



Chapter 1

The Conceptual Framework of New Development Strategies

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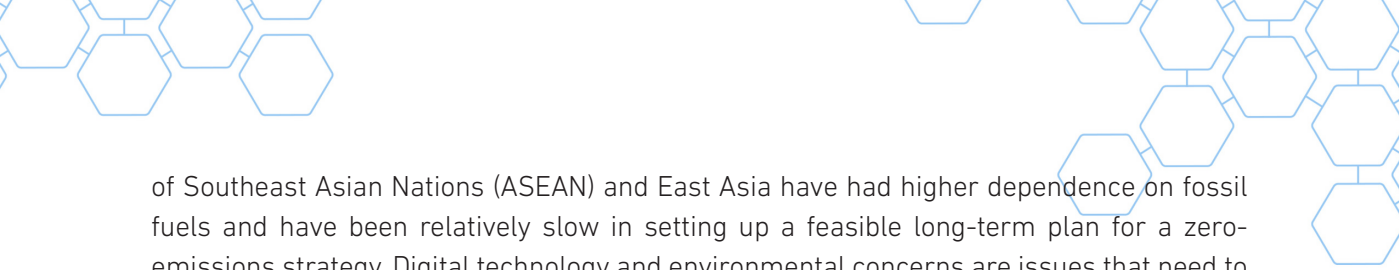
Current situation and challenges

Development strategies to be upgraded

In the past three decades, East Asia – including Northeast Asia and Southeast Asia – has aggressively used globalisation forces in its development strategies and has led the world in developing the task-by-task international division of labour or the second unbundling and in building up Factory Asia (Ando and Kimura, 2005; Baldwin, 2016). Factory Asia has overcome a number of economic crises and natural disasters since the 1990s. The global financial crisis caused a serious trade collapse in 2008–2009, but the sophisticated international production networks (IPNs) in East Asia revived strongly. World trade growth decelerated in the slow trade period of 2011–2016 when growth in international trade became slower than global gross domestic product (GDP) growth. However, IPNs in East Asia did not stop growing, contrary to public belief (Obashi and Kimura, 2018). East Asia has taken advantage of globalisation forces effectively, backed by long-lasting peace and the rules-based trading regime. Further, the relative importance of Factory Asia for the world, particularly in producing general and electric machineries, has steadily enhanced over time.

However, the situation has rapidly changed since the latter half of the 2010s. Factory Asia is now facing two immediate challenges that could generate structural changes: the coronavirus disease (COVID-19) and enhancing geopolitical tensions. COVID-19 was a huge tragedy for the whole world, and brought into question the fragility of global value chains (GVCs). In this context, it is important to ascertain whether the international division of labour has qualitatively changed in the COVID-19 era. In parallel, geopolitical tensions have intensified. This started as a tariff war between the United States (US) and China under the Trump Presidency in the US in 2017. The confrontation has since expanded to a more widely scoped competition between superpowers, and the decoupling pressure from both sides has intensified the move towards managed trade and investment. As many articles in the mass media claim, the recent geopolitical tensions may mark the end of the globalisation era.

On the other hand, a couple of new elements have been added to our development scene: digital technology and environmental concerns. The application of digital technology has expanded from relatively simplistic matching businesses to all aspects of our economy and society. How we take advantage of digital transformation for economic development is becoming a crucial issue. In addition, environmental concerns have intensified even during the COVID-19 pandemic, particularly in Europe and other developed countries, and the transition to a low-carbon society is a global trend. Many countries in the Association



of Southeast Asian Nations (ASEAN) and East Asia have had higher dependence on fossil fuels and have been relatively slow in setting up a feasible long-term plan for a zero-emissions strategy. Digital technology and environmental concerns are issues that need to be incorporated more explicitly in our development strategy.

The CADP 3.0 proposes that ASEAN and developing East Asia should still believe in the globalisation forces for their economic development. The following sections briefly discuss the two challenges stated above as well as some new elements.

COVID-19

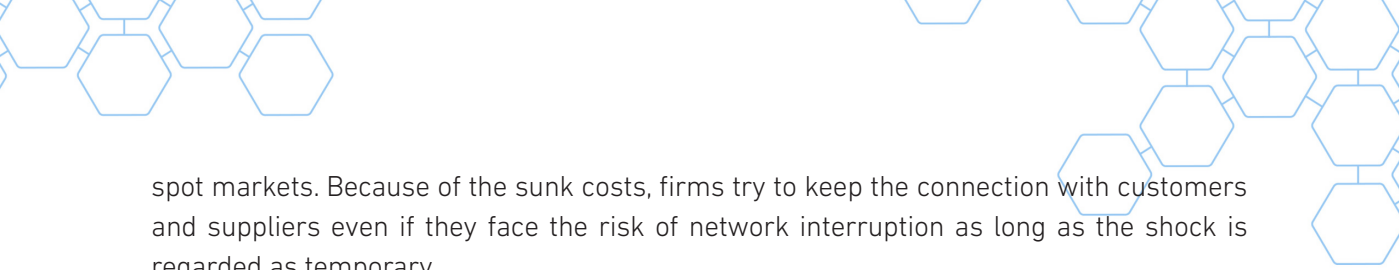
At the outbreak of COVID-19, massive numbers of pessimistic comments on the future of GVCs and globalisation were published in mass media. However, in the end, GVCs, particularly the sophisticated IPNs in East Asia, proved to be robust (less likely to be interrupted) and resilient (more likely to resume even if once interrupted).¹ Although mutations are still spreading sporadically, GVCs have survived COVID-19.

GVCs, or the international division of labour more generally, have developed primarily via economic forces. Technological progress for overcoming geographical distance, supported by the enhancement of physical and institutional connectivity, has dictated the form of the international division of labour. To extend and deepen their involvement in the international division of labour, firms carefully consider a trade-off between economic efficiency in the normal period and the cost of management against expected/unexpected risks. Once a supply or demand shock occurs somewhere in the world, GVCs may work as a shock transmission channel. Such shocks could originate from natural disasters or might be induced by human behaviour. COVID-19 was perhaps an unexpected shock at the beginning, and may not have been fully covered by firms' original contingency plans, but it was not the first shock that firms had experienced.

Perhaps contrary to public belief, IPNs in East Asia have a good record of robustness and resilience against various shocks. Facing the Asian Financial Crisis (1997–1998), the global financial crisis (2008–2009), and the Great East Japan Earthquake (2011), IPNs in East Asia proved to be more robust and resilient than other forms of international trade.² IPNs or the task-by-task international division of labour is robust and resilient because the design and operation of such networks require substantial sunk costs, compared with transactions in

¹ Miroudot (2020) explained the difference between robustness and resilience by drawing on risk management literature.

² See Obashi (2010); Ando and Kimura (2012); and Okubo, Kimura, and Teshima (2014).



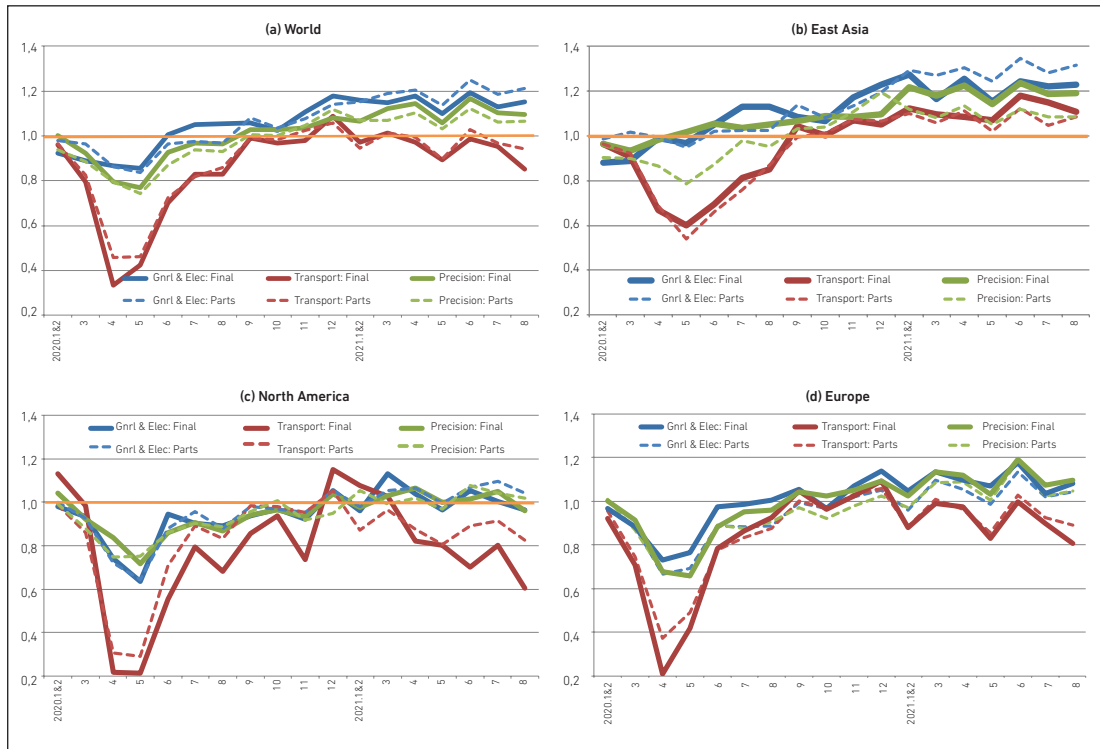
spot markets. Because of the sunk costs, firms try to keep the connection with customers and suppliers even if they face the risk of network interruption as long as the shock is regarded as temporary.

GVCs, particularly East Asian IPNs, also showed their strength against COVID-19.³ Three kinds of shocks were generated by COVID-19: negative supply shocks, negative demand shocks, and positive demand shocks. At the beginning, in February and March 2020, negative supply shocks came from China in the form of the interruption of Chinese exports of parts and final products in the value chains. In the following months, positive demand shocks on personal protective equipment (e.g. face masks and hand sanitisers) came to each country worldwide. Both types of shocks generated panic in many countries, and many claimed that this would mark the end of globalisation. That did not happen. Supply shortages were overcome in a few months in most countries – mainly by private forces, with vaccines as the exception – which was much quicker than people expected. In 2020, we were afraid of negative demand shocks due to the collapse of the financial sector and asset markets, and the deep recession. However, unprecedented huge mitigation policies in major countries largely weakened such shocks. Moreover, positive demand shocks were generated for remote work and stay-at-home related products (e.g. personal computers, computer monitors, dishwashers, and electric hand drills), allowing East Asia's exports to recover quickly.

Figure 1.1 presents the performance of machinery exports by region (Ando and Hayakawa, 2021). Machinery exports are decomposed into general and electrical machinery, transport equipment, and precision machinery; and separated into parts and final products. Although COVID-19 initially caused serious negative supply and demand shocks, global machinery exports emerged from the trough in April/May 2020 and returned to 2019 levels by October 2020. The fall in exports was significantly shallower in East Asia than in North America or Europe. Notably, East Asian exports of general and electrical machinery remained almost at 2019 levels – even in April and May 2020 – due to positive demand shocks. The Economic Research Institute for ASEAN and East Asia (ERIA) conducted a questionnaire survey for firms in ASEAN Member States (AMS) and India, and found quick and active responses to COVID-19 shocks by many Asian firms, often turning a profit (Oikawa et al., 2021).

³ See Ando, Kimura, and Obashi (2021); and Ando and Hayakawa (2021).

Figure 1.1 Regional Comparison of Machinery Exports to the World During COVID-19 (each month of 2019 = 1)



Source: Ando and Hayakawa (2021).

The turmoil due to COVID-19 is not over yet. The emergence of variants and the sporadic spread of infection remain, and strict lockdown and other measures in some countries are generating negative supply shocks. The movement of people is not yet back to normal, and our economies are experiencing a so-called K-shaped recovery, which means that the pace of recovery differs widely across sectors. Some confusion remains in the transport sector; and the shortage of semiconductors, mainly due to positive demand shocks, continues. However, these factors do not negate the functioning of IPNs in East Asia; rather, COVID-19 has enhanced the region's competitiveness. In addition, the accelerated introduction of digital technology – particularly the use of communication technology (CT) – is a good phenomenon for East Asia.

Geopolitical tensions

The increase in geopolitical tensions has become another serious concern for the future of GVCs. IPNs in East Asia have developed thanks to the long-lasting peace in the region and the mostly well-kept rules-based trading regime in the world. However, we may face difficulty in maintaining the rules-based trading regime in the near future.

Since the Trump Administration came into power in 2017, the US–China confrontation has steadily worsened. Initially, it was a relatively simple bilateral tariff war, though it substantially weakened the authority of the World Trade Organization (WTO). Bilateral tariffs between the US and China distorted trade patterns, while some countries (including Viet Nam and Mexico) increased exports to the US due to positive trade and investment diversion.⁴ Third countries do not have to be shy in capturing such windfall gains, which is actually good for the world. However, the overall effect on third countries would be negative. In addition, ad hoc bilateral deals between the superpowers, which tends to include preferential bilateral arrangements, can be harmful for third countries.⁵

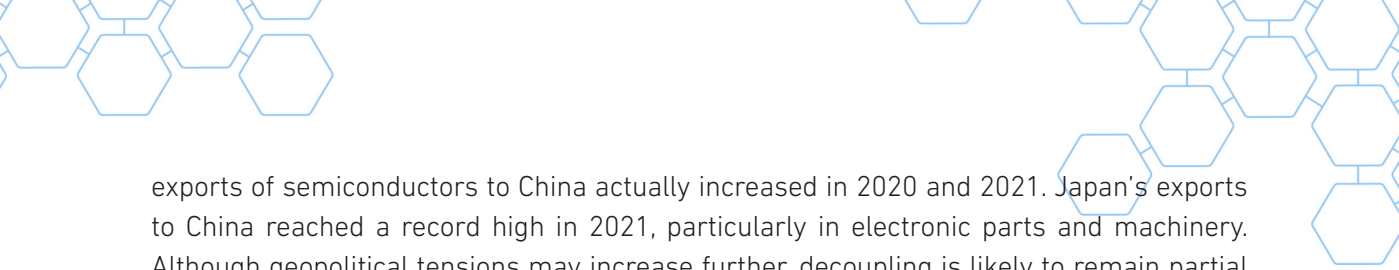
The US–China confrontation has not been limited to trade issues; it has expanded its scope to national security and technological competition between the superpowers, arguments over political and economic systems, and human rights issues. The pressure to decouple supply chains has been gradually intensified by both the US and China, even though middle powers between the US and China, including ASEAN, have close economic relationships with both.

The Russo–Ukrainian War presents extreme danger to the whole world. At the least, impacts on energy and food prices and their availability will hurt us. Price hikes might get worse, with export restrictions imposed by major exporting countries, which would prioritise domestic consumption as well as speculative transactions in the market. We now also need to carefully monitor macroeconomic stability. Inflation rates are high in the US and Europe, so the US and others have started to raise interest rates, which may cause currency depreciation and capital outflows in newly developed and developing countries.

Geopolitical debates are heated in G7 countries. However, as Lamy and Köhler-Suzuki (2022) pointed out, we should beware of the large gap between geopolitical discussion in politics and in economic reality. Decoupling of supply chains seems to proceed in specific areas such as products with sensitive technologies, batteries, and rare earth-related products, but trade-reducing effects are not mostly invisible at the aggregated level so far. The US

⁴ See, for example, Fajgelbaum et al. (2021).

⁵ Freund et al. (2020) simulated possible effects of the first-round deals between the US and China and found that third countries are likely to have negative economic effects.



exports of semiconductors to China actually increased in 2020 and 2021. Japan's exports to China reached a record high in 2021, particularly in electronic parts and machinery. Although geopolitical tensions may increase further, decoupling is likely to remain partial rather than escalating to a total cold war.

Based on this assumption, third countries – including AMS – must try to apply the rules-based trading regime as widely as possible. The trade rules under the WTO and free trade agreements (FTAs) now become more important than ever. If they were further weakened, uncertainties in economic activities would be enlarged and the vigorous economic activity would inevitably shrink. The role of dispute settlement should be emphasised. The WTO dispute settlement mechanism has been impaired as the US has blocked the appointment of Appellate Body members. Continuing efforts are needed to restore the full mechanism. In addition, AMS and East Asian countries must seriously consider their participation in the European Union (EU)-led initiatives of Multi-Party Interim Appeal Arbitration as a temporary backup. FTAs, including the Regional Comprehensive Economic Partnership (RCEP), should be fully used to reduce policy risks.⁶ By keeping the rules-based trading regime, ASEAN and the surrounding countries may attract trade and investment diversion.

However, even in third countries, some preparation is needed to face possible direct impacts of geopolitical tensions. For example, US export control laws and regulations include extraterritorial controls, i.e. firms located both inside and outside the US may need export licences issued by the US government for the re-export or domestic transfer of specific US products, parts, software, or technologies. This would be applied for firms located in ASEAN and East Asia. The US and the EU are legislating import restrictions for human rights issues, which may also apply to firms in various Asian countries apart from China. Cybersecurity needs to be enhanced. ASEAN and East Asia must develop collaboration with like-minded countries for constructing effective and efficient economic security systems.

