partners, cutting production costs, enjoying preferential policies provided by local governments, etc. The primary driver for enterprises to relocate production bases is the rise of production costs, especially labor cost in host countries. Due to China-US trade tensions and rising labor cost in China, some enterprises have moved their production bases to ASEAN countries before COVID-19 outbreak. High relocation cost, including money and time need for relocation, becomes the biggest obstacle for enterprises to relocate production bases (or production lines), followed by cumbersome and lengthy local legal procedures for relocation or withdrawal.

Fourth, economy of APT region has recovered rapidly amid COVID-19. Economies in the region are highly complementary and have great potential in cooperation with each other. Though governments of some developed countries outside of the region have introduced policies to re-shore their manufacturing sectors amid the epidemic, the dominant position of APT region in GSC cannot be replaced in the short term. The region has mature and large-scale manufacturing systems, strong industrial supporting capabilities and huge consumer markets. This supply chain, based on highly specialized division of labor and broad collaboration, has strong resilience and unique advantages in cushioning the impact of global public emergencies.

Fifth, COVID-19 outbreak has provided an opportunity for the rapid development of digital supply chain. In particular, digital supply chain is gaining robust momentum in the sectors that have a long industrial chain and require sophisticated production management, such as electronic communication, transportation equipment, and machinery manufacturing. However, due to backward network infrastructure and low IT application level in some ASEAN countries, lack of logistics information platforms has become the biggest barrier to information connectivity in the region.

6. Policy recommendations

APT region, as one of the world's most dynamic and promising regions in economic growth, is playing an increasingly important role in GSC. Economies in the region are highly complementary and have great potential in cooperation with each other. At present, COVID-19 is still spreading across the globe and APT countries are facing severe challenges in their economic growth. Under the new circumstances, it is even more imperative for all parties to take joint efforts to improve the supply chain resilience and connectivity in APT region so as to mitigate the negative effects of the epidemic on businesses, boost their confidence in trade and investment, and promote economic recovery in the region. To this end, this report puts forward the following policy recommendations.

6.1 Strengthening policy communication and coordination and working together to ensure an unimpeded supply chain

Governments need to strengthen communication and coordination on policies that may affect the supply chain. They should create an open, free, stable and transparent environment for trade and investment, oppose unilateralism and protectionism, and advocate market-based development of industrial and supply chains in APT region. Joint efforts could be made to keep supply chain smooth within the region and beyond and build a more resilient, sustainable and less vulnerable international cooperation network for supply chain in the region. Efforts could

also be made in exchanging and sharing information in a timely manner, such as countries' respective economic stimulus policies in response to COVID-19, in a bid to help enterprises stabilize supply chain, ease impact of COVID-19, generate synergy for development, and jointly stimulate regional economic growth. Countries in the region could explore the establishment of an APT emergency management mechanism for supply chain and an emergency management fund to improve the supply chain's ability in disaster prevention, mitigation and relief, and to increase the reserve of emergency materials so that countries could pool and share these materials when needed. They should strengthen forecast and early warning systems for major emergencies, follow the developments of the situation and make timely assessment, and strive to minimize the impact of force majeure on logistics and supply chain. To address the bottlenecks in SCC, including complex border management procedures, long customs clearance time and high logistics cost, APT countries should enhance government-enterprise collaboration and information exchange, step up cooperation in institutions and standards, explore the establishment of a unified information exchange and sharing platform for supply chain, and jointly take measures to solve the chokepoints in the entire supply chain. Focusing on the areas concerning enterprises most, such as customs procedures, logistics facilitation and transparency, countries could intensify coordination and cooperation among customs and other border agencies, set up and improve the single window system for international trade and promote the connectivity of single windows in the region, increase exchange of electronic customs data and information, simplify customs clearance procedures, reduce non-tariff barriers, improve trade facilitation, and make the regional supply chain smoother and more efficient, so as to fully unlock the potential of the regional trade and investment cooperation. In addition, they could expand market access for trade in services, promote mutual recognition of professional and technical qualifications, encourage the use of local currencies for payment and settlement in regional trade, improve SCC in the service sectors of cross-border logistics, international finance, service outsourcing, R&D and design, and accounting, and actively develop supply chain-related services.

