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Strengthening the Connectivity of Supply Chains in East Asia

LI Feng*

East Asia can optimise its manufacturing capacities, leverage regional integration, and boost its productivity through innovation potentials. These factors provide key regional advantages for supply chain connectivity in the region. Currently, the ASEAN Plus Three (APT) countries have achieved consensus and progress in connectivity. Value chains and low-carbon initiatives are two key concerns in the future. To improve APT supply chain connectivity, a long-term cooperation mechanism and intraregional policy coordination are an imperative, with full utilisation of connected infrastructure and shared technology.

GLOBAL SUPPLY CHAINS are undergoing dramatic transformation, characterised by regionalisation, localisation, digitalisation and greenisation. In East Asia, a close-knit network of industrial connectivity has been developed,

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and its interconnected supply chains play an essential role in global economic prosperity and stability.

Strengthening supply chain connectivity among ASEAN Plus Three (APT) countries is considered fundamental. According to the Direction of Trade Statistics by the International Monetary Fund (IMF), the total merchandise trade volume for APT countries reached US$100.8 trillion in 2022, while 49.4% of exports and imports occurring among APT countries. Such high level of interdependence in East Asia underscores the importance of regional supply chain connectivity. In emerging sectors, East Asian countries have established core supply chains in global semiconductor and new energy vehicle manufacturing.

There is a broad consensus on enhancing supply chain connectivity in East Asia, as evidenced by initiatives such as the Hanoi Plan of Action on Strengthening ASEAN Economic Cooperation and Supply Chain Connectivity in Response to the COVID-19 pandemic in 2021, the Joint Study on 10+3 Cooperation for Improvement of Supply Chain Connectivity in 2020 and the ASEAN–China Joint Statement on Mutually Beneficial Cooperation on the ASEAN Outlook on the Indo-Pacific in 2023, etc. However, several challenges, such as climate change, geopolitical uncertainty, and technological and digital transformation, persist. Addressing these challenges would require a concerted effort and practical actions based on regional consensus.

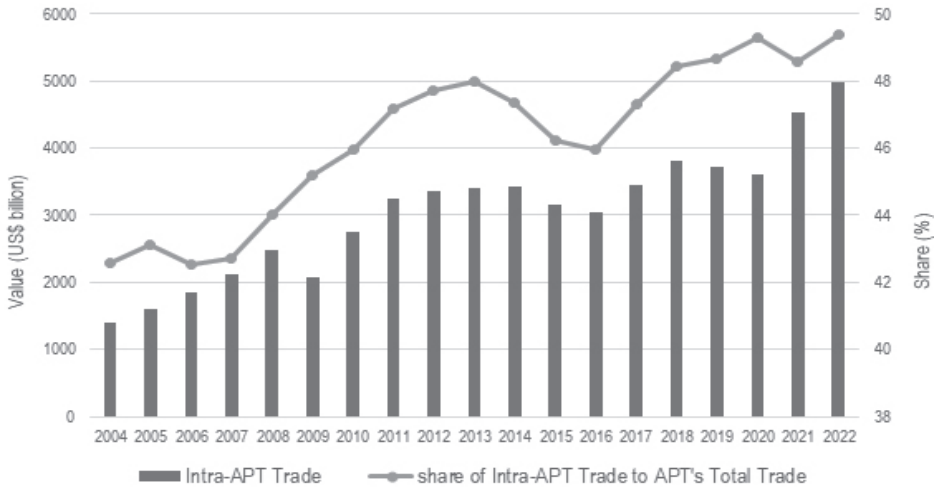
Connectivity is the Fundamental Key

Since the ASEAN Plus Three integration began in 1999, trade among APT members witnessed a rapid annual growth of 6.8% on average from 2007 to 2018, and by 2022, the share of intra-APT trade accounted for 49.4% of total APT trade (Figure 1). The increasing level of connectivity within the APT region that facilitates smooth trading of goods is the key driver of these favourable economic outcomes. Connectivity serves as a platform for production networks, linking local companies within the APT region to global value chains (GVCs), thereby facilitating efficient allocation of resources and keeping products affordable for consumers.[1] In the context of supply chains, connectivity is a simple yet fundamental concept essential for integration.

Supply chain connectivity encompasses several core dimensions: transport connectivity, commercial integration, customs and security integration, regulatory integration, planning and funding integration, work practices integration, and information systems integration. *Transport connectivity* involves improved connectivity and interoperability of modes (intermodalism), along with the synchronisation of terminals and hinterland flows. *Commercial integration* refers to trade and commercial agreements that improve cost, time and reliability of

[1] ASEAN, "Joint Study on 10+3 Cooperation for Improvement of Supply Chain Connectivity (SCC)", 2020, <https://asean.org/book/joint-study-on-103-cooperation-for-improvement-of-supply-chain-connectivity/> (accessed 12 July 2024).