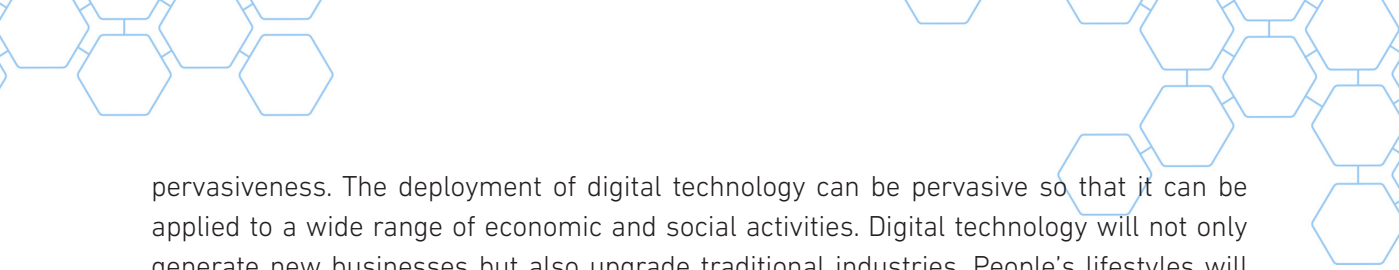
Digital technology

Digital technology is a blessing that we must use in a constructive way. It will substantially change the development strategies of newly developed and developing countries. That is why this report places it at the centre of the framework.

Digital technology mostly consists of general-purpose technologies.⁷ Such technologies have two important properties relevant for our development strategies. The first is the

⁶ Kimura (2021, 2022) highlighted the potential role of the RCEP in reducing policy risks and maintaining the rules-based trading regime.

⁷ The following conceptual framework is drawn from Chapter 8 in this volume.



pervasiveness. The deployment of digital technology can be pervasive so that it can be applied to a wide range of economic and social activities. Digital technology will not only generate new businesses but also upgrade traditional industries. People's lifestyles will also change.

The second is innovation spawning. Although the technologies are high-tech, supported by the accumulation of research and development (R&D) mostly in developed countries, the deployment of such technologies is relatively easy. Creative imitation is often possible. This property will provide room for catching up and leapfrogging for newly developed and developing countries. We can thus drastically revise innovation policies. By applying digital technology, the pattern of the international division of labour and international trade will also change. Technologies will accelerate globalisation even if some political and economic backlash arises.

We will deepen these discussions in the following section of this chapter.

Environmental concerns

Environmental concerns, particularly in the context of global warming and the quest for a low-carbon economy, have rapidly intensified all over the world. Although COVID-19 temporarily slowed energy consumption and carbon emissions, the movement for a green revolution – particularly in Europe – has intensified. The US Biden Administration has revived interest in global warming issues. Although the Russo–Ukrainian War may enhance the need for fossil fuels in the short run, environmental concerns in civil society have not subsided.

ASEAN and East Asia depend heavily on fossil fuels, with a wide variety of situations across countries. Manufacturing-centred economic development is typically energy-intensive and prone to carbon emissions. The region is also vulnerable to natural disasters due to climate change. The planned decarbonation strategy in ASEAN and East Asia may not be enough for the global movement towards a low-carbon economy.

Together with decarbonising our economies, we would like to achieve steady and inclusive economic growth. Rapid abolition of fossil fuel usage may not be a feasible solution for many countries in the region. The Energy Unit of ERIA's Research Department is leading constructive policy research in ASEAN and East Asia. The region requires an optimal scenario of energy and the environment to achieve well-balanced economic development with sustainability.

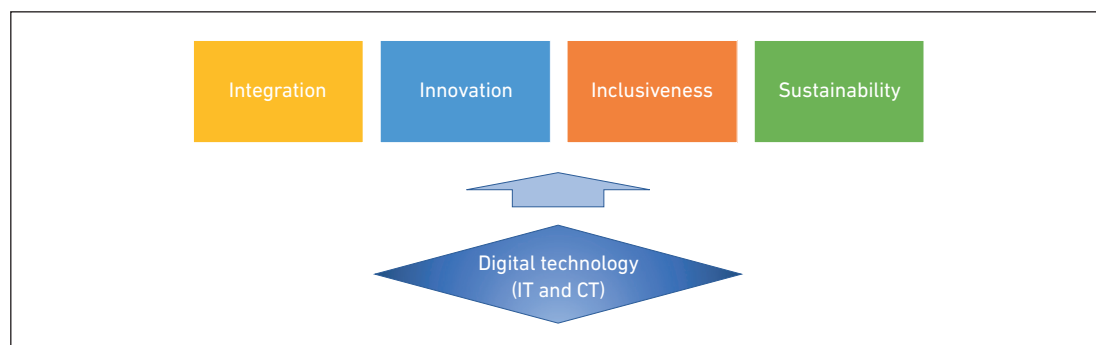
Development strategies: Four pillars with digital technology

COVID-19 and geopolitical tensions are immediate concerns all over the world. From the viewpoint of ASEAN and developing East Asia, countries should continuously take advantage of globalisation forces for economic development. The following section discusses how development strategies must be renewed based on the new economic environment.

Digital technology is becoming a strong booster for economic development. With digital technology, globalisation can accelerate the catching up of newly developed and developing countries. Technologies expand the scope of globalisation. To take advantage of digital technology, a comprehensive set of policies must be prepared.

This chapter claims that the following four pillars with digital technology conceptualise the new development strategies for ASEAN and developing East Asia: integration, innovation, inclusiveness, and sustainability (Figure 1.2).

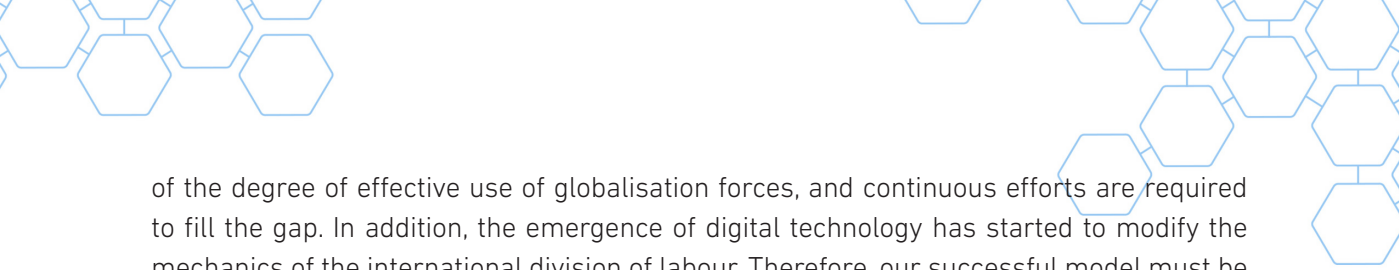
Figure 1.2 Four Pillars for Economic Development with Digital Technology



CT = communication technology, IT = information technology.

Source: Authors.

The first pillar – integration – has been at the core of development strategies in ASEAN and East Asia for three decades. Starting from *de facto* economic integration in the 1990s, progressive *de jure* economic integration followed in the 2000s and 2010s, and FTA networks with ASEAN at the core have been established. In particular, involvement in the task-by-task international division of labour or IPNs has been widened and deepened in the region. The scope of integration has also gradually been expanded from purely economic to social and cultural integration. A large disparity remains amongst countries in the region in term



of the degree of effective use of globalisation forces, and continuous efforts are required to fill the gap. In addition, the emergence of digital technology has started to modify the mechanics of the international division of labour. Therefore, our successful model must be reviewed and adjusted in line with new technological developments.

The second pillar – innovation – calls for a substantial reformulation of our development strategies. ASEAN and developing East Asia have steadily moved up the development ladder and have started looking at the final step towards fully developed economies. Innovation has naturally grown in importance – realising an innovation system is the last stage of becoming an advanced country. In addition, digital technology has drastically altered the nature of innovation. The old model of a national innovation system, where the government, universities/research institutes, and private sector get together to conduct massive R&D, may not be fully applicable anymore. The innovation strategy must be reconsidered to support digital transformation of our economy and society.

The third pillar – inclusiveness – is a popular notion in the political context, though it is used as a vaguely defined concept. The concept of inclusiveness must cover three dimensions: geographical, industrial, and societal. Efficiency and equity are based on different value judgements but are closely interrelated. Particularly in the context of newly developed and developing countries, it is important to think of how far inclusiveness can be achieved by using market forces, rather than leaving it for social policy accompanied by government expenditures or transfers. Digital technology has also been changing various aspects of the economy and society in achieving inclusiveness. A holistic approach must be established for inclusiveness.

The last pillar – sustainability – is another focal point in reforming our development strategies. ASEAN and developing East Asia are facing both short- and long-run issues related to sustainability. Decarbonisation requires a long-run grand strategy, while the current hike in fossil energy prices must be taken care of in the short run. Resource and waste management and the circular economy are also important issues for sustainability. In addition, ASEAN and developing East Asia are prone to severe damage from natural and disasters induced by human behaviour, which calls for adequate disaster management. Economic development is imperative for the region. The issue is how to pursue both economic growth and sustainability with digital technology.

The following section discusses these four pillars in detail.

Integration

De facto and *de jure* economic integration

Integration has been the central theme in ASEAN and East Asian development strategies for three decades. This report contends that it should continue to be placed at the core of development strategies, with modifications to accommodate digital technology.

ASEAN and East Asia have been a best practice case in aggressively taking advantage of the mechanics of IPNs or the task-by-task international division of labour. This started from *de facto* economic integration in the latter half of the 1980s when ASEAN forerunners adopted unilateral tariff cuts and trade facilitation to attract export-oriented foreign direct investment (FDI), particularly in electrical machinery. In the 1990s, the formation of IPNs in electrical and electronic machinery advanced substantially with the WTO-led Information Technology Agreement. Then the Asian Financial Crisis occurred in 1997–1998. ASEAN as a group accelerated the *de jure* economic integration process, and the overall liberalisation of trade in goods and FDI liberalisation for manufacturing were advanced. The connectivity concept has effectively supplemented efforts towards economic integration. The key was to communicate with the private sector and address policy needs progressively. Although the existing gaps in the degree of IPNs utilisation are still substantial, ASEAN latecomers have grown faster than the forerunners, and a steady catching up has been observed.

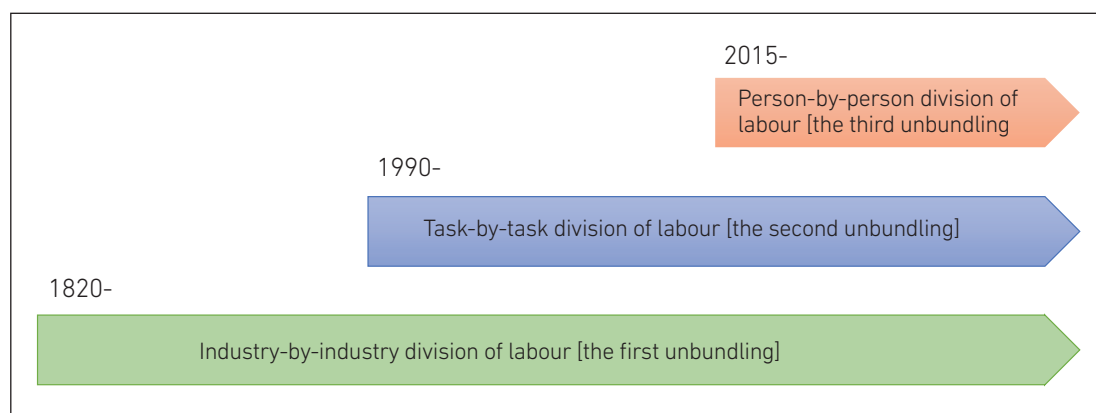
To go beyond the development stage the region has reached, we should review the mechanics of the international division of labour and examine how digital technology would transform it.

The unbundling concept

The unbundling concept proposed by Baldwin (2016) is useful in categorising the pattern of the international division of labour. The first unbundling, i.e. the geographical separation between production and consumption, started around 1820 when the transport revolution with steamships and railways occurred and transportation costs for goods were reduced. This generated an industry-by-industry international division of labour, supported by trade in raw materials and final products. The second unbundling, or the task-by-task international division of labour, was initiated around 1990 when the first wave of the information and communication technology (ICT) revolution reduced communication costs and ideas started moving. The success of ASEAN forerunners in the past three decades has been based on

the aggressive use of this type of the international division of labour. The third unbundling, or the person-by-person international division of labour, started around 2015 when the second wave of the ICT revolution reduced face-to-face costs. The unbundling patterns overlap (Figure 1.3). A country or region that is ready to move to a higher unbundling has more choices for using the international division of labour to exploit different location advantages in a better manner.

Figure 1.3 Three Modes of Unbundling or the International Division of Labour



Source: Authors.

Table 1.1 summarises the three modes of unbundling and digital technology.⁸ It tabulates, for each unbundling, the type of international division of labour, what is made mobile, typical industries, and required institutional and physical connectivity. Although ASEAN and developing East Asia still use the first unbundling as the rest of the developing countries in the world does, the region, particularly the ASEAN forerunners, take extensive advantage of the second unbundling. Further, the seeds of the third unbundling have become visible in the past several years. Digital technology affects all modes of unbundling as a game changer. For the first unbundling, digital technology can be used for problem solving, productivity enhancement, and sometimes upgrading to the second unbundling. The second unbundling may widen and deepen IPNs through digital technology. In the context of the third unbundling, digital technology allows us to explore the frontier of new businesses.

The following section focuses on the second and third unbundlings.

⁸ Kimura (2018) discussed the introduction of the unbundling concept to the development strategy argument in ASEAN.

Table 1.1 The Three Modes of Unbundling and Digital Technology

Item	The first unbundling	The second unbundling	The third unbundling
International division of labour	Industry-wise (production and consumptions are unbundled)	Task-wise (and industry is unbundled); IPNs	Person-wise (a task is unbundled)
What moves?	Goods	+ Ideas (capital, technology, managerial ability, business persons)	+ Data
Typical industries	Agriculture/fisheries/ food, mining, labour-intensive industries, tourism	Machinery industries and industries in global value chains	Service outsourcing
Institutional connectivity	WTO-based liberalisation: Tariff removal or specific industries, GSP	FTAs: Overall tariff removal, trade facilitation, TBT, B2B services liberalisation, FDI liberalisation in manufacturing	Mega-FTAs: SPS, standards and conformance, regulatory coherence, overall services liberalisation, movement of people, IPR, flow of data
Physical connectivity	Medium-grade logistics infrastructure (roads, ports/airports), infrastructure services	High-grade logistics infrastructure (full-scale ports/airports, multimodal), urban/suburban development (logistics, mass-scale infrastructure services)	Digital connectivity, urban amenities (urban transport, living environment, varieties of possible consumption of goods and services), smart cities
Digital technology as a game changer	Problem solving Enhance productivity Upgrade to the second unbundling	Further widening and deepening of international production networks	Explore frontiers of new business

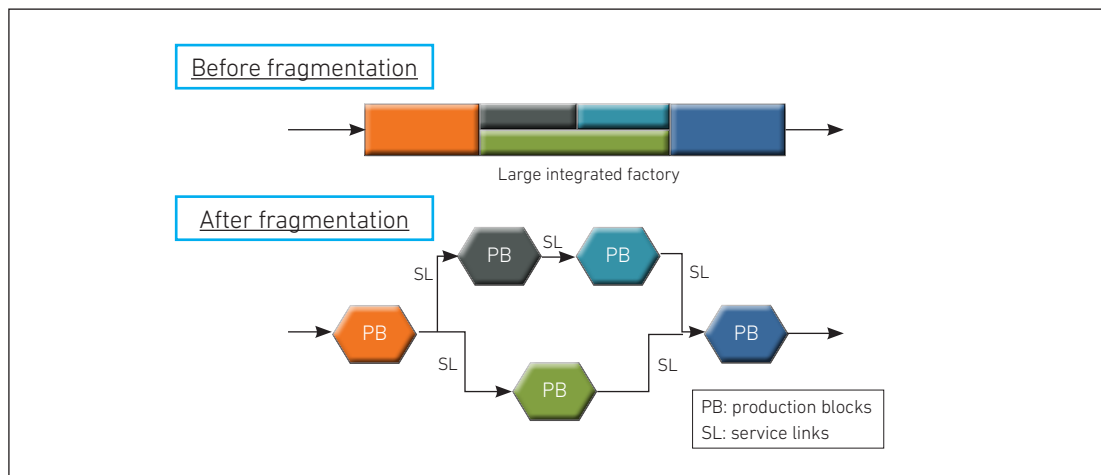
GSP = Generalized System of Preferences, WTO = World Trade Organization, IPN = International Production Network, TBT = Technical Barriers to Trade, B2B = Business to Business, FDI = Foreign Direct Investment, FTA = Free Trade Agreement, SPS = Sanitary and Phytosanitary, IPR = Intellectual Property Right.

Source: Authors.

Fragmentation and agglomeration in the second unbundling

The mechanics of the second unbundling were conceptualised by Jones and Kierzkowski (1990) as the fragmentation theory (Figure 1.4). Fragmentation of production means that a set of production processes that are originally in one place will be separated into multiple production blocks located in different places. This means that the international division of labour will become process-wise or task-by-task production, and remotely located production blocks will be connected by service links that include parts and components trade and tight coordination. To make production fragmentation economically viable, two conditions must be met. First, production costs in production blocks must be substantially reduced by using differences in location advantages. Second, the costs of service links that connect remotely located production blocks will not be too high. Only a limited number of newly developed and developing countries, including ASEAN and East Asia, have been successful in participating in IPNs based on these two conditions. Saving service link costs is crucial. To meet this condition, ASEAN and East Asia have made significant efforts at improving institutional and physical connectivity.