6.2 Making further efforts to shore up weak links in infrastructure and improving cross-border transportation connectivity in the region

At present, logistics infrastructure develops unevenly in APT countries. For instance, the conditions of ports and airports are better than those of highways and railways, while the port transport and distribution systems need to be improved. Efforts should be made in the following areas: strengthening the construction of highways, railways and other transportation facilities as well as infrastructure related to energy and telecommunication sectors in APT countries; improving distribution and transportation systems of ports and airports and the road network leading to them; constantly raising the quality of infrastructure for regional connectivity; setting up efficient and smooth cross-border transportation networks including sea, air, road and rail transportation; cutting logistics costs for businesses; and increasing logistics efficiency. In addition, countries are expected to enhance international cooperation under the framework of the New International Land-Sea Trade Corridor, advance infrastructure construction related to multimodal transport and cold chain transport, promote seamless connection between land and sea transport, as well as land and air transport, and strive to create a unified transport rule system for trans-regional multimodal transport and cold-chain transport. They could also strengthen legislative cooperation in Public-Private Partnership (PPP), create a good development environment for PPP projects, and explore the establishment of an APT PPP asset trading market. Stronger support could be given to private investors to participate in infrastructure construction, and financial transparency of transportation infrastructure-related projects could be improved further. The governments

are also advised to conduct more cooperation with multilateral financial institutions such as the Asian Infrastructure Investment Bank, the Asian Development Bank and the Silk Road Fund so as to provide investment and financing support for infrastructure construction in the region. They are expected to enhance synergies between the Belt and Road Initiative (BRI) and the ASEAN Economic Community (AEC) as well as Master Plan on ASEAN Connectivity 2025 (MPAC 2025). Further efforts could be made to intensify cooperation among China, Japan and ROK in developing innovative modes of third-party cooperation in the ASEAN market, ensure greater coordination in capital, technology and personnel, and thereby jointly bring the regional connectivity to a new stage.

6.3 Enhancing regulatory coordination and cooperation and gradually establishing a mutually recognized and compatible system of standards and rules

Each of APT countries has its own systems of laws, regulations and standards, some of which are different from international standards. When conducting cross-border trade and investment, enterprises find the incompatibility or inconsistency of standards and rules remains a common problem, which has increased their operation cost. For instance, the non-uniform infection prevention and control standards of countries have created difficulties in cross-border movement of business persons and transportation of goods. This has become a common complaint from the respondents. Countries should set up fast tracks for the areas hit hard by the epidemic, such as people-to-people exchanges and logistics transportation, and strengthen mutual recognition of standards in epidemic control to facilitate mobility and raise transport efficiency. Regulatory communication and information sharing need to be strengthened in the areas of logistics and transportation, Sanitary and Phytosanitary Measures (SPS), technical barriers to trade (TBT), etc. While encouraging the application of international standards, countries could explore the possibility of signing mutual recognition agreements on the basis of their own domestic standards. They are expected to establish regional laboratories for product quality assessment, expand the application of electronic SPS certificates, and promote the automatic application, approval and issuance of SPS certificates. In addition, technical cooperation and exchange in the formulation of new standards could be strengthened to improve the consistency of regulations and standards in various countries and minimize the negative effects of non-uniform standards on enterprises.

6.4 Accelerating the building of FTAs and other mechanisms to provide institutional guarantee for SCC

The FTAs, as an important platform and mechanism to promote SCC, encompasses a range of issues closely related to SCC, namely tariff reduction, customs procedures and trade facilitation, SPS and TBT, liberalization of investment services, transparency, intellectual property rights, competition policy, industrial cooperation, etc. APT countries should advance the signing of the RCEP and speed up negotiations on the China-Japan-ROK Free Trade Agreement, aiming to reduce barriers to trade and investment, promote liberalization and facilitation, create a better environment for economic and trade cooperation, provide a sound institutional guarantee for the full improvement of SCC, and boost enterprises' investment confidence in the region. Governments are suggested to cooperate closely with public media, business associations, development zones, industrial parks, etc. to disseminate the FTA-related policies to enterprises so that they can make use of and benefit more from the FTAs. Efforts could also be made to include rules on supply chain cooperation into the FTAs and establish a supply chain committee consisting government officials, enterprise representatives,

experts and scholars, so as to facilitate cross-sectoral coordination in various links of the supply chain, strengthen risk early warning and crisis management in supply chain, and improve the reliability and security of regional supply chain.

6.5 Stepping up construction of new types of infrastructure and improving connectivity of digital supply chain

Efforts in this area are expected to include strengthening the construction of new infrastructure like trans-oceanic cable, fiber optic communication networks and data centers to promote the integrated development of modern digital technology and supply chain; using technologies like artificial intelligence, block chain, cloud computing, and big data to connect all linkages of the supply chain; and realizing intelligent and visualized management. The aim is to help businesses improve efficiency, lower costs and quickly integrate into the global market. Government-enterprise cooperation should be enhanced to drive forward the application of new technologies such as block chain, so that the whole process of cross-border cargo transportation and warehousing could be digitally tracked. The establishment of a financial system for supply chain could be explored. International cooperation in the fields of fight against cybercrime, e-consumer protection, electronic transaction, data protection and privacy protection should be strengthened; making of sound rules for data localization should be explored; and security in SCC should be enhanced. APT countries are expected to cooperate more on setting standards for data interfaces in all aspects of e-commerce and express logistics, and actively promote the integration of facilities and equipment, operation processes and information exchange. Enterprises engaged in e-commerce, logistics and platform building in the region are encouraged to deepen cooperation to improve connectivity and safe sharing of data on e-commerce and express delivery. Efforts could be made to establish and improve a uniform postal and express delivery system in the region, exempt tariffs on express delivery and transport of mails, raise the efficiency of handling small packages, and provide reliable, efficient and flexible express delivery services for e-commerce.