FIGURE 1 TRADE CONNECTIVITY IN EAST ASIA



Note: APT denotes ASEAN Plus Three.
Source: International Monetary Fund, Direction of Trade Statistics, various years.

transport and distribution services. *Customs and security integration* pertains to efficient movement of cargo across borders through the harmonisation of customs and security procedures. *Regulatory integration* aims to promote modal choice and prevent subsidised modal preference by harmonising regulations across jurisdictions and encouraging standardisation and certification. *Planning and funding integration* refers to the planning and funding of infrastructure provision from an integrated multimodal and logistics chain perspective. *Work practices integration* pertains to developing organisational and skills competencies for efficient cargo movement. *Information systems integration* refers to the interconnectivity of information systems through technologies like blockchains.[2]

There is a common consensus on the importance of connectivity among APT countries (see Table 1). From ASEAN's perspective, the "ASEAN Leaders' Statement on ASEAN Connectivity Post-2025 Agenda", published in 2022 for the occasion of the 40th ASEAN Summit, reaffirms the "ASEAN Community Vision 2025: Forging Ahead Together", the "Vientiane Declaration on the Adoption of the Master Plan on ASEAN Connectivity (MPAC) 2025", and the "Ha Noi Declaration on the ASEAN Community's Post 2025 Vision". From the APT's perspective, the "ASEAN Plus Three Leaders' Statement on Connecting the Connectivities Initiative", issued in 2019 during the 22nd ASEAN Plus

[2] The Geography of Transport Systems, "Elements of Supply Chain Connectivity and Integration", <https://transportgeography.org/contents/chapter7/logistics-freight-distribution/supply-chain-connectivity-integration-coordination/> (accessed 9 August 2024).

TABLE 1 COMMON CONSENSUS FOR CONNECTIVITY IN EAST ASIA	
Proposers	**Guiding Documents**
ASEAN	ASEAN Leaders' Statement on ASEAN Connectivity Post-2025 Agenda
	ASEAN Community Vision 2025
	Master Plan on ASEAN Connectivity 2025
	Ha Noi Declaration on the ASEAN Community's Post 2025 Vision
ASEAN Plus Three	ASEAN Plus Three Leaders' Statement on Connecting the Connectivities Initiative
	2018–2022 ASEAN Plus Three Cooperation Work Plan
	Manila Declaration on the 20th Anniversary of the ASEAN Plus Three Cooperation
	Leaders' Statement on ASEAN Plus Three Partnership on Connectivity
China, Japan and the Republic of Korea	Joint Declaration of the Seventh Japan–China–the Republic of Korea Trilateral Summit
China	Beijing Initiative for the Connectivity of Industrial and Supply Chains

Source: Author's compilation from various sources.

Three Summit, highlights connectivity and aligns with the "2018–2022 ASEAN Plus Three Cooperation Work Plan", the "2017 Manila Declaration on the 20th Anniversary of the ASEAN Plus Three Cooperation", the "2016 Master Plan on ASEAN Connectivity 2025" and the "2012 Leaders' Statement on ASEAN Plus Three Partnership on Connectivity". From the perspective of China, Japan and the Republic of Korea, the "Joint Declaration of the Seventh Japan–China–the Republic of Korea Trilateral Summit", issued in 2018, recognises the importance of enhanced regional connectivity, and the three countries are committed to pursuing trilateral dialogue and consultation to improve regional connectivity and infrastructure cooperation for the benefit of East Asia as a whole. In this regard, economic cooperation is strengthened in areas such as supply chain connectivity. In 2023, at the China International Supply Chain Expo, China launched the "Beijing Initiative for the Connectivity of Industrial and Supply Chains", which proposes maintaining stable and smooth flows of global industrial and supply chains to promote global economic development.

However, regional connectivity can be influenced by global dynamics, including factors such as geopolitical disputes, industrial relocation and emerging technologies, etc. These global dynamics further highlight the importance of regional connectivity, and urge East Asia to keep pace with global trends and implement measures to move upstream in the supply chains and develop as technology-driven economies.

Two Major Criteria for Sustainable Connectivity

In the context of globalisation, supply chain connectivity is prevalent and significant, both globally and regionally, whether in trilateral or bilateral

arrangements. Every economy in East Asia has participated in the chains, reflecting deep regional economic integration. Supply chain connectivity is a long-term trend that cannot be disregarded and no country can remain isolated from this connectivity. To better leverage the connectivity trend and ensure the resilience of supply chains, coordinated policies and information-sharing are essential, together with two major principles serving as drivers, namely the integration of supply chains connectivity with value chains and decarbonisation. In other words, implementing efficient and green supply chains connectivity is crucial for sustainability.