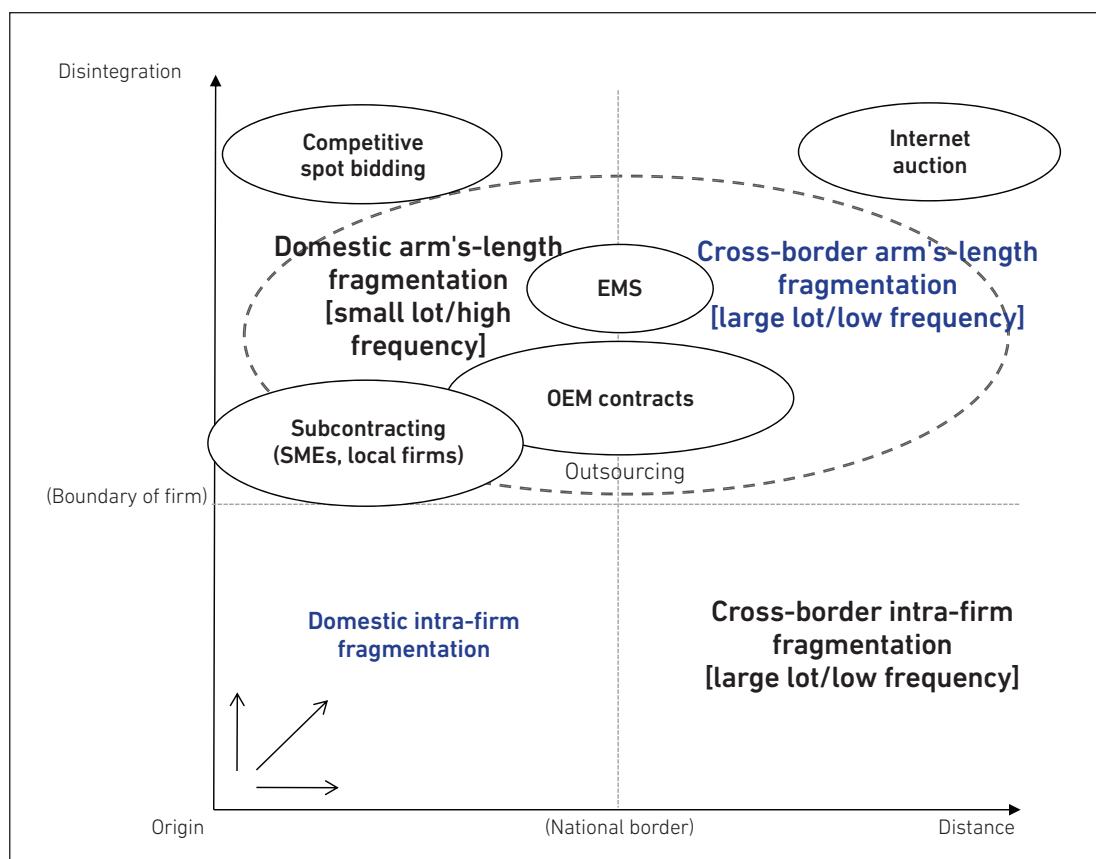
Figure 1.4 Fragmentation of Production – An Illustration



Source: Authors.

Although Baldwin (2016) did not emphasise it, the formation of industrial agglomeration is also important from the viewpoint of economic development.⁹ Fragmentation and agglomeration may be regarded as opposing moves, but they are not. Figure 1.5 illustrates the concept of two-dimensional fragmentation, which has the geographical distance axis (domestic or cross-border) and the disintegration axis (intra-firm or arm's length (inter-firm)). In a second unbundling-type industry such as the machinery industry, a firm typically designs and operates a production network by combining multiple short-/long-distance and intra-firm/arm's-length transactions. Long-distance transactions tend to be intra-firm while short-distance ones are likely to be arm's length. In Figure 5, the top-left area corresponds to short-distance and arm's-length transactions, which generates industrial agglomeration. This is the mechanism to have fragmentation at the firm level and agglomeration at the aggregate level at the same time.

Figure 1.5 Two-Dimensional Fragmentation and Industrial Agglomeration



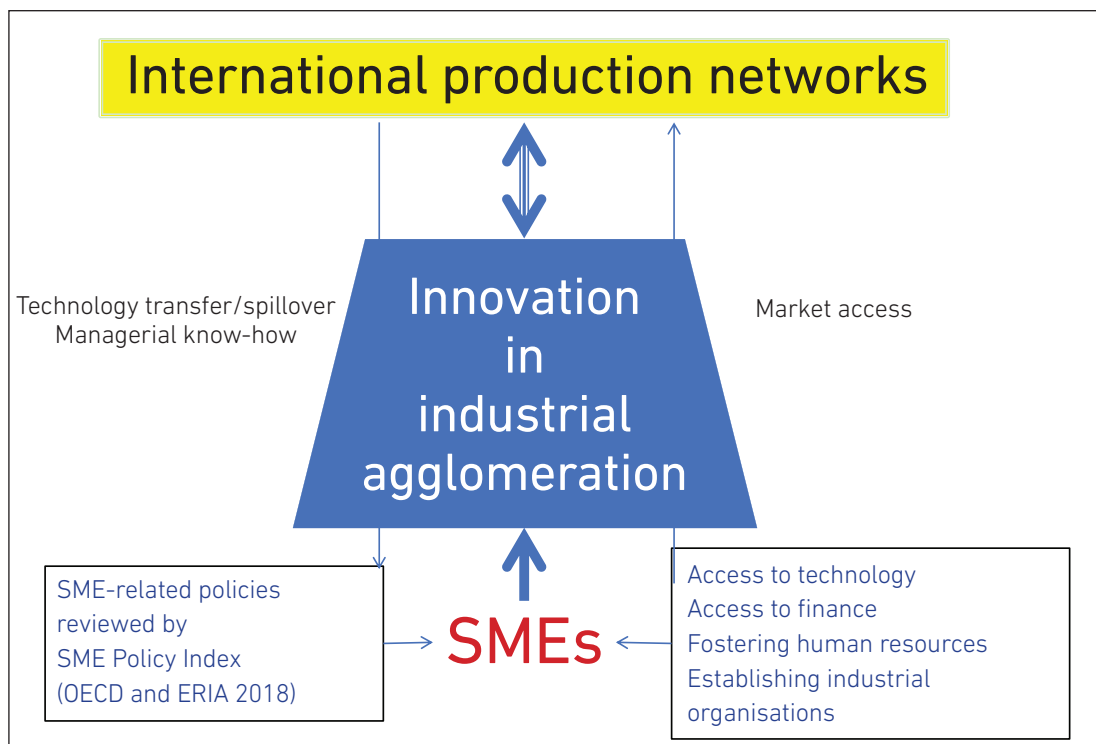
EMS = Electronics Manufacturing Service, OEM = original equipment manufacturer, SME = small and medium-sized enterprise.

Source: Kimura and Ando (2005), modified by the authors.

⁹ ERIA (2010, 2015) also emphasised the importance of the formation of industrial agglomeration.

Industrial agglomeration provides precious opportunities for local firms, particularly small and medium-sized enterprises (SMEs), to participate in IPNs (Figure 1.6). Multinational enterprises often require high-frequency small-lot deliveries of intermediate inputs over a short distance, and local firms or SMEs with price competitiveness may have chances to become suppliers. Once local firms participate in IPNs locally, they obtain access to foreign markets indirectly and might be able to receive technology transfer as well as obtaining managerial know-how from multinationals. Such technological channels are particularly important in the case of local firms in ASEAN.¹⁰ By combining a set of SME development policies, industrial agglomeration can be a vigorous place for upgrading the industrial structure while achieving inclusiveness. The formation of industrial agglomeration requires substantial investment in urban/suburban infrastructure, but it is essential to achieving full industrialisation, particularly for countries with large populations.

Figure 1.6 Industrial Agglomeration and Local Firms



SMEs = small and medium-sized enterprises.

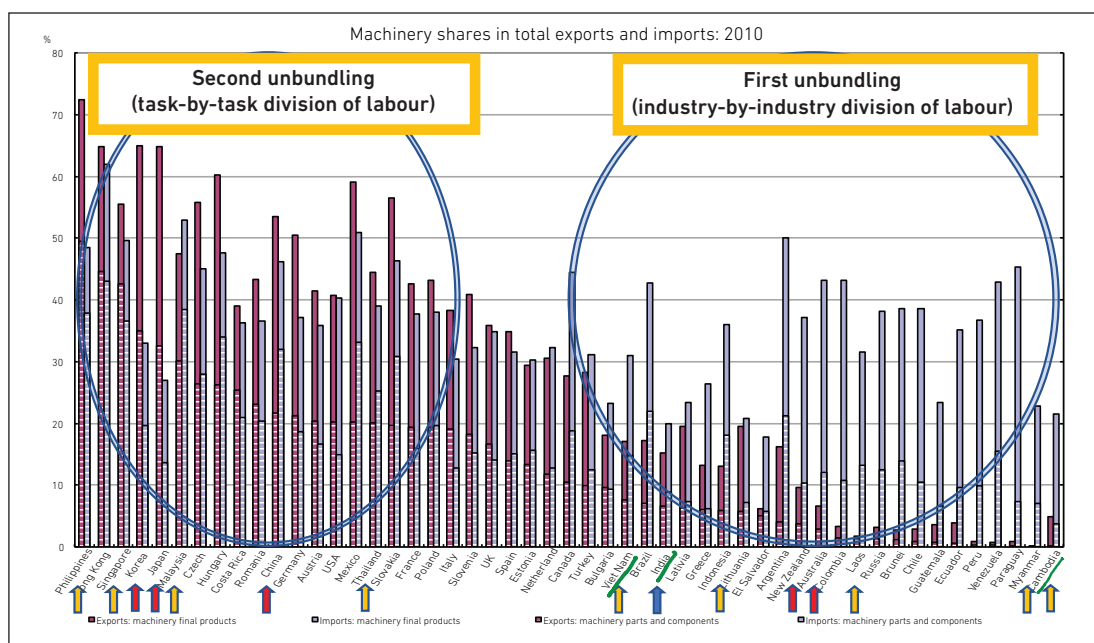
Source: Authors.

¹⁰ See, for example, Kimura, Machikita, and Ueki (2016).

Status of Factory Asia: The second unbundling

In the following, we primarily look at machinery trade because machinery industries – including general machinery, electrical machinery, transport equipment, and precision machinery – are representative industries for the second unbundling. Although other industries may conduct the second unbundling, machines typically consist of a large number of parts and components that require different materials and technologies, so the machinery industry is likely to have sophisticated vertical and horizontal production networks. Figure 1.7 and Figure 1.8 present the proportion of machinery exports and imports (HS 84–92) in total merchandise exports and imports in selected countries in 2010 and 2019. The red bar denotes exports while the blue bar represents imports. The stripe portion is parts, and the rest is final products. Countries are placed in the order of the height of parts export ratios from the left. Countries on the left-hand side – including the Philippines, Singapore, Malaysia, and Thailand as well as the Republic of Korea (henceforth, Korea), Japan, and China – export and import machinery intensively, and a large portion is occupied by parts exports and imports. In the first unbundling world, the industry-by-industry international division of labour dominates, so international trade in one industry tends to be one-way trade. Here, intra-industry trade is generated by the task-by-task international division of labour. This is a clear indication that these countries participate in IPNs or the second unbundling.

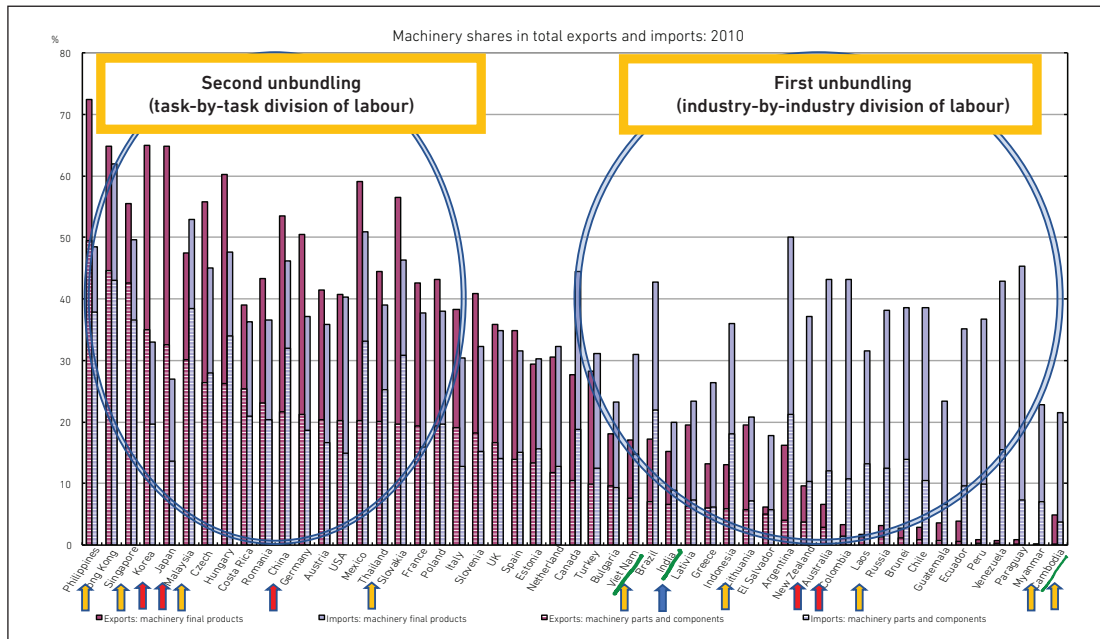
Figure 1.7 Machinery Shares in Total Exports and Imports, 2010



UK = United Kingdom, UN = United Nations, US = United States.

Source: Ando, Yamanouchi, and Kimura (2021).

Figure 1.8 Machinery Share in Total Exports and Imports, 2019



Source: Ando, Yamanouchi, and Kimura (2021).

Some countries, such as India and Indonesia, are not yet fully participating in IPNs. On the other hand, countries including Viet Nam and Cambodia move leftwards in the 2010s. In other parts of the developing world, some Eastern European countries and Mexico indicate high parts export ratios while others are mostly still in the realm of the first unbundling.

Table 1.2-1.4 are from a gravity equation exercise to indicate the strength of commitments to machinery IPNs by East Asian countries and the world (drawn from Ando, Kimura, and Yamanouchi, 2022b). Table 1.2 is a trade matrix for machinery trade (HS 84–92) in 2019. Rows are exporters, and columns are importers. 'Actual (A)' shows the actual trade value in 2019. 'Predicted (B)' is a fitted value of bilateral trade calculated from the gravity equation regression, which indicates a 'world standard' trade value after controlling for the economic size of exporters and importers, distance, and others. '(A)/(B) (%)' is the ratio of (A) to (B); 'more than 100%' means that the country exports machinery to the counterpart more than expected, and vice versa. The most notable finding in this table is high actual predicted ratios in ASEAN for both exports and imports. ASEAN's commitment to machinery IPNs is very high, considering its economic size and others. The ratio of intra-ASEAN exports reaches 271%, and export and import connections with China, Japan, and Korea are also very high. Ratios with the rest of the world are also high, particularly on the export side. Despite high levels of machinery exports, China's ratios of actual to predicted exports are not very high. At the other extreme, India has very low ratios, particularly on the export side.

Table 1.2 Actual and Predicted Machinery Trade, 2019

Exporter (row)/ Importer (Column)	Value (\$ million), %	China	Japan	Rep. of Korea	ASEAN	Australia and New Zealand	India	North America	Europe	Rest of the world	Total (World)
China	Actual (A)		75,889	58,515	161,657	7,708	37,831	295,546	249,381	476,571	1,364,100
	Predicted (B)		118,568	65,893	72,285	9,463	50,069	163,984	177,079	295,714	953,054
	(A)/(B)(%)		64	89	224	81	76	181	141	161	143
Japan	Actual (A)	81,031		20,245	59,962	2,582	5,817	126,272	64,669	110,119	670,448
	Predicted (B)	74,293		22,386	21,715	3,928	7,716	64,147	60,411	84,697	338,752
	(A)/(B)(%)	109		90	276	66	81	197	107	130	139
Rep. of Korea	Actual (A)	84,679	9,161		54,181	744	6,551	66,569	36,682	77,051	335,618
	Predicted (B)	45,860	24,865		8,639	1,307	2,996	21,772	22,348	35,613	163,400
	(A)/(B)(%)	185	37		627	57	219	306	164	216	205
ASEAN	Actual (A)	83,070	39,456	24,559	122,522	4,107	17,733	117,662	83,394	151,101	644,176
	Predicted (B)	39,799	18,528	6,644	45,225	2,846	8,388	34,797	38,940	65,409	260,576
	(A)/(B)(%)	209	213	370	271	144	211	338	216	231	247
Australia and New Zealand	Actual (A)	114	57	66	373	11	45	1,215	930	8,395	11,206
	Predicted (B)	2,694	1,766	531	1,521	300	540	7,916	5,269	13,322	33,859
	(A)/(B)(%)	4	3	12	25	4	8	15	18	63	33
India	Actual (A)	1,971	792	566	9,107	228		13,273	11,687	27,601	65,224
	Predicted (B)	56,238	12,864	4,836	18,953	2,042		32,905	45,745	87,819	261,402
	(A)/(B)(%)	4	6	12	48	11		40	26	31	25
North America	Actual (A)	63,106	28,621	23,338	43,379	5,678	9,328	617,230	161,678	177,220	1,129,577
	Predicted (B)	105,297	65,732	20,088	42,459	15,982	18,806	591,802	291,501	327,579	1,479,047
	(A)/(B)(%)	60	44	116	103	36	50	104	55	54	76
Europe	Actual (A)	144,804	37,144	30,659	64,599	8,846	24,562	286,773	151,7637	428,107	2,543,132
	Predicted (B)	122,616	66,879	22,266	51,213	11,851	27,976	318,751	1,298,753	542,040	2,462,344
	(A)/(B)(%)	118	56	138	126	75	88	90	117	79	103
Rest of the world	Actual (A)	92,501	22,859	16,508	60,029	8,727	21,201	95,207	180,288	192,063	689,382
	Predicted (B)	137,655	59,758	23,082	55,204	17,478	38,627	227,839	380,672	360,433	1,300,757
	(A)/(B)(%)	67	38	72	109	50	55	42	47	53	53
Total (World)	Actual (A)	551,277	213,978	174,456	575,838	38,631	123,069	1,620,747	2,306,885	1,648,311	7,523,193
	Predicted (B)	584,462	368,959	165,726	317,013	65,196	154,578	1,463,914	2,320,719	1,812,625	7,523,192
	(A)/(B)(%)	94	58	105	182	59	80	111	99	91	100

ASEAN = Association of Southeast Asian Nations.