6.6 Promoting technology sharing and capacity building to make SCC benefit more people

Weak technical strength and human resource will prevent a company from improving their supply chain efficiency, and will constrain a country from meaningfully participating in international supply chain or benefiting from it, especially for the developing economies. APT countries, therefore, need to strengthen technology sharing and cooperation, especially cooperation in new technologies related to automation, visualization and digitalization, share successful experience and best practices through conferences, seminars, training programs and other means, and encourage opening up, innovation and data sharing. It should be noted that the new technological revolution has made it easier for industries and jobs to move regionally and even globally, and the epidemic has accelerated the pace of career change. Against this backdrop, countries should strengthen vocational education and career change training and promote lifelong learning, so as to better prepare their labor force for diversified job needs in the post-epidemic era and amid the new technological revolution. It is suggested to build a safe and stable international supply chain for epidemic control supplies in an effort to enhance the supporting capacity of medical supplies. Multinational enterprises in the region are encouraged to open up global supply chain resources, and leading enterprises are supported to build industrial Internet platforms to allow small and medium-sized enterprises to more easily access the global supply chain network system. The multinational enterprises are also encouraged to better fulfill their social responsibilities and foster good interaction

between industrial parks (including special economic zones, free zones and export processing zones) and local economic and social development.

6.7 Deepening comprehensive reform to stimulate domestic circulation and power SCC in the region

China's development experience has showed that a domestic market that is open, free, efficient and unified and enables fair competition is the foundation for attracting foreign investment and participating in GSC. Such a market will facilitate the development of SCC. Therefore, it is necessary for countries to carry out systematic and comprehensive reforms in various fields, keep alignment with the World Bank's index evaluation system of Ease of Doing Business, raise administrative efficiency in all respects, remove behind-the-border barriers, vigorously improve domestic business environment, and provide stable and predictable policies for enterprises. Countries also need to further lift barriers in their domestic markets and break government monopolies, promote the free and efficient flow of factors, improve the efficiency of market allocation, cut domestic circulation costs, unblock domestic economic circulation, form a benign domestic supply chain system, and work to create a strong domestic market. The economies with a small domestic market are expected to advance the building of the ASEAN common market, while endeavoring to join the regional economic integration processes such as APT and RCEP, and increase their appeal to GSC with the expansion of regional common markets.

7. Conclusion

The trade, investment and economic ties among APT countries are very close. Improvement of SCC is of great significance for APT countries to create a free, enabling and efficient environment for trade and investment, promote the economic and industrial development in the region, safeguard the international economic and trade order and boost global economic growth.

The outbreak and wide spread of COVID-19 has presented new challenges to SCC in APT countries. The shock of the pandemic has disrupted logistics in the short term, caused a shutdown of a large number of enterprises, sent the international trade into severe contraction, and made SCC in the region face a risk of breakdown. In the long term, if the situation goes worse, some multinational enterprises may reconsider their networks of global industrial chain and attempt to develop localized, regionalized and decentralized production and supply chains. This means inevitable adjustments and evolution of global industrial and supply chains and will have profound impact on SCC in APT countries.

Under the new circumstances, improving SCC will help forge a more resilient supply chain and ensure economic recovery and growth in the region. It also plays an important role in boosting confidence in global economic recovery and promoting the attainment of SDGs. All parties need to take joint efforts to improve the resilience and connectivity of supply chain in the region so as to mitigate the negative effects of the epidemic on businesses, boost their confidence in trade and investment, and promote economic recovery and growth in the region. To this end, APT countries should conduct cooperation in the following areas: strengthening policy communication and coordination and working together to ensure an unimpeded supply chain; making further efforts to shore up weak links in infrastructure and improving cross-border transportation connectivity; enhancing regulatory coordination and cooperation and

gradually establishing a mutually recognized and compatible system of standards and rules; accelerating the building of FTAs and other mechanisms to provide institutional guarantee for SCC; stepping up the construction of new types of infrastructure and improving the connectivity of digital supply chain; promoting technology sharing and capacity building to make SCC benefit more people; and deepening comprehensive reform to stimulate domestic circulation and power SCC in the region. Governments of APT countries need to work together to maintain the stability of global industrial and supply chains while coordinating their efforts of containing the epidemic and resuming work and production in their own countries. They are suggested to make sustained efforts to promote liberalization and facilitation of trade and investment, cut logistics costs in imports and exports, improve transportation facilitation for foreign trade, and build unimpeded international logistics corridors, thereby making positive contributions to the connectivity of global and regional supply chains.