More value added

Based on the concept of international division of labour, countries not only participate but also specialise in producing specific types of products for exchange or focus on selected parts of the production process that they perform more efficiently. Currently, trade in intermediate goods is relatively common globally. According to World Trade Organisation's statistics, the share of intermediate goods (the share of world exports of non-fuel intermediate goods in total world exports) has remained steady at just over 50% for many years, reaching 54% in the fourth quarter of 2023.[3] Therefore, in numerical volume, intermediate trade accounts for more than half of global trade, signifying that supply chain connectivity yields benefits. Along the supply chain, before the goods become final products, intermediate goods may flow between countries several times, thereby connecting numerous producers and manufacturers.

However, while many manufacturers participate in supply chains and intermediate trade, their contributions to product value and their earnings can vary significantly across different producers and countries. This variation underscores the concept of global value chains (GVCs). For instance, iPhones 3G, designed and marketed by Apple's US team, are produced outside of the United States, apart from its software and product design. Manufacturing iPhones involves several companies from China, the Republic of Korea, Japan, Germany and the United States. Components produced by these companies for iPhones are shipped to Foxconn in Shenzhen, China for assembly into final products before being exported to the United States and the rest of the world.[4] Despite majority of the manufacturing activities were conducted in China, its assembly process only contributed 1.3% to the total final value of the iPhone, and Foxconn's gross profit rate constituted less than 10%, much lower than those of Apple, Qualcomm and Intel with over 40% gross profit rate.

[3] World Trade Organisation, *Global Trade Outlook and Statistics*, April 2024, p. 31.

[4] Xing Yuqing and Neal Detert, "How the iPhone Widens the United States Trade Deficit with the People's Republic of China", Asian Development Bank Institute Working Paper no. 257, December 2010, p. 3.

The Organisation for Economic Co-operation and Development classifies GVC involvement into forward participation (as a supplier of parts and capital goods) and backward participation (by assembling imported parts for export). Japan has a high forward participation ratio, supplying parts and capital goods. China, traditionally involved in backward participation by importing parts for processing and assembly for exports, has rapidly developed advanced domestic industries to produce parts domestically, thus strengthening its position as a supplier of parts and capital goods to other countries. Among ASEAN countries, Singapore, Malaysia and the Philippines have increased their domestic value-added ratios, lowering backward participation as a result, while Thailand and Vietnam have increased backward participation, reflecting rapid globalisation in recent years. Vietnam, in particular, stands out for its rapid rise in backward participation.[5] Historically, Asia's backward GVC linkages outpaced forward linkages due to its prominent role as an assembler, especially in medium- to high-tech sectors.[6] However, East Asia, and particularly ASEAN, requires further efforts to enhance value-added supply chains (Figure 2).

Supply chain connectivity is well established in East Asia, but the future necessitates a greater focus on more added value by moving upstream along the value chains. By enhancing efficiency and increasing added value, East Asia can deepen its participation in the regional supply chain, yielding greater returns. While APT countries are capable of producing many products along the supply chain, achieving the capability to produce more high-quality products within the value chain should be the ultimate goal.

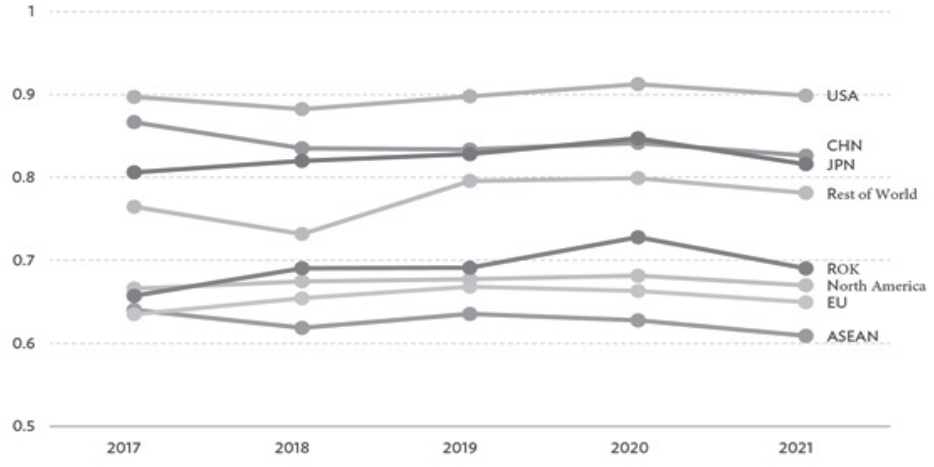
More decarbonised

In recent years, sustainable development has drawn significant global attention. Economic terms and concepts such as green economy, blue economy and low-carbon economy have been widely discussed and implemented, and the "2030 Agenda for Sustainable Development" gained broad recognition. COP 28 ("Conference of the Parties" to the United Nations Framework Convention on Climate Change) in 2023 was particularly pivotal as it marked the conclusion of the first global stocktake of efforts under the Paris Agreement to address climate change issues. The stocktake showed that progress was too slow across all areas of climate action—from reducing greenhouse gas emissions to strengthening resilience to a changing climate, to providing financial and technological support to vulnerable nations. Countries responded to implement measures to accelerate