Notes: 'Actual (A)' denotes the actual values of specific country/region pairs; 'Predicted (B)' denotes the corresponding predicted values, and '(A)/(B) (%)' denotes the ratio of actual to predicted values in percentage. North America refers to Canada, Mexico, and the United States; Europe refers to the 27 European Union member countries and the United Kingdom; and 'Rest of the world' refers to 128 countries and regions, including Hong Kong, Macao, and Taiwan. The predicted values for regions are calculated by totalling the member countries' predicted values.

Source: Ando, Kimura, and Yamanouchi (2022b).

Table 1.3 aggregates countries into three regions – East Asia (ASEAN, China, Japan, and Korea); North America; and Europe – and the rest of the world. East Asia's intra-regional exports reach 155% in the actual predicted ratio, while those in North America and Europe are 104% and 117%, respectively. East Asia also exports machinery to other regions much more than predicted. This indicates the high commitment of East Asia to machinery IPNs. East Asia is strong in electric machinery while North America and Europe show their presence in transport equipment.

Table 1.3 Actual and Predicted Machinery Trade for Three Major Regions, 2019

Exporter (row)/ Importer (column)	Value (\$ million), %	East Asia	North America	Europe	Rest of the world	Total (World)
East Asia	Actual (A)	874,958	607,050	434,667	897,997	2,814,672
	Predicted (B)	564,700	284,701	298,778	567,605	1,715,783
	(A)/(B) (%)	155	213	145	158	164
North America	Actual (A)	158,443	617,230	161,678	192,226	1,129,577
	Predicted (B)	233,376	591,802	291,501	362,368	1,479,047
	(A)/(B) (%)	68	104	55	53	76
Europe	Actual (A)	277,206	286,773	1,517,637	461,516	2,543,132
	Predicted (B)	262,974	318,751	1,298,753	581,866	2,462,344
	(A)/(B) (%)	105	90	117	79	103
Rest of the world	Actual (A)	204,942	109,694	192,904	258,272	765,812
	Predicted (B)	375,111	268,660	431,686	520,561	1,596,019
	(A)/(B) (%)	55	41	45	50	48
Total (World)	Actual (A)	1,515,549	1,620,747	2,306,885	1,810,011	7,253,193
	Predicted (B)	1,436,160	1,463,914	2,320,719	2,032,400	7,253,193
	(A)/(B) (%)	106	111	99	89	100


Source: Ando, Kimura, and Yamanouchi (2022b).

Figures for individual AMS are shown in Table 1.4. Although Brunei, the Lao People's Democratic Republic (Lao PDR), Cambodia, and Myanmar are a bit behind on this criterion, other AMS present strong commitments to machinery IPNs. Indonesia is developing tight connections with some other AMS, particularly in transport equipment. Viet Nam has caught up quickly with the forerunners.

Table 1.4 Actual and Predicted Machinery Trade for ASEAN Member States, 2019

Exporter (row)/ Importer (column)	Value (\$ million), %	Singapore	Brunei	Malaysia	Thailand	Indonesia	Philippines	Viet Nam	Lao PDR	Cambodia	Myanmar	ASEAN	China, Japan, and Rep. of Korea	Total (World)
Singapore	Actual (A)		393	13,234	3,955	5,543	4,543	3,470	30	338	815	32,321	34,364	156,011
	Predicted (B)		128	5,444	678	1,469	274	210	34	59	150	8,446	6,468	34,514
	(A)/(B)(%)		309	243	583	377	1,657	1,653	88	572	543	383	531	452
Brunei	Actual (A)	90		55	4	2	0	4		0	0	155	42	250
	Predicted (B)	74		70	25	38	19	10	1	2	6	245	327	1,416
	(A)/(B)(%)	122		79	15	5	1	38	2	0	0	63	13	178
Malaysia	Actual (A)	19,979	110	6,593	1,795	1,795	1,609	2,958	8	97	86	33,125	27,355	147,174
	Predicted (B)	8,476	188	1,486	2,124	2,124	269	214	36	62	161	13,015	6,308	38,377
	(A)/(B)(%)	235	59	444	84	84	598	1,384	22	156	54	255	434	383
Thailand	Actual (A)	3,786	49	4,377	3,574	3,574	3,860	4,798	915	1,581	827	23,768	22,145	113,417
	Predicted (B)	1,310	82	1,844	1,114	1,114	435	513	231	283	538	6,348	11,006	44,997
	(A)/(B)(%)	289	59	237	321	321	888	935	397	559	154	374	201	252
Indonesia	Actual (A)	3,471	40	1,210	2,311	2,311	3,226	1,851	21	91	147	12,367	4,551	30,530
	Predicted (B)	3,323	150	3,087	1,305	1,305	691	455	71	109	171	9,361	16,248	70,177
	(A)/(B)(%)	104	26	39	177	177	467	407	30	83	86	132	28	44
Philippines	Actual (A)	5,852	2	1,497	2,189	473	1,073	1,061	0	10	6	11,090	17,663	62,111
	Predicted (B)	608	74	383	499	678	239	239	32	44	65	2,623	9,235	27,307
	(A)/(B)(%)	962	3	391	438	70	445	445	0	23	9	423	191	227
Viet Nam	Actual (A)	1,718	20	1,493	2,535	1,122	1,073		105	295	244	8,606	40,332	131,457
	Predicted (B)	492	40	322	623	472	252	1,948	225	162	85	2,674	11,129	28,431
	(A)/(B)(%)	349	51	464	407	238	425	1,948	47	182	286	322	362	463
Lao PDR	Actual (A)	6	0	8	397	4	0	27		1	0	444	82	770
	Predicted (B)	45	3	30	159	42	19	127		17	19	462	814	2,460
	(A)/(B)(%)	13	0	28	250	9	0	21		8	1	96	10	31
Cambodia	Actual (A)	8	0	16	202	1	62	47	1		2	341	346	1,403
	Predicted (B)	91	6	62	225	74	30	107	19		10	624	648	2,906
	(A)/(B)(%)	9	0	27	90	2	206	44	7		18	55	53	48
Myanmar	Actual (A)	133	0	13	113	6	11	60	0	0		336	205	852
	Predicted (B)	304	19	209	564	153	60	74	30	13		1,426	2,777	9,993
	(A)/(B)(%)	44	0	6	20	4	19	81	0	1		24	7	9
ASEAN	Actual (A)	34,944	614	21,904	18,299	12,510	14,385	14,276	1,082	2,412	2,126	122,552	147,085	644,176
	Predicted (B)	14,723	690	11,451	5,563	6,613	2,050	1,948	679	752	1,205	45,225	64,971	260,576
	(A)/(B)(%)	237	89	191	329	203	702	733	159	321	177	217	226	247
China, Japan, and Rep. of Korea	Actual (A)	49,071	427	34,230	41,200	31,174	25,148	86,404	995	2,485	4,664	275,800	329,520	2,170,496
	Predicted (B)	18,495	1,609	11,602	16,517	20,509	11,853	14,692	1,893	1,236	4,234	102,639	351,865	1,455,207
	(A)/(B)(%)	265	27	295	249	152	212	588	53	201	110	269	94	149
Total (World)	Actual (A)	154,458	1,729	86,621	81,632	58,174	51,501	119,042	2,257	6,313	8,112	575,838	939,711	7,253,192
	Predicted (B)	72,025	5,168	47,512	50,633	65,241	27,378	28,933	4,342	4,069	11,713	317,013	1,119,147	7,253,192
	(A)/(B)(%)	214	33	182	161	89	210	411	52	155	69	182	84	100

ASEAN = Association of Southeast Asian Nations.
Source: Ando, Kimura, and Yamanouchi (2022b).



Variations remain amongst AMS. Cambodia, the Lao PDR, and Myanmar have just started stepping into the second unbundling and seeking industrial diversification. Indonesia, the Philippines, and Viet Nam are working to form thick industrial agglomeration. Malaysia and Thailand have already reached maturity in the second unbundling. There is a lot of room for catching up.

Digital technology and IPNs

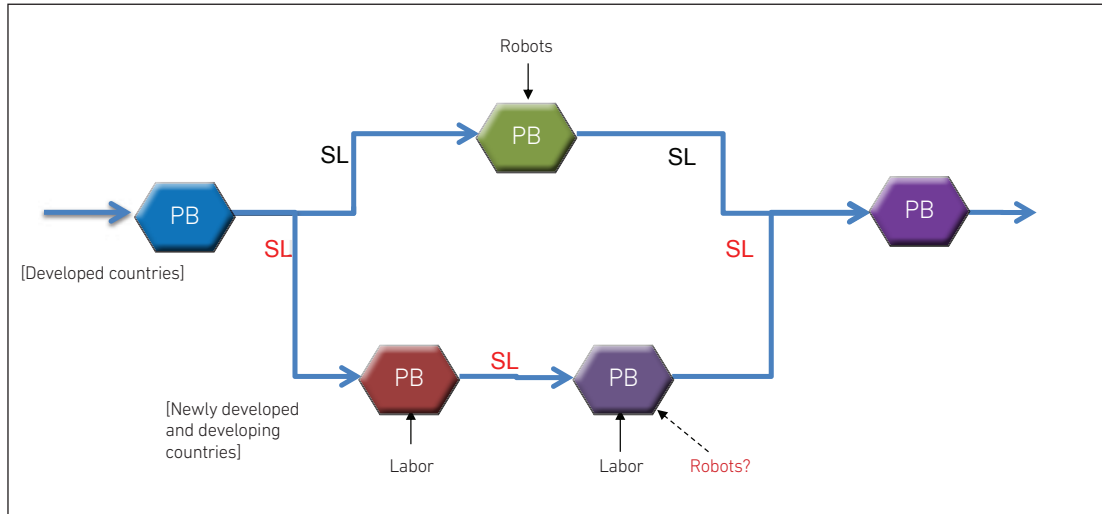
Economic development in ASEAN and developing East Asia has been manufacturing-centred, and countries in the region have mostly been successful in graduating to upper middle-income economies. However, how much can we depend on the manufacturing sector? More concretely, how will digital technology change the pattern of the international division of labour?

Digital technology may affect manufacturing IPNs in multiple ways. As a thought experiment, let us divide digital technology into two elements: information technology (IT) and CT.¹¹ IT such as artificial intelligence (AI) and robotics speeds up data processing and economises tasks; therefore, it may generate 'concentration forces' against the international division of labour. CT such as the internet and smartphones overcomes geographical distance; thus, it may create 'dispersion forces' that facilitate the international division of labour. Which forces will be stronger may decide the future of IPNs, including newly developed and developing countries.

The above argument assumes that IT is introduced solely by developed countries and works as a substitute for labour in newly developed and developing countries (Figure 1.9). However, IT may be introduced by newly developed and developing countries and works as a complement for labour. Obashi and Kimura (2021) conducted a gravity equation exercise for 104 countries in 2011–2017, and found that the introduction of industrial robots in newly developed and developing countries in East Asia enhanced network trade, together with imported digitally deliverable services that represent CT. Although the introduction of industrial robots is still in the preliminary stage, IT may not necessarily work against newly developed and developing countries. Manufacturing as a whole will become more digital technology-intensive, so newly developed and developing countries must be positive for the introduction of IT to seek the possibility of complementarity with labour as well as enhancing the usage of CT.

¹¹ The concept of IT and CT is drawn from Baldwin (2016).

Figure 1.9 Introduction of Industrial Robots to International Production Networks



PB = production block, SL = service link.

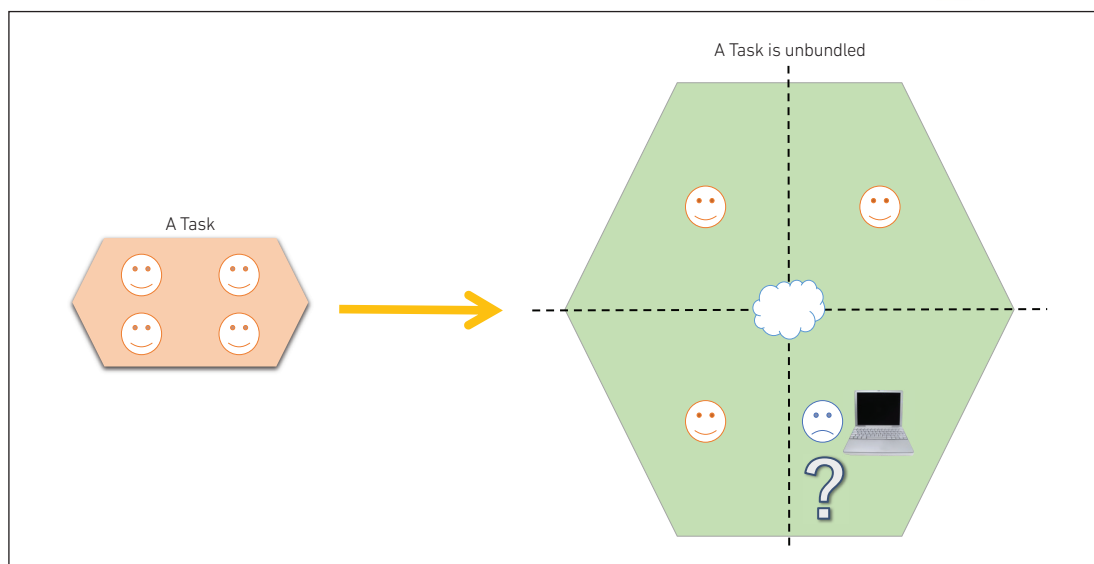
Source: Author, illustrating the idea of Obashi and Kimura (2021).

In the short run, COVID-19 accelerates the usage of CT in IPNs. ASEAN and developing East Asia must take this opportunity to enhance the usage of CT in IPNs even in a normal period. Further, the introduction of IT may also be promoted to keep production blocks. Nurturing human resources for digital technology will be key.

The third unbundling

The third unbundling is finer than the first and second unbundlings. In the third unbundling, a task is unbundled and people in different locations perform it (Figure 1.10). The second wave of the ICT revolution reduces face-to-face costs, and people in different countries coordinate to conduct a task. The reach of the third unbundling is still quantitatively small but has the potential to be a major channel of the international division of labour in the future.

Figure 1.10 The Third Unbundling

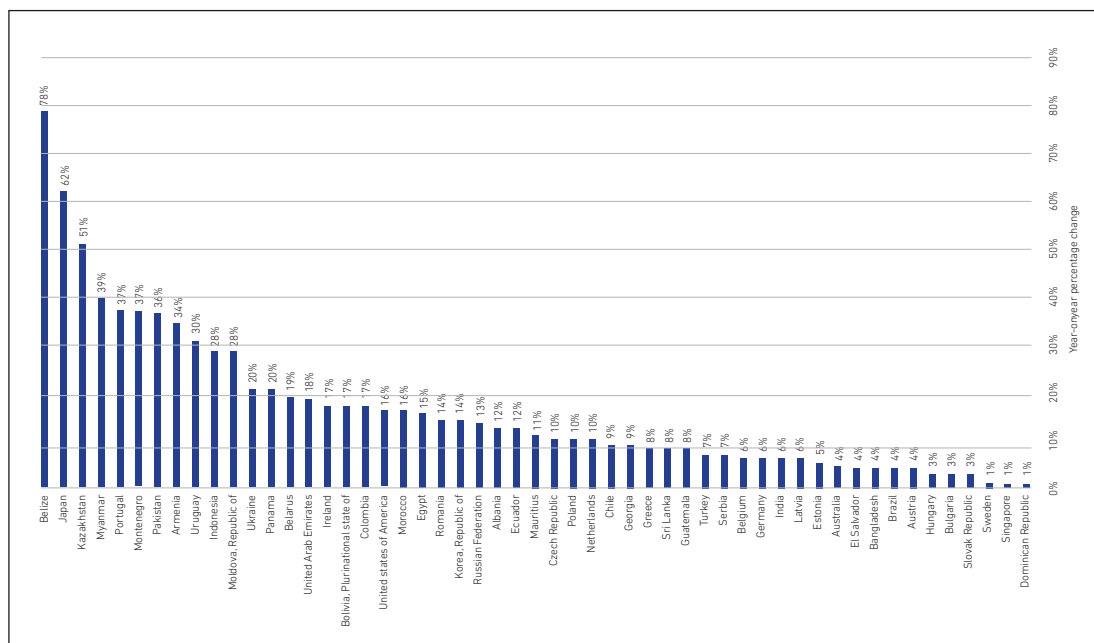


Source: Authors.

A good example of the third unbundling is Upwork, which provides matching services for freelancers throughout the world. Although its operations are limited to Japan, Coconala provides a matching platform for online service individuals and customers. Various kinds of business process outsourcing are provided for the world by companies located in the Philippines. Online English conversation classes provided by teachers in Cebu have been successful in Japan. Digital connectivity easily overcomes geographical distance. Of course, some barriers or frictions remain in such cross-border transactions, including asymmetric information, language barriers, e-payments, troubleshooting, and others. However, wage gaps across countries are huge compared with gaps in talent. COVID-19 forced us to work remotely and lowered the psychological barrier to service outsourcing, both domestic and cross-border. When credible mediators provide matching services, the third unbundling may expand significantly.