[5] Ayako Yamaguchi, "Global Value Chains (GVCs) in East Asia: Can They Contribute to Further Sophistication of Regional Industries under the Head Wind of Intensifying Trade Frictions?", Institute for International Monetary Affairs, Newsletter no. 2, 2019, p. 3.

[6] Asian Development Bank, *Asian Economic Integration Report 2024: Decarbonizing Global Value Chains*, 2024, p. 5.

FIGURE 2 SHARE OF DOMESTIC VALUE-ADDED IN TOTAL EXPORT FOR VARIOUS COUNTRIES AND REGIONS



Notes: USA denotes the United States of America; CHN, China; JPN, Japan; ROK, the Republic of Korea; EU, the European Union.
Source: University of International Business and Economics, Asian Development Bank, Institute of Developing Economies–Japan External Trade Organisation and World Trade Organisation, Global Value Chain Development Report 2023: Resilient and Sustainable GVCs in Turbulent Times, November 2023, p. 60.

action across all areas by 2030. This includes a call for governments to expedite their transition from fossil fuels to renewables such as wind and solar power in their next round of climate commitments.

Currently, Asia emits more greenhouse gas during production than other parts of the world. However, in terms of consumption, advanced economies are the largest contributors. Asia's high carbon emissions are attributed to its role as the "factory of the world". By leveraging its comparative advantages as global production and trade reorganised around GVCs, Asia has minimised overall costs related to production, transport, information, regulation and policies. Globally, the transition to net-zero and decarbonisation has become an integral part of every country's economic growth and development strategy.[7] Energy transition could lead to an entirely new economic system, significantly altering production and consumption practices.

Given the global and regional context of climate change and decarbonisation, there is a pressing need for environmental-friendly supply chains, with regional consensus among APT countries. In 2021, the "ASEAN Leaders' Declaration on the Blue Economy" emphasises sustainability, mentioning the word seven

[7] Asian Development Bank, *ASEAN and Global Value Chains: Locking in Resilience and Sustainability*, March 2023, p. 25.

times. The "ASEAN Joint Statement on Climate Change to the 28th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change", issued in 2023, also refers to the term "green" seven times. Japan aims to establish a low-carbon growth model, particularly in East Asia, and has proposed an "East Asia Low-carbon Growth Partnership" under the framework of the East Asia Summit.[8] Within the Network of East Asian Think-tanks (NEAT), several Working Group meetings were held to discuss related issues, including "The Sustainable Development Goals and East Asian Cooperation" and "Toward Carbon Neutrality in East Asia" in 2022, "Climate Change and East Asian Sustainable Development" and "Toward 2050 Carbon Neutrality in East Asia" in 2021.

There are opportunities for supply chains in the transition towards a low-carbon economy.

There are opportunities for supply chains in the transition towards a low-carbon economy. Major actions taken by companies to support this transition include: (i) building a comprehensive carbon emissions baseline, gradually filled with actual supplier data; (ii) setting ambitious and holistic carbon emission reduction targets and publicly reporting progress; (iii) revisiting product design choices for a low-carbon economy; (iv) designing circular value chains and geographic sourcing strategies; (v) setting and tracking ambitious green procurement standards; (vi) collaborating with small- and medium-sized enterprise suppliers through technical assistance programmes to address their emissions; (vii) developing internal governance mechanisms to align regulatory incentives with emission targets.[9]

In 2021, ASEAN released its first State of Climate Change Report, which provides an overview of the state of climate change in the ASEAN region, and outlines opportunities for cooperation and collaboration towards 2050 climate targets. APT countries must also take climate change into full consideration, necessitating the decarbonisation of the supply chain connectivity in East Asia to align with the green economy.

Three Distinct Regional Advantages

Supply chain connectivity not only aligns with the long-term global trends, but also holds significant APT-based regional potential, as East Asia possess distinct regional advantages and local competence.

[8] Ministry of Foreign Affairs of Japan, "Japan's Vision and Actions toward Low-Carbon Growth and a Climate-Resilient World", 29 November 2011, <https://www.mofa.go.jp/policy/environment/warm/cop/lowcarbongrowth_vision_1111.html> (accessed 13 August 2024).

[9] Venkatachalam Anbumozhi, Kaliappa Kalirajan and Yao Xianbin, *Rethinking Asia's Low-carbon Growth in the Post-Covid World: Towards a Net-Zero Economy*, Economic Research Institute for ASEAN and East Asia, 2022, p. 94.

Regional integration

Regional integration within the APT framework has accelerated in recent years. The Asian Economic Integration Report 2024 evaluates regional integration in eight aspects, including trade and investment, money and finance, regional value chains, infrastructure and connectivity, people and social integration, institutional arrangements, technology and digital connectivity, and environmental cooperation. Since the mid-2000s, regional integration has progressed steadily, albeit with variations across dimensions and subregions. According to the Asia-Pacific Regional Cooperation and Integration Index, the region's integration in regional value chains, and people and social integration is comparable to that of the European Union (EU). The most significant progress is in Asia-Pacific's technology and digital connectivity, driven by adoption of digital transformation policies by many economies, especially during the COVID-19 pandemic. However, integration in trade and investment has slowed somewhat since 2019. While intra-subregional integration has grown faster than inter-subregional integration in Southeast Asia, East Asia and Central Asia, regional integration serves as a crucial buffer against global shocks, helping to mitigate their negative effects. In the face of rising protectionism and increased risks of global fragmentation compounded by economic challenges, enhanced cooperation and investment in (both soft or regulatory and hard or infrastructure) connectivity can strengthen economic resilience and offer mutual benefits. Closer dialogue and regional policy discussions will better equip Asian economies to address the challenges and risks related to supply chain vulnerabilities and climate change.[10]

Closer dialogue and regional policy discussions will better equip Asian economies to address the challenges and risks related to supply chain vulnerabilities and climate change.

Within the region, ASEAN, as the region's oldest active regional organisation formed in 1967, has implemented an ASEAN Economic Community, which incorporates elements of a common market arrangement that is known to be the most developed institutional framework in East Asia for promoting integration consensus and efforts from various dimensions.[11] The APT cooperation process began in 1997 with the convening of the leaders of ASEAN and China, Japan and the Republic of Korea at the sidelines of the Second ASEAN Informal Summit

[10] Asian Development Bank, *Asian Economic Integration Report 2024: Decarbonizing Global Value Chains*, 2024, p. 3.

[11] Christopher M Dent, "East Asian Integration Towards an East Asian Economic Community", Asian Development Bank Institute Working Paper no. 665, 2017, p. 2.

in Malaysia. The APT Summit was institutionalised in 1999 when the leaders issued a "Joint Statement on East Asia Cooperation" at the Third APT Summit in Manila. The joint statement outlined the main objectives, principles and further directions for APT cooperation, and APT leaders' commitment to strengthen and deepen East Asia cooperation across economic and social, political and other fields. The Regional Comprehensive Economic Partnership (RCEP), an agreement effective since 2022, aims to broaden and deepen ASEAN's engagement with Australia, China, Japan, the Republic of Korea and New Zealand. RCEP seeks to establish a modern, comprehensive, high-quality and mutually beneficial economic partnership that will facilitate the expansion of regional trade and investment, and contribute to global economic growth and development. Accordingly, it will generate market and employment opportunities to businesses and people in the region, and support an open, inclusive and rules-based multilateral trading system. With ASEAN and RCEP, East Asia is becoming increasingly integrated through economic cooperation, benefitting society and community, as well as supply chain connectivity.

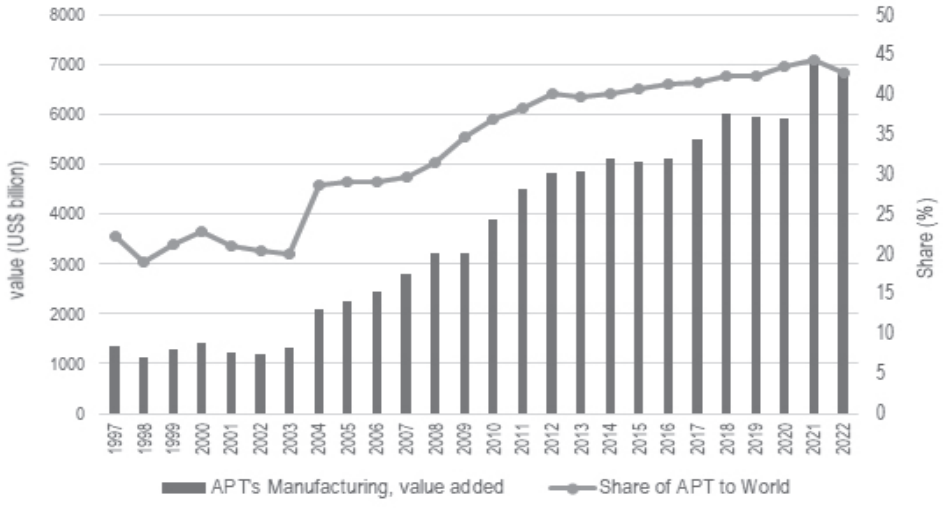
APT economies are increasingly important in global supply chains, particularly in manufacturing.