It is not easy to capture the third unbundling precisely in statistics. However, some figures are available for trade in ICT services and other business services that overlap with the third unbundling. During the COVID-19 era, the recovery of trade in services was much slower than that of trade in goods. Travel services are still experiencing a large slump. On the other hand, ICT services trade did not drop much, and trade in computer services (part of ICT services) grew in 2020 (Figure 1.11). COVID-19 accelerated the growth in digitalised and digitalising services trade.

Figure 1.11 Computer Services Exports, 2020
(year-on-year percentage change)

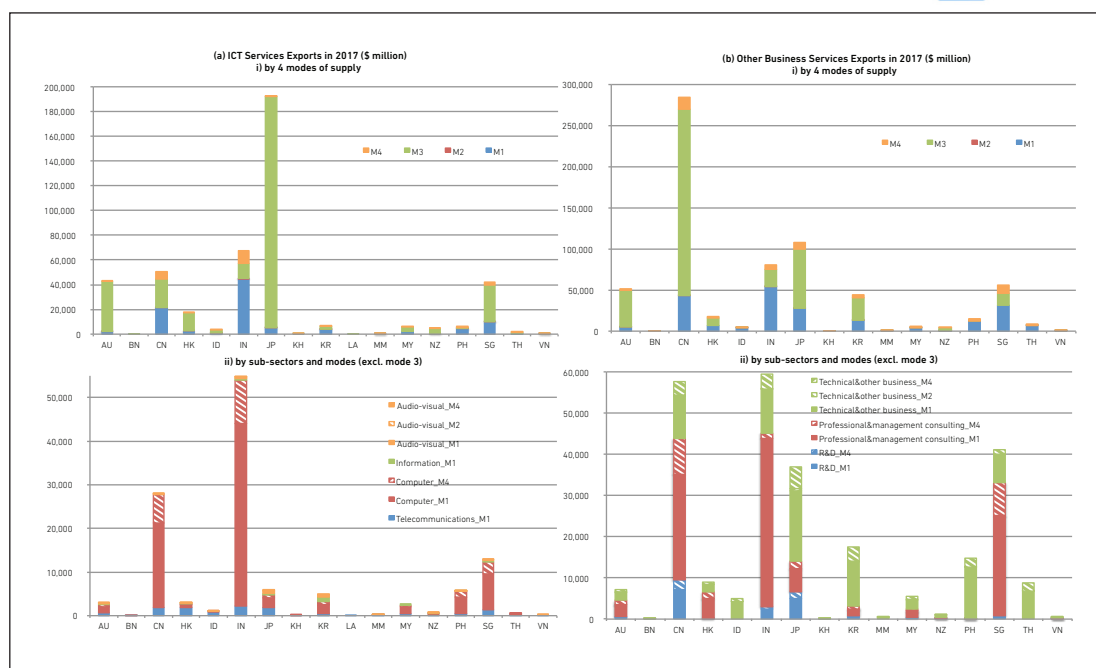


Source: WTO (2021).

Services trade statistics based on balance of payments statistics do not capture the service provision made by service providers moving to a customer's country. In other words, a large portion of mode 3 (commercial presence) and mode 4 (movement of natural persons) in the services trade definition under the General Agreement on Trade in Services is not captured in statistics. The Foreign Affiliates Trade in Services statistics are an initiative for filling this gap, and the WTO homepage (WTO, n.d.) presents tentative estimates up to 2017. The upper part of Figure 1.12 shows 4-mode¹² estimates of ICT services and other business services exports by ASEAN and East Asian countries. The lower part of the figure displays further disaggregation based on the balance of payments statistics. We can see that exports of these services are still in their infancy in many countries, even considering the quality of the data.

¹² The four modes of supply of services are: cross-border transactions (mode 1), consumption abroad (mode 2), commercial presence in another country (mode 3), and presence of natural people in another country (mode 4).

Figure 1.12 ICT Services and Other Business Services Exports, 2017

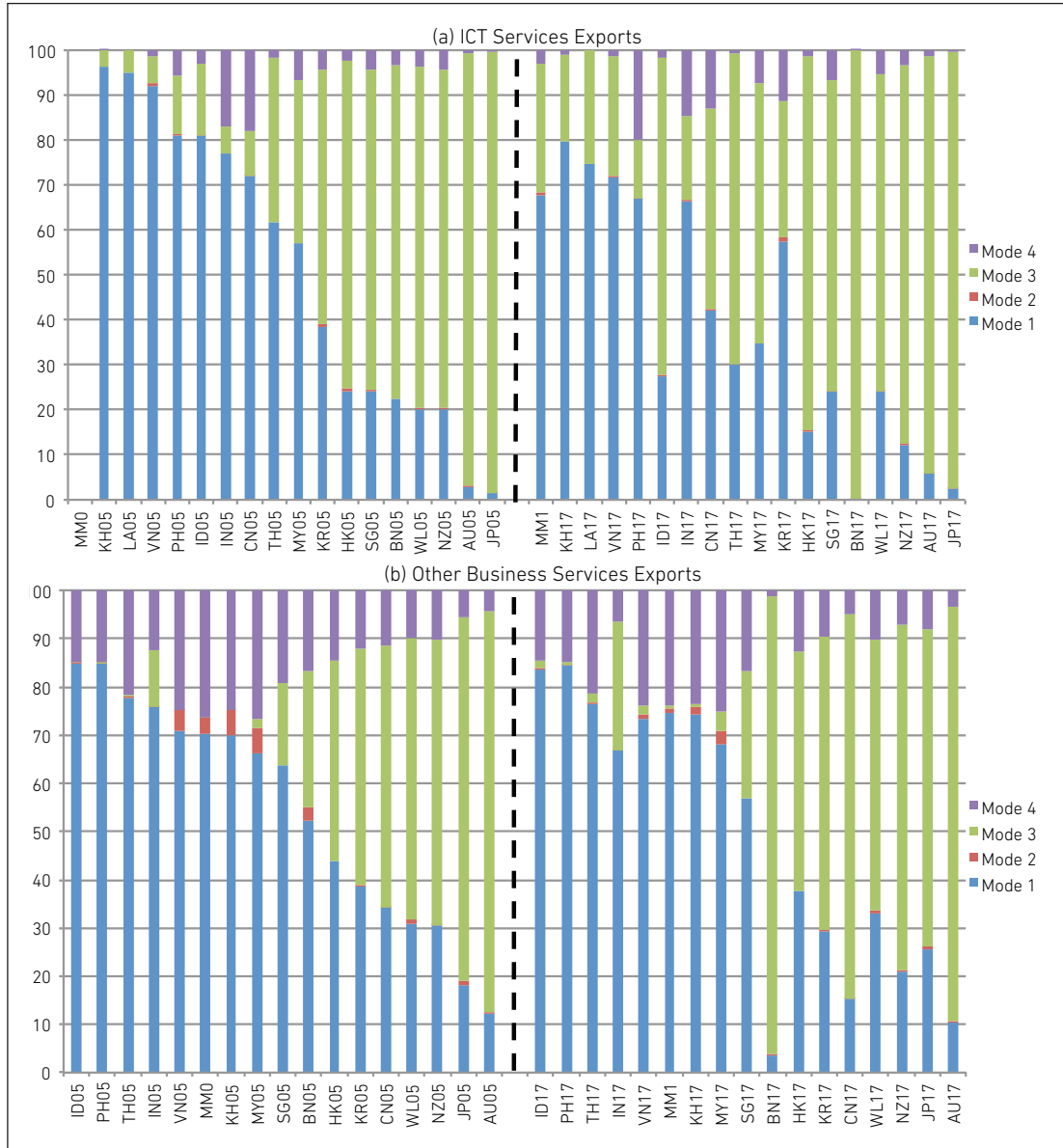


ICT = information and communication technology, R&D = research and development, M1 = Service trade mode 1, M2 = Service trade mode 2, M3 = Service trade mode 3, M4 = Service trade mode 4, AU = Australia, BN = Brunei Darussalam, CN = China, HK = Hong Kong, ID = Indonesia, IN = India, JP = Japan, KH = Cambodia, KR = Republic of Korea, MM = Myanmar, MY = Malaysia, NZ = New Zealand, PH = Philippines, SG = Singapore, TH = Thailand, VN = Viet Nam.

Source: Ando, Kimura, and Yamanouchi (2022a). Data are originally from the WTO HP (WTO, n.d.).

Figure 1.13 presents the mode composition of these services exports in 2005 and 2017. Mode 1 (cross-border) and mode 4 are relatively large in developing countries. However, as a country goes up the development ladder, mode 3 is becoming dominant. This indicates the importance of mode 3 once the services trade reaches the mature stage and business matching becomes crucial. Services trade liberalisation as well as data governance rules appear to be linked with the development of the third unbundling.

Figure 1.13 Mode Composition of ICT Services and Other Business Services Exports, 2005 and 2017



ICT = information and communication technology, AU = Australia, BN = Brunei Darussalam, CN = China, HK = Hong Kong, ID = Indonesia, IN = India, JP = Japan, KH = Cambodia, KR = Republic of Korea, MM = Myanmar, MY = Malaysia, NZ = New Zealand, PH = Philippines, SG = Singapore, TH = Thailand, VN = Viet Nam, WL = World.

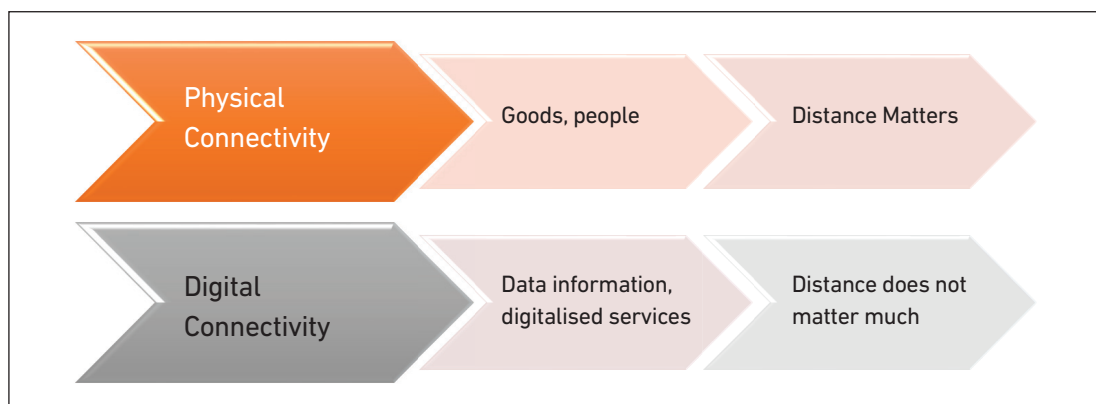
Source: Ando, Kimura, and Yamanouchi (2022). Data are originally from the WTO HP (WTO, n.d.).

Policies to upgrade achievable unbundling

In the past three decades, ASEAN and East Asia have been successful in expanding the scope of unbundling or the international division of labour by unleashing private dynamism with ASEAN-centred integration initiatives. Development gaps that generate arbitrage opportunities for the international division of labour have not yet been exhausted. By enhancing institutional and physical connectivity with digital technology, ASEAN and East Asia can use globalisation forces even more effectively.¹³

The first unbundling can use digital technology more extensively, particularly in rural areas for inclusiveness. Continuous efforts at enhancing institutional and physical connectivity are required. Digital technology, particularly CT, improves access to information, business matching, and marketing, partially through e-commerce. Digital connectivity can complement physical connectivity (Figure 1.14). There is also huge room for enhancing productivity by introducing IT.¹⁴

Figure 1.14 Physical and Digital Connectivity

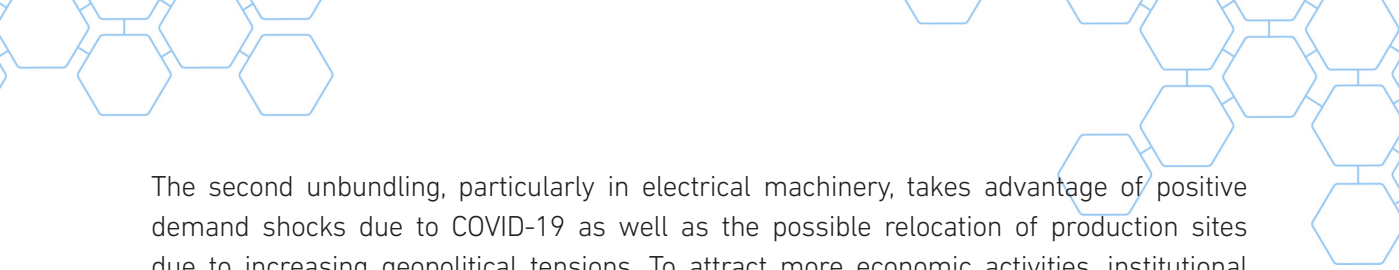


Source: Authors.

¹³ In Chapter 6, Ambashi, Fujita and Suzuki list important hard infrastructure projects in the region. In Chapter 7, Kumagai and Isono employ the Geographical Simulation Model and estimate the economic effects of enhancing physical and institutional connectivity.

¹⁴ Kozono discusses the agricultural sector in Chapter 16, particularly the introduction of digital technology, cold chains, and a sustainable food system.

¹⁵ Buban and Ha provide a detailed discussion in Chapter 2 on the improvement of trade facilitation and non-tariff measures. Ramli and Majid discuss the importance of regulatory coherence in Chapter 3.



The second unbundling, particularly in electrical machinery, takes advantage of positive demand shocks due to COVID-19 as well as the possible relocation of production sites due to increasing geopolitical tensions. To attract more economic activities, institutional connectivity beyond tariff cuts – such as the enhancement of FTA use, trade facilitation, the improvement of non-tariff measures operation, standards and conformance, and regulatory coherence – will work.¹⁵ Physical connectivity may still need to improve, particularly in urban and suburban infrastructure, to support industrial agglomeration. COVID-19 was a natural experiment on how far CT can substitute the movement of people, and we found that CT worked strongly. After COVID-19, the movement of people will revive, but not exactly like in the pre-COVID-19 era. More intensive and extensive use of CT will expand the applicability of the second unbundling.

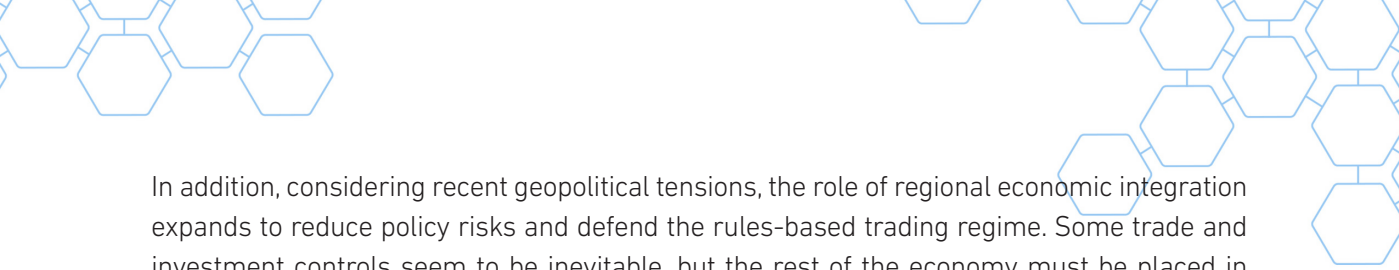
The third unbundling world requires a more people-centred approach for connectivity. With e-commerce, international cargos shift their weight from containers to parcels, from sea to air. International transactions are still dominated by business to business (B2B), but business to consumer (B2C) and consumer to consumer (C2C) are increasing in importance. Digital connectivity overcomes distance though it may not be a perfect substitute for face-to-face meetings. In addition to essential infrastructure like high-speed internet connections, the institutional setting for digital businesses and data flows will become important.

ASEAN-centred integration initiatives

ASEAN-centred integration initiatives have played a very important role in supporting private economic activities by advancing liberalisation and international rule-making. ASEAN integration has deepened and expended its scope to political and socio-cultural integration. ASEAN has led the ASEAN+1 initiative and established the RCEP with ASEAN Centrality at its core. It is imperative to deepen ASEAN-centred integration initiatives for upgrading institutional and physical connectivity with a digital technology flavour.¹⁶

¹⁵ Buban and Ha provide a detailed discussion in Chapter 2 on the improvement of trade facilitation and non-tariff measures. Ramli and Majid discuss the importance of regulatory coherence in Chapter 3.

¹⁶ In Chapter 4, Prakash proposes to connect the connectivity plans in Asia and beyond.



In addition, considering recent geopolitical tensions, the role of regional economic integration expands to reduce policy risks and defend the rules-based trading regime. Some trade and investment controls seem to be inevitable, but the rest of the economy must be placed in the rules-based trading regime. Ad hoc use of trade and other policies for political purposes should be avoided as far as possible. Trade forums such as the ASEAN Economic Community and the RCEP could be used as a troubleshooting mechanism.¹⁷ In addition, although the dispute settlement mechanism in regional trade agreements has barely been used, we should consider the possibility. Ultimately, ASEAN and East Asia should join forces and support the WTO as an anchor for the rules-based trading regime.