In East Asia, regional integration has solid foundation and draws considerable attention from policymakers. Within APT, integration is a recurring theme emphasised in leaders' annual consensus. The APT Cooperation Work Plan 2023–2027 serves as a guiding framework for enhancing APT cooperation for the next five years towards achieving the long-term goal of establishing an East Asia community with ASEAN as the driving force. It focuses on political and security, economic and finance, sociocultural and connectivity cooperation, all of which contribute significantly to regional integration. In each year's Chairman's Statement of ASEAN Plus Three Summit, integration remains a focal key word.

Manufacturing capacities

APT economies are increasingly important in global supply chains, particularly in manufacturing. Throughout industrial revolutions, there were constant shifts in supply chains. Today, there are three major manufacturing centres globally, including the North American supply chain network with the United States as the centre, the European supply chain network centred on Germany and the Asian supply chain network centred on APT. In recent years, developing economies have assumed a more prominent role in global manufacturing, while the comparative advantages of developed economies are diminished. According to the World Bank's statistics, referring to the share of regional manufacturing value added to the world's total, East Asia and Pacific accounted for 46.87%, a historic high, while North America accounted for 16.57% and Europe and Central Asia accounted for 22.28%, both indicating a downward trend (Figure 3).

FIGURE 3 ASEAN PLUS THREE'S MANUFACTURING CAPACITIES



Note: APT denotes ASEAN Plus Three.
Source: World Bank Open Data, Manufacturing, value added (current US$).

APT has regional advantages in manufacturing capacities not only in quantity, but also in quality. With the transition in manufacturing and increasing efficiency, APT's approach to production has evolved. Decades ago, APT relied heavily on labour-intensive assembly work; but today, the focus has shifted towards hiring more skilled talents for high-quality manufacturing. In the case of iPhone X, more Chinese companies participated in iPhone X value chain, compared to the iPhone 3G value chain, undertaking relatively sophisticated tasks beyond simple assembly. China contributed US$104 in value added to each iPhone X, approximately 25.4% of US$409.24 in total production cost, while by comparison, the United States contributed 18.7%, the Republic of Korea 25.8% and Japan 19.3%. Despite the increase in value added by Chinese firms, all core components were still supplied by American, Japanese and Korean companies.[12] While APT countries engage in supply chains and global manufacturing in various ways, the region as a whole has continuously increased its global competence in many sectors.

The Asian supply chain is more dispersed compared to those in North America or Europe. In Asia, goods in process cross borders multiple times, often through trading hubs, before reaching their final destinations.[13] In terms of supply chain

[12] Xing Yuqing, *Decoding China's Export Miracle: A Global Value Chain Analysis*, New Jersey, World Scientific, 2021, p. 82.

[13] Nagwa Riad et al., "Changing Patterns of Global Trade", International Monetary Fund, 2011, p. viii.

connectivity, this dynamic provides APT countries numerous opportunities to participate and cooperate within the Asian manufacturing centre.

Innovation potentials

East Asia is one of the world's most innovative regions. According to the World Intellectual Property Organisation's (WIPO) statistics, the world's five largest science and technology (S&T) clusters are all located in East Asia, with Japan's Tokyo–Yokohama being the biggest S&T cluster. In the Global Innovation Index 2023 rankings, Singapore ranks fifth, the ROK 10th, Japan 13th, Malaysia 40th and Thailand 43rd while China (12th), Vietnam (46th), the Philippines (56th) and Indonesia (61st) are the middle-income economies making most progress in innovation over the last decade.[14] Continuous R&D (research and development) expenditure has propelled East Asia to an energetic innovator. According to the World Bank Open Data, China's R&D expenditure as a percentage of GDP increased from only 0.56% in 1996 to 2.41% in 2020. Similar increases were also observed in other APT countries: Japan increased from 2.64% in 1996 to 3.27% in 2020; the ROK from 2.22% to 4.80%; Singapore from 1.32% to 2.16%; Malaysia from 0.22% to 0.95%; and Thailand from 0.12% to 1.33%.

Continuous R&D (research and development) expenditure has propelled East Asia to an energetic innovator.