Innovation

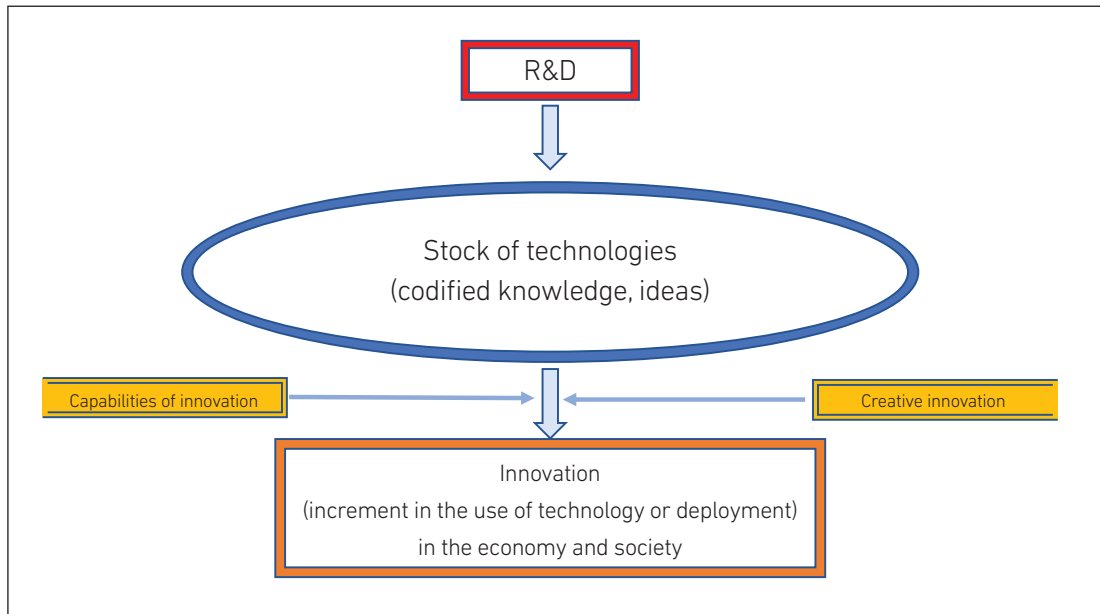
Technologies and innovation with digital technology

Now we will discuss the second pillar – innovation. In the past two decades, digital technology has drastically changed innovation. Innovation strategies in newly developed and developing countries must be substantially renewed quickly.

As a starting point, let us set the definition of ‘innovation’ in our context (Figure 15). R&D and other activities generate technologies, which can also be called codified knowledge or ideas. We have a stock of technologies that may or may not be used. Innovation is defined as the increment in the use or deployment of technology, selected from the stock of technologies, in the economy and society.

¹⁷ Kimura (2021) discussed the expanded role of regional trade agreements in the era of geopolitical tensions.

Figure 1.15 Stock of Technologies and Innovation



R&D = research and development.

Source: Authors.

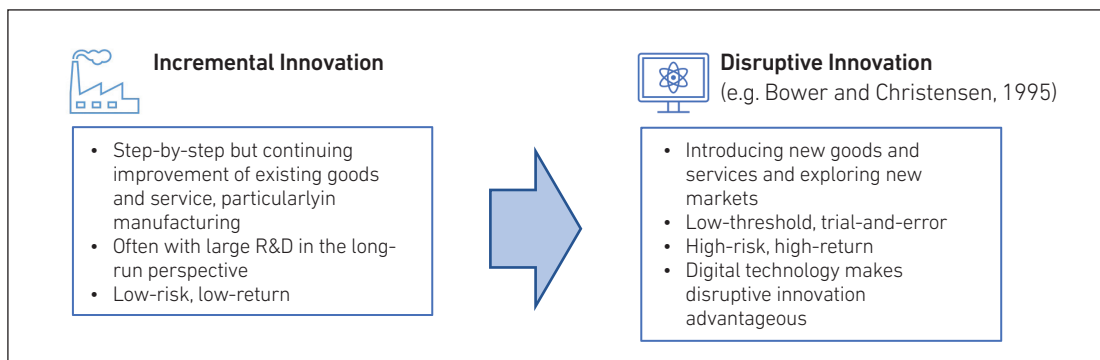
R&D requires substantial investment for the accumulation of human capital and experience and thus tends to be conducted mainly in developed countries. In addition, up to the 20th century, innovation also required substantial capabilities together with R&D, and thus innovation was also mostly done in developed countries. Digital technology changed this structure. Most digital technology is general purpose, characterised by its pervasiveness and innovation spawning. Deployment and imitation are often quite easy, which allows disruptive innovation to emerge.

Incremental and disruptive innovation

The old innovation strategy applied in Northeast Asia was a national innovation system model in which the triangle of the government, universities/research institutes, and the private sector conducted incremental innovation backed by massive R&D. The manufacturing sector was at the core of innovation. However, in the past two decades, disruptive innovation has dominated the business scene with explosively expanding internet/smartphone users. Major companies throughout the world have had to adapt and change in these 2 decades.

Differences between incremental innovation and disruptive innovation are summarised in Figure 1.16. Incremental or gradual innovation is step-by-step innovation that aims to continue improving goods and services, typically in manufacturing. It often accompanies extensive R&D in the long-run perspective. Therefore, it is relatively low-risk and low-return. On the other hand, disruptive innovation (Bower and Christensen, 1995; Schmidt and Druehl, 2008) introduced new goods and services and explored new markets while rendering existing goods and services obsolete. It has a low threshold for entry, characterised by trial and error. It is thus high risk and high return. Digital technology makes disruptive innovation advantageous, particularly in matching platform businesses.

Figure 1.16 Stock of Technologies and Innovation



R&D = research and development.

Source: Authors.

Shapiro and Varian (1998) pointed out the important characteristics of digital businesses, including low fixed costs, strong lock-in effects, and the existence of network externalities. These characteristics of digital business platforms support the emergence of unicorns and potential risks on information control, privacy protection, and competition policy.

However, since 2015 or so, digital businesses in Asia have started shifting their weight from relatively simple matching businesses to businesses that rejuvenate or upgrade traditional industries. This means that digital technology begins to transform our economy and society as a whole, i.e. digital transformation (DX) starts. This may make some form of collaboration between incremental and disruptive innovation meaningful from now on, particularly in manufacturing where incremental innovation has accumulated.

Advantages of backwardness and leapfrogging

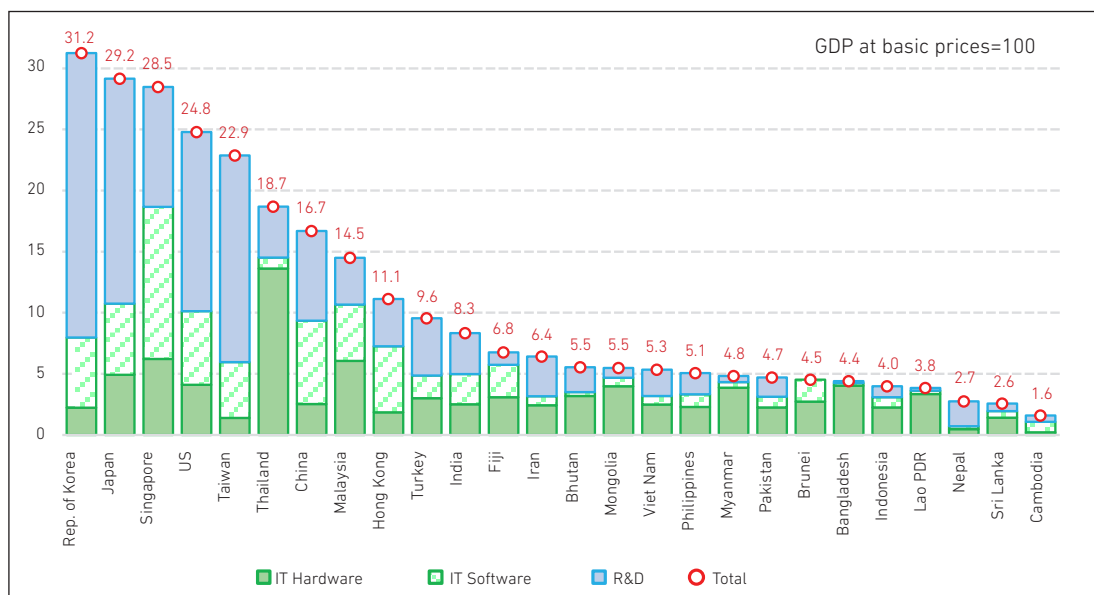
Up to the end of the 20th century, developed countries almost monopolised both R&D and innovation. But the situation has changed drastically. Digital technology itself is high-tech, and thus substantial R&D investment is required. However, digital technology is often easy to deploy. Even if serious R&D may be difficult, newly developed and developing countries can jump into the deployment of digital technology. Deployment often requires local adaptation of digital businesses that potentially give local entrepreneurs some advantages over multinationals.

The deployment of digital technology is sometimes easier in newly developed and developing countries than in developed countries. Developing countries tend to have immature economic systems and institutions, and the deployment of digital technology for matching, escrow services, and e-payments, for example, may be accepted more easily – without coordination with existing systems or resistance from people with vested interests. Even where a business model is well established in developed countries, local adaptation of such a model may still make good business sense. Local players tend to have advantages even if they are not at the global technological frontier. 'Super application', developed by transport matching platformers, is an example of this. In addition, many newly developed and developing countries have a young population, which is a big advantage in introducing digital technology.

Low R&D–GDP ratios have long been regarded a serious problem in developing countries. The old national innovation system model in Northeast Asia attaches significant importance to large R&D investment. However, digital technology may call for a fundamental revision of this strategy. Figure 1.17 presents the estimates of the stock of IT and R&D capital, relative to GDP, in 2019. As expected, Korea, Japan, Singapore, the US, Taiwan, and China have relatively large R&D capital stock to GDP ratios. Other countries in Asia have small R&D capital stock; instead, their IT hardware and software capital stock is relatively large. This may not necessarily be a bad thing if the deployment of digital technology, rather than R&D, is important for these countries.

Figure 1.17 Stock of IT and R&D capital relative to GDP, 2019

(ratios of end-of-year capital stocks of IT and R&D to the basic price GDP in 2019)



GDP = gross domestic product, IT = information technology, R&D = research and development, US = United States.

Source: APO (2021).

Innovation policy in newly developed and developing countries may need to be revised to take advantage of digital technology. By doing so, countries in the region may capture the opportunities of catching up and leapfrogging.

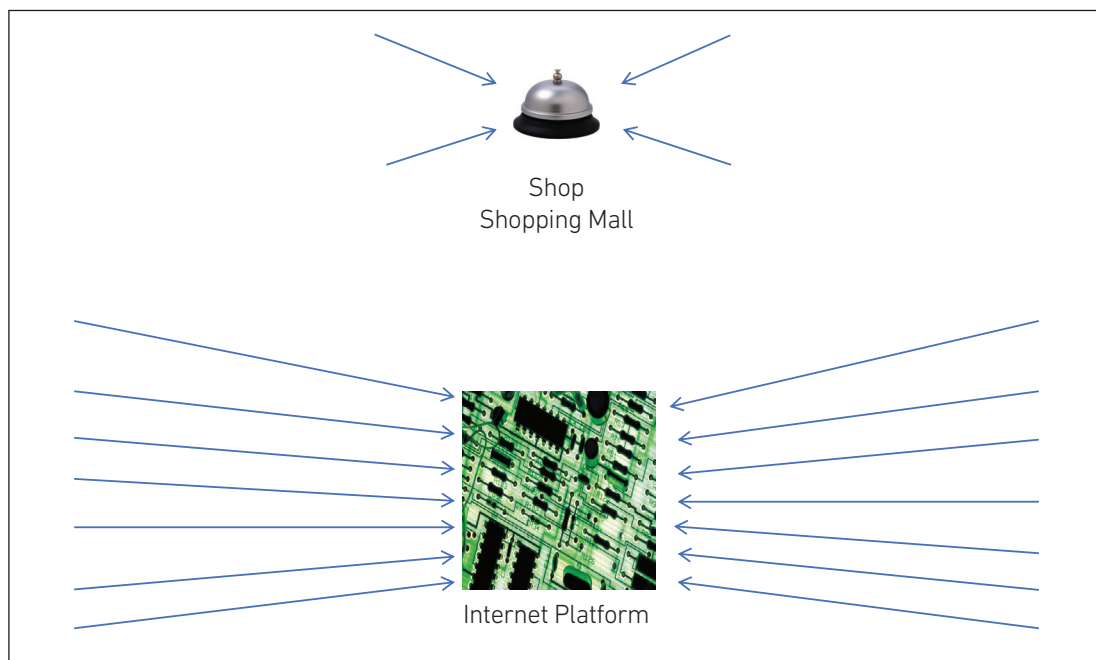
Digital businesses

The size of digital-related businesses seems to be still limited in ASEAN and developing East Asia, but the wave of digitalisation has arrived. It started from the proliferation of internet platforms with rapidly expanding subscribers of smartphones and use of the internet.

Internet platforms can drastically reduce the cost of matching in communication, information dissemination, and B2B/B2C/C2C matching as well as in delivering government services. Figure 1.18 illustrates the reduction in matching costs. For example, in B2C commerce, we used to have a corner shop or a store in a shopping mall where sellers of goods and services displayed their products and customers came to choose and consume. Substantial matching costs are borne by both sellers and buyers in such a physical transaction.

Although the internet platform for e-commerce may not be a perfect substitute for the joy of physical shopping, sellers can post their products at much cheaper prices and buyers save substantially on their search costs. The internet matching platforms intensify competition and at the same time expand the number of market participants while enhancing the variety of goods and services.

Figure 1.18 Reduction in Matching Costs by Platformers

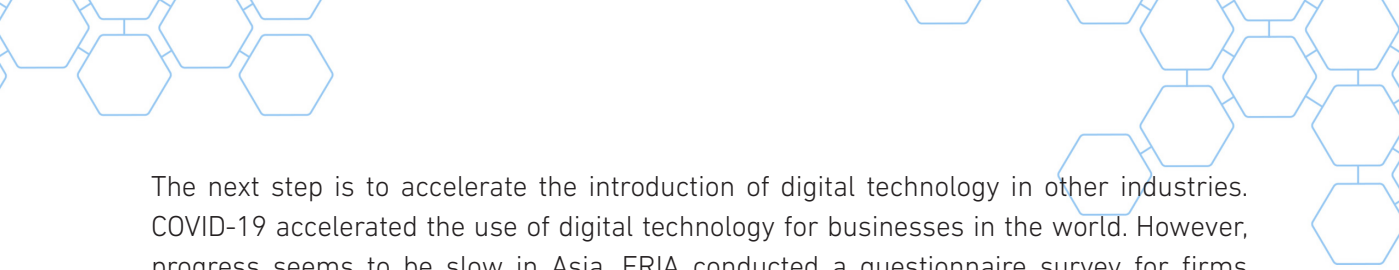


Note: Arrows represent customers and suppliers.

Source: Authors.

The growth of social networking services has been impressive in ASEAN and developing East Asia, and e-commerce is also growing. Transport matching business has been very successful, and super applications have expanded the scope of digital businesses. The advantages of backwardness seem to work strongly.

Although the benefits of matching platforms are obvious, a number of concerns should be taken care of by providing an enabling policy environment. The key is to retain healthy competition amongst platforms, both domestic and foreign. Competition policy and proper taxation of multinational digital platforms are essential. The recent development of policy frameworks observed in the region may mostly solve other concerns such as consumer protection, privacy protection, and cybersecurity.



The next step is to accelerate the introduction of digital technology in other industries. COVID-19 accelerated the use of digital technology for businesses in the world. However, progress seems to be slow in Asia. ERIA conducted a questionnaire survey for firms in ASEAN and India and found that only 23% of respondents promoted digitalisation to respond to the pandemic shocks to supply chains (Oikawa et al., 2021). To make progress in the digital transformation, customised digitalising services must be promoted. Although platformers can take care of this to some extent, the development of digital venture businesses is crucial. To do so, economic systems must be prepared to allow trial and error for disruptive innovation, and policymakers should not be afraid of learning from foreign businesses rather than jumping into inefficient infant industry protection.

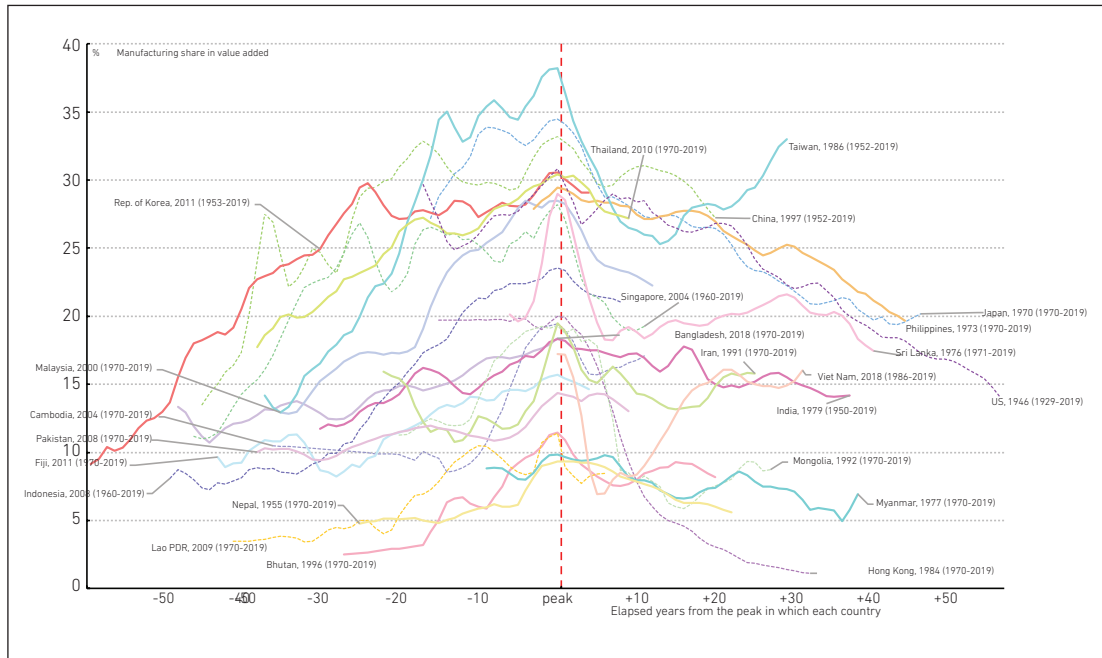
Manufacturing and disruptive innovation

Digital technology has made disruptive innovation dominant in the past two decades. The manufacturing sector, which used to be a champion of innovation, has not kept pace with it. What will happen regarding manufacturing in the future?

ASEAN and East Asia have manufacturing-centred development strategies and have been successful in achieving steady economic growth and rapid poverty alleviation. Manufacturing and related services generate massive numbers of jobs for relatively poor people, which accelerates the shift of employment from the informal to formal sectors. This inclusive growth contrasts well with jobless growth in some resource-based developing countries in the world. Many countries in ASEAN and developing East Asia have large populations and still require massive job creation.

Rodrik (2016) pointed to the phenomenon of premature deindustrialisation, in which many developing countries in recent periods have started to lose their GDP/employment share of the manufacturing sector without experiencing full industrialisation. Rodrik claimed that premature deindustrialisation is salient, particularly in Latin America and Sub-Saharan Africa. How about Asia? Figure 1.19 presents GDP shares of the manufacturing sector in selected countries, placing the peak of each country's inverse U shape at the centre. The US, Japan, Taiwan, Korea, China, and Thailand reached above 30% at the peak, while Malaysia and Singapore were somewhere between 25% and 30%. Indonesia climbed up to 23% while India and Viet Nam never reached 20%. Some tendency of lowering peaks may be read from the diagram.

Figure 1.19 Country Peaks in Manufacturing GDP Shares

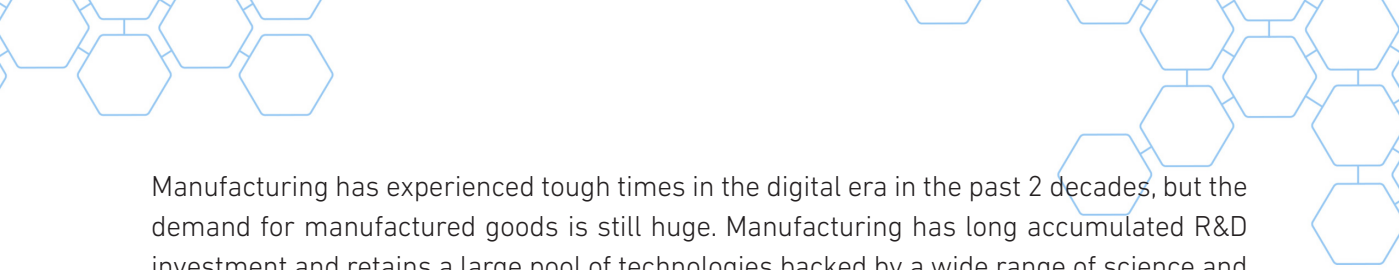


GDP = gross domestic product, US = United States.

Source: APO (2021).

However, ASEAN and developing East Asia may not need the manufacturing shares too much. Pure unskilled labour-intensive manufacturing operations in the first unbundling always look for cheap labour and thus are footloose. The region is committed to the second unbundling with more stable, thick IPNs. It is important to take advantage of fragmentation and agglomeration forces at the same time.

The demand for manufacturing goods will continue, with a gradual shift toward the quest for customised and differentiated products. Product lines will be more demand-driven, small quantities and many varieties supported by quick reshuffling of production lines will be called for, and services that labour is good at performing vis-à-vis robots will be attached. These can be realised in the extension of the second unbundling. ASEAN and developing East Asia must move up in the GVCs. The key is the thickness of industrial agglomeration and the nurturing of human capital and entrepreneurship.



Manufacturing has experienced tough times in the digital era in the past 2 decades, but the demand for manufactured goods is still huge. Manufacturing has long accumulated R&D investment and retains a large pool of technologies backed by a wide range of science and technology. The second unbundling, particularly in electronics, is the strength of ASEAN and East Asia. The next step must be to seek the possibility of combining incremental innovation and disruptive innovation.

Renewed innovation policy

ASEAN and developing East Asia have long subscribed to the conventional national innovation system model, but now is the time to combine incremental and disruptive innovation. Not only R&D, but also the deployment of technology, must be emphasised.

To do so, a favourable ecosystem for venture businesses must be prepared. First, a business environment that allows trials and errors must be provided. Venture capital and other financial facilities are needed for high-risk and high-return investment. Technology hubs are essential, including incubator centres, co-working spaces, accelerators, university education for entrepreneurs, and others. Second, human capital should be nurtured and attracted. Not only programmers, but also creative entrepreneurs, are needed. The mobility of educated people must be secured, and urban amenities to attract domestic and foreign human capital should be improved. Third, the link between technology stocks in the world and technology deployment must be strengthened. Universities and research institutes allocate resources for expanding the scope of venture businesses. Last, refrain from protecting infant industries without careful consideration. Competition and access to technology and managerial know-how are essential.

At the same time, digital infrastructure networks must be fully established under government guidance. 5G deployment, data centres, and networks are essential to digital businesses and digital transformation.

Innovation and urban amenities

Thanks to the second ICT revolution, the cost of 'face-to-face' communication via the internet has plummeted, and the use of CT was intensified by COVID-19. However, face-to-face interactions have many benefits on generating innovative ideas. How to attract creative people and activate innovation will be an important policy agenda for ASEAN and East Asia.

The US has a long tradition of fierce competition amongst cities to attract qualified workers by providing favourable urban amenities. A paper by Glaeser, Kolko, and Saiz (2001) is a seminal work that listed four key elements of urban amenities to attract well-educated people: (i) the presence of a rich variety of services and consumer goods, (ii) aesthetics and physical setting, (iii) good public services, and (iv) speed. Job opportunities and urban amenities for creative people go together and are mutually reinforcing.

Cities in ASEAN and East Asia are entering the era of competition. How to attract creative people, both foreign and local, will be crucial in the path towards a fully developed stage of development. ERIA has conducted a series of studies on GVCs, cities, and urban amenities; and Thangavelu, Kimura, and Narjoko provide policy discussion on this topic in Chapter 10.

Digital governance

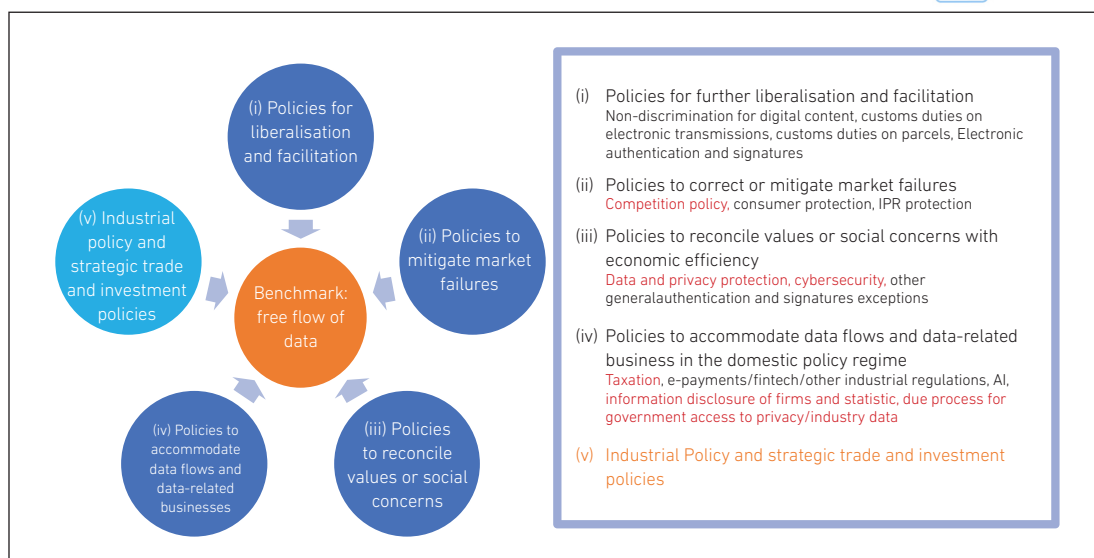
In the digital era, policies related to data and data-related businesses are essential. However, quite often, these policies are introduced and implemented without a solid basis of economic logic. The potential costs of improper data-related policies are huge.

Chen et al. (2019) provided an overall policy framework of data flows and data-related businesses (Figure 20). The standard economic approach to justify economic policies is to set a laissez-faire economy as a benchmark and justify policies as measures to correct distortion. In this case, a situation with free flow of data is set as a benchmark. An economy with free flow of data basically provides efficiency, but some government intervention may be needed for enhancing efficiency and addressing economic and social concerns. There are five categories of possible policies:

- (i) Policies for further liberalisation and facilitation
- (ii) Policies to correct or mitigate market failures
- (iii) Policies to reconcile values or social concerns with economic efficiency
- (iv) Policies to accommodate data flows and data-related businesses in the domestic policy regime
- (v) Industrial policy and strategic trade and investment policies

Examples of policies in each category are listed in Figure 1.20.

Figure 1.20 Digital Governance to Support the Free Flow of Data



AI = artificial intelligence, IPR = intellectual property rights.

Source: Chen et al. (2019).

Policies in red font in Figure 1.20 are pending policy issues. Privacy protection is the most controversial and can be easily politicised. Excessive or inefficient protection may deter data flows substantially and may end in isolation from the digital world;¹⁸ a careful review of other countries' examples is needed, and efforts to form an international consensus should continue. For giant platforms, competition policy and taxation, together with information disclosure, must be established. Discipline regarding government access to private data is another important element in the digital economy. The importance of cybersecurity calls for international cooperation (e.g. a surveillance mechanism like the one monitoring the financial market, and establishing a joint task force to coordinate and/or synchronise actions against fraudulent attacks).¹⁹

The WTO Joint Initiative on E-commerce statement appears to have made some progress, but it will be difficult to develop a holistic policy framework at the multilateral level in the short run. Even amongst ASEAN and East Asia, large differences remain in the regulatory framework and the basic philosophy on digital governance. However, the speed of technological progress and business innovation is fast, and the establishment of an international policy framework for free flow of data with trust is an urgent need. Initiatives for like-minded countries must be promoted to create new international rules.

¹⁸ For example, unleashing the potential of data sharing in the social dimension enables the effectiveness of using an application to trace COVID-19 and supports measures to control the COVID-19 pandemic.

¹⁹ Chen discusses the way to achieve free flow of data with trust in Chapter 5.



Moving forward, institutionalising governance structures and mechanisms – e.g. in-country coordination and consultations amongst agencies in charge of digitalisation, effective stakeholder engagement with industries, and a monitoring system for various digitalisation initiatives – might help. Further, such best practices could be shared and cooperation with related regional organisations could be enhanced to increase the effectiveness of the monitoring system.

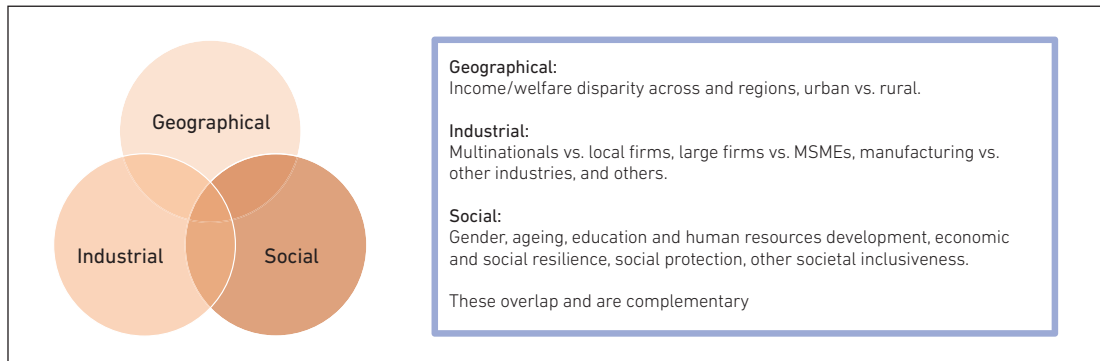
Inclusiveness

Three dimensions of inclusiveness

Inclusiveness or equity is an important value that cannot be fully achieved through economic efficiency. Achieving inclusiveness is sometimes economically costly, but inclusiveness and economic efficiency are not necessarily substitutes. Whenever possible, we must look for the use of economic forces to achieve inclusiveness.

Inclusiveness is a popular word in political discourse, but the scope of inclusiveness is not necessarily clearly defined. This report conceptualises inclusiveness in three dimensions: geographical, industrial, and societal (Figure 1.21). Geographical inclusiveness addresses income or welfare disparity across countries and regions. A typical example is the development gap between urban and rural areas. Industrial inclusiveness examines gaps between different industrial sectors such as multinationals versus local firms, large firms versus micro, small, and medium-sized enterprises (MSMEs), manufacturing versus other industries, and formal versus informal sectors. Societal inclusiveness covers various societal gaps in terms of gender, ageing, education and human resources development, access to medical services, economic and social resilience, social protection, and others. These three kinds of inclusiveness issues partially overlap but may require different policies and social movements.

Figure 1.21 Three Dimensions in Inclusiveness



MSMEs = micro, small, and medium-sized enterprises.

Source: ERIA (2012).

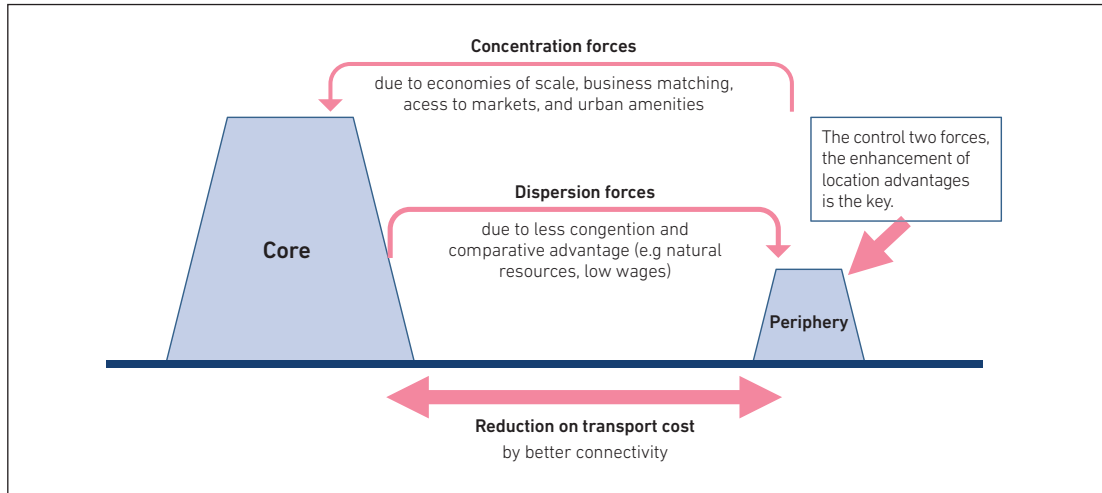
Geographical inclusiveness

Achieving a balance between urban and rural areas has been a big challenge in economic development. Rural areas tend to be isolated from the development of urban areas, and thus the betterment of connectivity is one of the essential policies. However, connectivity alone may not automatically enhance the welfare of rural people. What else is needed? The new economic geography provides a useful conceptual framework.

Figure 1.22 illustrates the basic structure of the new economic geography on the location of economic activities.²⁰ There is a core and a periphery, which can be interpreted as urban and rural areas. When transport costs between the core and the periphery fall, two forces on economic activities are generated. One is concentration forces. The core develops agglomeration, which creates two kinds of positive agglomeration effects: economies of scale in production and proximity to markets. These make the core attract economic activities. The other is dispersion forces. Agglomeration also generates negative agglomeration effects or congestion in the form of land price hikes, wage increases, traffic jams, and pollution. In addition, the periphery may have some type of location advantage, such as the availability of inexpensive labour. This causes some economic activities to move out of the core to the periphery. For geographical inclusiveness, policymakers may want to move some economic activities to the periphery. To do so, an assessment of the balance between concentration forces and dispersion forces is important. To control two forces, the enhancement of location advantages in the periphery, such as the development of industrial estates, is often necessary.

²⁰ The theory of the new economic geography was presented by Fujita, Krugman, and Venables (1999) and Baldwin et al. (2003).

Figure 1.22 The New Economic Geography – Concentration and Dispersion Forces

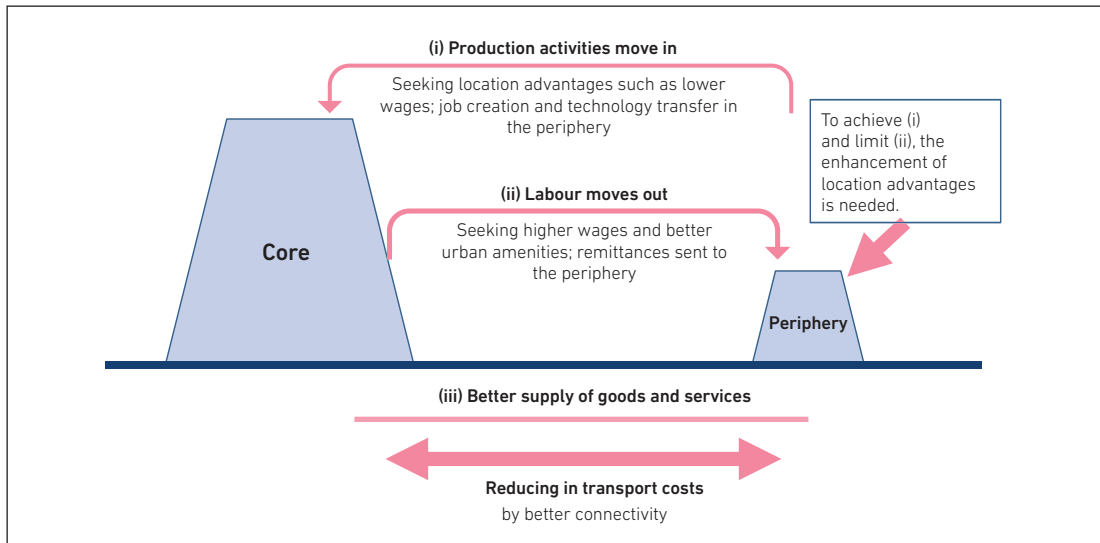


Source: ERIA (2010).