When manufacturing capacity meets innovation potentials, East Asia can achieve remarkable milestones. VinFast, Vietnam's first volume car manufacturer, completed its automotive production within just 21 months, half the average time to build such a manufacturing plant. The entire value chain has been integrated and digitalised using Siemens' Digital Enterprise portfolio, ensuring VinFast's high manufacturing efficiency and product quality. In this sense, VinFast exemplifies how the automotive industry drives digital transformation in manufacturing. Its mission of relentless innovations focuses on offering the best smart mobility experience and superior value for customers, with an emphasis on enhancing seamless customer experience, highest safety standards, superior craftmanship and intelligent infotainment with lifestyle personalisation.

The new energy vehicle supply chain holds great potentials in East Asia. Leveraging China's traditional advantages in manufacturing, with huge population for low production costs and a vast consumer market, along with R&D capability and productivity capacity, the electric vehicle supply chain looks promising. More importantly, the "ASEAN Plus Three Leaders' Statement on Developing of Electric Vehicle Ecosystem" in 2023 reflects a top-level consensus.

[14] World Intellectual Property Organization, *Global Innovation Index 2023: Innovation in the Face of Uncertainty*, 2023, pp. 22–23.

However, APT supply chain connectivity, while having regional advantages, also faces local challenges. The Asia-Pacific Economic Cooperation (APEC) research has identified five chokepoints related to supply chain connectivity, which East Asia must address through collaborative efforts by consensus and determination (Table 2).

TABLE 2 FIVE CHOKEPOINTS OR CHALLENGES IN SUPPLY CHAIN CONNECTIVITY

Areas	Challenges in detailed descriptions
Procedures and Digitalisation	Inefficient digitalisation of end-to-end supply chains, including border procedures and trade documentation exchanges
Infrastructure and Logistics	Inadequate infrastructure development to support robust multimodal connectivity and logistics networks
Data Flows and Payments	Insufficient cooperation on data flows and cross-border payments to support increasingly digitalised supply chains
Green Economy and Sustainability	Lack of understanding of green supply chain management practices and increasing pressure for supply chains to be sustainable
Micro, small and medium enterprises (MSMEs)	Lack of targeted support to facilitate MSMEs' access and integration into global supply chains

Source: Akhmad Bayhaqi and Nguyen Thu Quynh, "Measuring Progress on the Supply Chain Connectivity Framework Action Plan (SCFAP III) 2022–2026: Indicators and Policy Practices", Asia-Pacific Economic Cooperation, September 2023, pp. iv–v.

APEC identified the aforementioned five chokepoints as general challenges to supply chain connectivity. In reference to East Asia, another five aspects are summarised in Table 3.

TABLE 3 CHALLENGES IN SUPPLY CHAIN CONNECTIVITY FOR EAST ASIA

Areas	Challenges in detailed descriptions
Geopolitical uncertainties	Geo-economic fragmentation caused by anti-globalisation and strategic games, and instability due to Russia–Ukraine conflict
Infrastructure deficits	Insufficient supply of both domestic and multinational infrastructure facilities, and desperate demand for infrastructure finance
Regulatory barriers	Confusion resulting from spaghetti bowl effect and overuse of non-tariff measures, and pending harmonisation of trade, foreign direct investment and industrial policies
Instability of the chains	Dilemma of choices between concentration and diversification, and vulnerability to global economic fluctuations
Role of smaller economies	Inadequate involvement and returns for smaller economies, insufficient capacities, excessive R&D and production costs, scarcity of high-tech, and low value-added in GVCs

Source: Author's compilation from various sources.

Four Cooperation Measures

Enhancing intraregional cooperation and supply chain connectivity among APT countries is crucial in offering effective solutions tailored to diverse local conditions. To maximise benefits across economic and social dimensions for all APT countries, the following policy recommendations are proposed.

To achieve open and inclusive supply chain connectivity, transparent governance at both national and regional levels is vital to ensure equal and fair treatment for all market participants. Besides, a rules-based and market-oriented business environment should be emphasised...

Long-term cooperation mechanism and rules-based business environment

Establishing an APT Supply Chain Working Group could be beneficial. Through negotiation and coordination, this group could promote interdependence, reduce uncertainties and enhance resilience. Regional supply chain connectivity is a comprehensive and systematic endeavour; thus, a specific mechanism is essential to promote experience and good practices, share financial and technological resources, and to address specific local demands. Moreover, multiparty engagement involving governments, businesses and nongovernmental organisations for all APT countries is necessary for effective future cooperation.

Transparent governance is fundamental for a robust business environment and provides a basic guarantee for supply chain connectivity. To achieve open and inclusive supply chain connectivity, transparent governance at both national and regional levels is vital to ensure equal and fair treatment for all market participants. Besides, a rules-based and market-oriented business environment should be emphasised, highlighting the importance of implementing lawful regulations and market mechanism. In practice, localised and coordinated industrial policies, streamlined administration procedures, trade facilitation and deregulation of foreign direct investment are exemplary practices.

Industrial parks and special economic zones (SEZs) serve as efficient platforms for supply chain connectivity. These examples of industrial agglomeration not only pool funds and cluster good firms, but also have a positive spillover effect along the supply chain. The next step pertains to enhancing respective industrial parks or SEZs in integrated East Asia to encourage localised and diversified development in a regionally coordinated manner. China and ASEAN have already cooperated in many industrial zones (Table 4), but more are needed in the future.

Intraregional policy coordination and development convergence

The centrality of ASEAN should be maintained. In the context of cooperation among APT countries, supply chain connectivity can benefit from ASEAN's

TABLE 4 CHINA'S OVERSEAS INDUSTRIAL ZONES IN ASEAN	
Country	**Name of Industrial Zones**
Brunei	Pulau Muara Besar Industrial Park
Cambodia	Sihanoukville Special Economic Zone
Indonesia	China–Indonesia Economic and Trade Cooperation Zone (Kawasan Industri Terpadu Indonesia China)
	PT Indonesia Morowali Industrial Park
	Julong Agricultural Cooperation Zone
Laos	Vientiane Saysettha Development Zone
Malaysia	Malaysia–China Kuantan Industrial Park
Thailand	Thai–Chinese Rayong Industrial Zone
Vietnam	Long Jiang Industrial Park
	China–Vietnam (Shenzhen–Haiphong) Economic and Trade Cooperation Zone

Source: Author's compilation.

experiences in implementing good practices and harmonious collaboration. Furthermore, ASEAN centrality is indispensable for addressing diversified demands based on local conditions. With ASEAN centrality, supply chain connectivity can be tailored in appropriate forms that are more appropriate for diversified local needs.

The RCEP serves as an ideal instrument to promote supply chain connectivity. Beyond the numerous 10+1 agreements, RCEP offers high-standard regulations that support regional economic cooperation. As supply chain connectivity currently lacks effective binding laws, RCEP can serve as a lawful guarantee to facilitate intraregional businesses, and to protect the legitimate benefits of all parties. In the future, RCEP requires further upgrading to meet higher standards, incorporating more non-tariff measures under effective regulation.

Convergence programmes should be implemented collaboratively for shared development. APT countries share common goals of economic growth and sustainable development, which can be advanced through regional and national arrangements, such as the Chiang Mai Initiative Multilateralisation, the ASEAN Plus Three Macroeconomic Research Office, the ASEAN Digital Economy Framework Agreement, the China–Myanmar Economic Corridor, the Greater Mekong Subregion, the Eastern Economic Corridor, the Belt and Road Initiative and the Data Free Flow with Trust, etc.

Upgraded infrastructure network and diversified financial sources

Infrastructure connectivity is vital for supply chain connectivity. Domestic infrastructure construction and logistics performance are fundamental for effective supply chains. Furthermore, infrastructure connectivity across the region—e.g. Lao–China Railway, Kyaukphyu deep sea ports and Laem Chabang deep seaport—is

highly essential to facilitate the movement of products, capital and people, and more infrastructure projects are necessary. In the future, based on domestic infrastructure facilities, more transnational routes should be constructed, and landmark projects should be given publicity to attract more projects and encourage spillover effects.

Given the substantial financial gap for infrastructure, diverse financial sources are required, including not only the World Bank, the Asian Development Bank and the Asian Infrastructure Investment Bank. Both international and regional financing, from public and private capital, should be mobilised, with public-private partnerships being a practical example. Besides, infrastructure financing should prioritise greener projects and favour smaller economies.

Shared technology community and care for smaller economies

A community with shared technology would give great impetus. In the era of a technology-driven economy, East Asian countries should collaborate closely to fully leverage new technologies such as digitalisation and artificial intelligence to enhance regional supply chain connectivity. Joint research, personnel training, technical assistance and technology transfer should be encouraged to foster technological flows in East Asia.

Similar to global aid for trade, technology for connectivity is important for East Asia, particularly for smaller diverse economies. To overcome inefficient capacity, lack of technology and uneconomical benefits, technological sharing and assistance are an imperative. Therefore, a community with shared technology is needed, alongside a focus on technology for smaller economies. If feasible, a technology for connectivity initiative with concrete actions should be proposed and implemented.

Conclusion

Despite facing challenges, supply chain connectivity is particularly well suited for APT countries, promising significant development in the future. The region's traditional manufacturing strengths and emerging technological advantages provide strong impetus, although further work is needed. Multiparty engagement is fundamental, concerted actions are necessary, and connectivity in infrastructure and technology are beneficial in any form of cooperation. With consensus and coordinated policies, priority areas for cooperation, qualified businesses as market players, and social demands as the ultimate goal, supply chain connectivity will foster comprehensive development effects for individual countries and the entire region.