To make this thought experiment more realistic, we introduce the movement of people or labour and digital technology in addition to the movement of economic activities. Figure 1.23 illustrates three measures to improve the welfare of rural people when transport costs between the core and the periphery decline. The first is to move economic activities from the core to the periphery by providing good location advantages in the periphery. The availability of inexpensive labour is an element of location advantages, and the construction of industrial estates with reliable economic infrastructure services may work to some extent. In addition, the use of digital technology, particularly CT, must be aggressively promoted to make food processing, cottage industries, and possibly software outsourcing enjoy larger markets.²¹

²¹ Zen discusses various aspects of rural development in ASEAN and East Asia in Chapter 13.

Figure 1.23 Three Ways to Enhance Geographical Inclusiveness



Source: ERIA (2020).

The second is to allow workers to move from the periphery to the core and send part of the money earned back to the periphery. In the process of industrialisation, some people from rural areas move to urban and suburban areas, making rural households richer. However, if this goes too far, rural areas are hollowed out. The balance between the two measures is important.

The third is better supply of goods and services for the periphery. This effect should not be understated; the welfare of rural people could be substantially improved. By overcoming the digital divide at least partially, digitalised services can be delivered by overcoming geographical distance.

These are the essence of policymaking to achieve a balance between urban and rural areas.

Industrial inclusiveness

Industrial inclusiveness is a serious issue. There exists a huge development gap between large companies and MSMEs. There is a long-lasting debate on whether governments should provide subsidies or other preferential arrangements for MSMEs or not. In any case, we must at least remove disadvantageous conditions to cancel out market failures.

Policies for SME development in AMS are systematically reviewed by the SME Policy Index (OECD and ERIA, 2018) in eight dimensions:

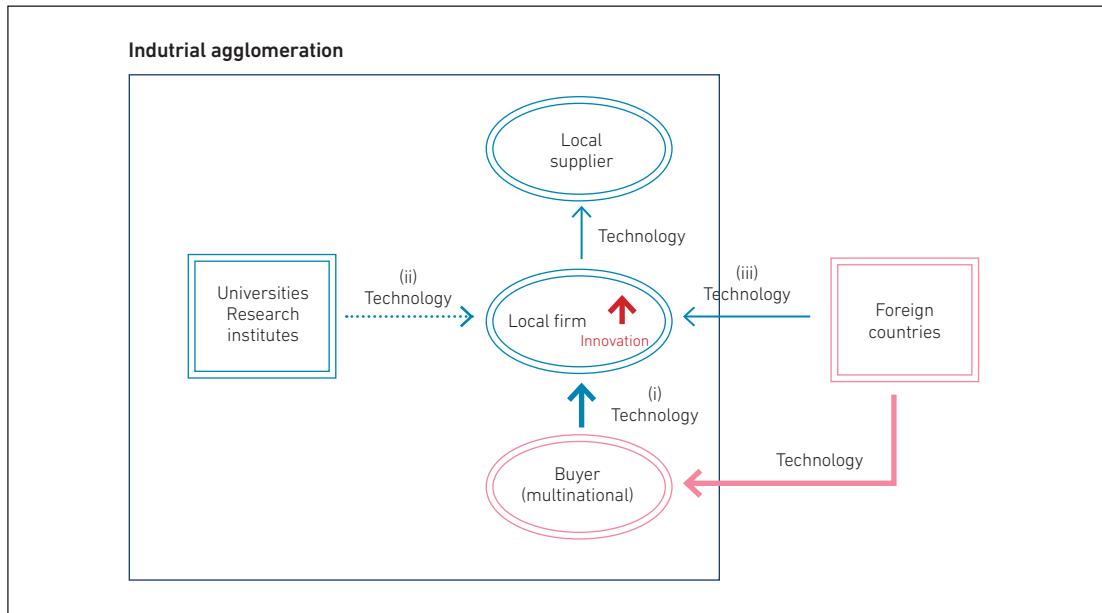
- (i) Productivity, technology, and innovation
- (ii) Environmental policies and SMEs
- (iii) Access to finance
- (iv) Access to market and internationalisation
- (v) Institutional framework
- (vi) Legislation, regulation, and tax
- (vii) Entrepreneurial education and skills
- (viii) Social enterprises and inclusive SMEs

At a lower development stage, SMEs tend to have internal constraints regarding product quality and delivery timing, business plans, bookkeeping, entrepreneurship, and engineers; thus, building up basic capability at the firm level should be a priority. At a higher development stage, external constraints become crucial; solving market failure through better access to finance, market/matching, and technological resources will be important.²²

Filling the gap between multinationals and local firms is often crucial. For the manufacturing sector, a number of empirical studies have confirmed vertical technology spillovers; the seminal work is Javorcik (2004). Based on an extensive questionnaire survey in ASEAN, Kimura, Machikita, and Ueki (2016) found that local firms get access to technologies through technology transfer from multinational buyers in the same industrial agglomeration. In general, firms in developing countries may obtain technologies (i) directly from foreign countries, (ii) through domestic universities and research institutes, and (iii) through vertical links with multinational plants in the country (Figure 1.24). While Japan, Korea, and Taiwan used to depend mainly on the first and second channels, ASEAN takes advantage of the third channel, at least for process innovation or productivity upgrading. Industrial agglomeration nurtures inter-firm linkages.

²² In Chapter 14, Narjoko reviews MSME responses to COVID-19 and discusses the way forward.

Figure 1.24 Channels to Obtain Access to Technologies in ASEAN



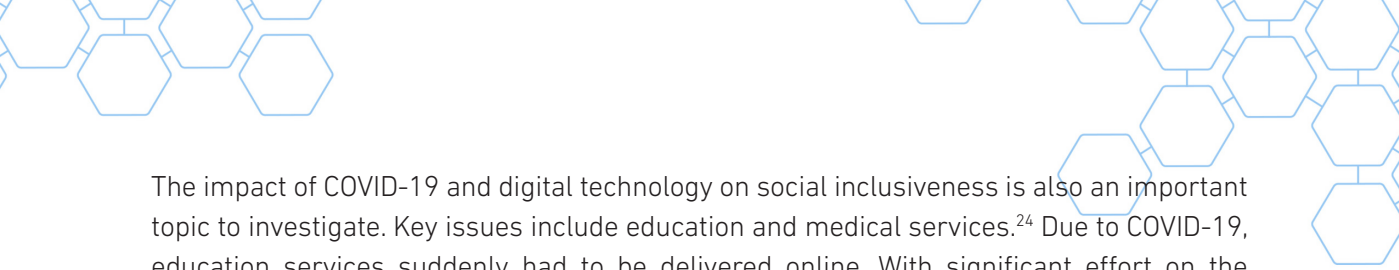
Source: ERIA (2015).

Aggressive use of digital technology should also be promoted. COVID-19 has accelerated the use of CT in GVCs. SMEs are generally slow in adopting digital technology but need to catch up with the irreversible changes. E-payments and e-IDs are penetrate further, potentially helping SMEs expand their scope of businesses. The digital divide must be resolved. Strengthening digital skills (the abilities, skills, and knowledge essential to keep up with digital transformation), education, and technical and financial support for SMEs will not only contribute to digitalisation in the region but also help them overcome their vulnerability to economic shocks in the post-pandemic era.

Social inclusiveness

Social inclusiveness covers various aspects of the economy and society. Some items require not only government policies and regulations but also people's awareness. Gender, ageing, and persons with disabilities exemplify such issues.²³

²³ The Healthcare Unit of ERIA has conducted several studies on ageing and basic healthcare, and discussion papers cover issues such as gender (Sey, 2021) and persons with disabilities (Crosta et al., 2021).



The impact of COVID-19 and digital technology on social inclusiveness is also an important topic to investigate. Key issues include education and medical services.²⁴ Due to COVID-19, education services suddenly had to be delivered online. With significant effort on the ground, the use of CT by educational services has drastically advanced. However, at the same time, regional and income disparity have stood out in the capability of CT use. CT usage will remain to some extent even after COVID-19, depending on the level of education. Inclusiveness must be enhanced not only for short-run equity but also for nurturing human capital for the future.

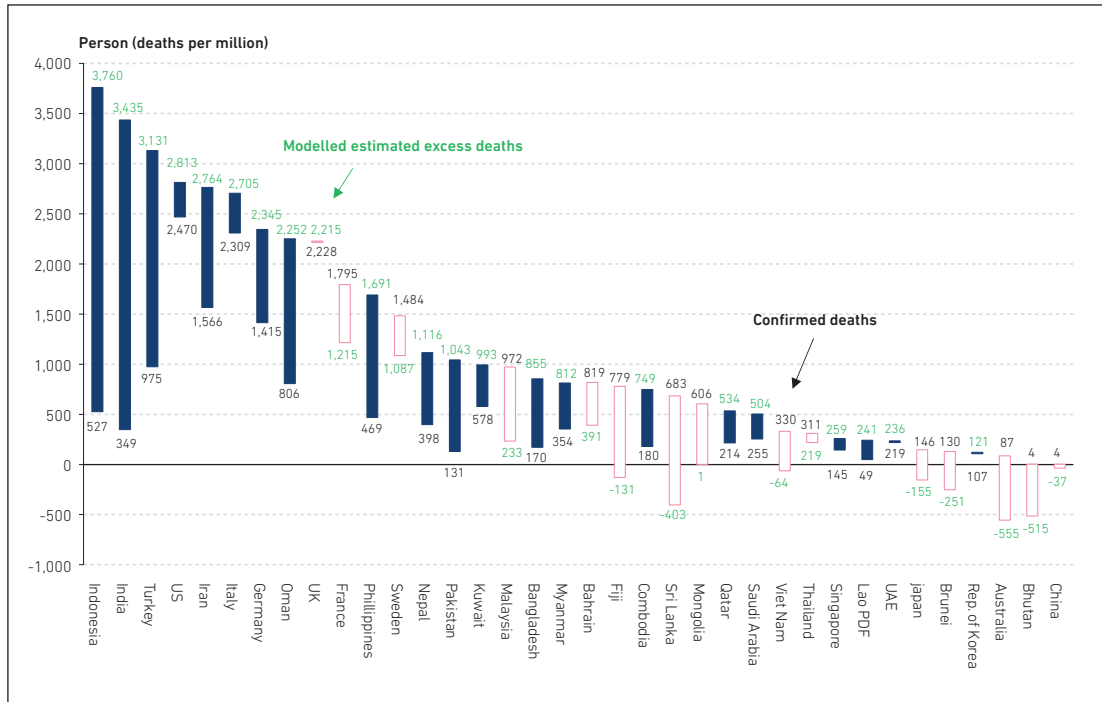
The capability of medical services has attracted attention since the beginning of the pandemic. Figure 1.25 presents the confirmed COVID-19 deaths and estimated excess deaths per million population up to the end of 2021 in selected countries, based on the World Health Organization (WHO). The number of confirmed COVID-19 deaths per million is not very high in Asian countries compared with the US and European countries. However, excess deaths per million estimated from the past trend are large in some countries. The gaps between estimated excess deaths and confirmed deaths are positive and large in Indonesia, India, and the Philippines. Although the reason why these countries have positive gaps must be carefully investigated, a possible hypothesis is that the gap comes from the underreporting of COVID-19 deaths or excess deaths from other diseases or injuries due to the lack of capacity of medical facilities.²⁵ In any case, these figures alert us to assess the quality and quantity of medical facilities and services. Basic universal health coverage is essential, and the hierarchy of levels of medical facilities must be well organised. We must also take advantage of digital technology whenever appropriate.²⁶

²⁴ Shrestha discusses the education and skill development system in detail in Chapter 9.

²⁵ Suriastini et al. (2022) reported the results of a phone survey in two waves for older people in Indonesia during COVID-19.

²⁶ Yong reviews the healthcare system in the region in Chapter 15 and calls for digitalisation.

Figure 1.25 Confirmed COVID-19 Deaths and Estimated Excess Deaths
(as of 31 Dec 2021)



UAE = United Arab Emirates, UK = United Kingdom, US = United States.

Source: APO (2022). The original data are from World Health Organization and World Bank website.

Another long-term issue is financial inclusion. Access to the payment system and bank accounts has drastically improved with the introduction of smartphones, e-payments, and e-bank accounts, including poor rural people. Various kinds of fintech have also proliferated. Digital technology is changing the paradigm though many things remain to be done to improve financial inclusion.²⁷

Another big issue is social protection.²⁸ Countries with ageing populations will need to consider reform of their pension systems. Before that, health insurance is a priority. Some sort of universal coverage would be the immediate issue. In the private sector, life and auto insurance markets are expanding. Traditional social protection through family ties still exists, but the need to provide formal social protection will intensify in the future.

ASEAN and developing East Asian countries do not have strong progressive tax system and income redistribution measures yet. In the future, this will be an important political issue.

²⁷ Cavoli and Shrestha (2021) is a recent study on financial inclusion, including the impact of digital technology.

²⁸ ERIA publications on social protection include Asher and Kimura (2015).

Sustainability

Multidimensional issues for sustainability

The distant future presents many uncertainties. Life is short, and we may not be able to care about the life of our descendants as much as ours, but we can begin by looking at repercussions of the rapid economic growth in the past two centuries and try to avoid a possible crisis for humanity.

At the same time, we should address large development gaps that remain across countries and regions. Developing countries have strong aspirations for economic growth. Economic growth and sustainability must be balanced.

For ASEAN and East Asia, sustainability is not only a long-term goal but also an immediate challenge. Climate change is one challenge that must be addressed immediately. Although the causality may not be well verified, fluctuation in rainfall and frequent typhoons are now annual events. Sea levels are rising. Resource management, particularly water and waste management, are urgent issues. The region is prone to various natural disasters, and an organised system of preparation, rescue, and recovery must be established. How to make sustainability solutions complementary to economic development is key for the region, with countries at different development stages.

Towards a low-carbon economy

Decarbonisation is now a worldwide mission, and countries declaring net zero emissions goals by 2050 or 2060. COVID-19 slowed energy consumption, but the green movement has rather intensified, particularly in Europe. Although the Russia–Ukrainian War is forcing some countries to return to fossil fuels at least temporarily, the move towards decarbonisation is likely to continue.

ASEAN and East Asia have grown on the basis of manufacturing, and some countries heavily depend on fossil fuels. ERIA regularly publishes the *Energy Outlook and Energy Saving Potential in East Asia* to review the long-term energy outlook of the East Asia Summit countries (Kimura and Han, 2021). The report indicates that extra efforts may be required in the region. The long-term transition scenario of primary energy composition must meet energy demands driven by economic and population growth. Not only the supply quantity

and carbon dioxide (CO₂) emissions but also elements such as costs and prices, safety and stability, daily/seasonal volatility and complementarity, storability, and others must be carefully considered. The demand side of energy can also do many things. There is huge potential for energy saving and technological progress in industry, transport, homes, and services. International trade and collaboration, such as power grid connections, could also be promoted. The role of the private sector in decarbonisation and environmental issues is increasing.²⁹ Some companies are trying to establish clean supply chains, and the financial sector prioritises green investment. These efforts must be strengthened further.³⁰

Environmental concerns will soon be linked to trade policy. The EU is about to introduce the Carbon Border Adjustment Mechanism, in which the producer side primarily bears the cost of emissions. This will create heated debate.

Resource management and environmental issues

Resource management, other than energy, is also an important sustainability topic for ASEAN and East Asia. Resources may include water, forests, biodiversity, fisheries, and other natural resources. Some issues related to water and fisheries, for example, are cross-border so international coordination may be needed. Technical collaboration, including the introduction of digital technology, must be developed by countries in the region.

Waste management is an urgent matter in many urban and suburban areas in the region. Plastic debris has recently attracted special attention, for which ERIA established the Regional Knowledge Centre for Marine Plastic Debris for ASEAN+3.³¹

ASEAN is promoting the circular economy, for which ERIA is providing policy research.³² The movement of smart cities also promotes efficient resource circulation as well as innovation capabilities of cities.³³ To solve environmental problems with new technologies (e.g. Industry 4.0, and digital and smart technology), collaboration frameworks with governments, technology developers/suppliers, environmental specialists, the financial sector, and international organisation must be established (Chapter 18). These are important initiatives for the region.

²⁹ Iwasaki and Ueki discuss the development of electric vehicles and the introduction of digital technology in automobile-related sectors in Chapter 12.

³⁰ Kimura et al. provide a holistic view of the energy/resource transition in the region in Chapter 17.

³¹ <https://rkcmpd-eria.org/>

³² <https://www.eria.org/news-and-views/eria-supports-development-of-framework-for-circular-economy-for-the-asean-economic-community/>

³³ Anbumozhi discusses the concept of smart cities and their possible links with the development of new industries in Chapter 11.

Disaster management

ASEAN and East Asia are vulnerable to natural and disasters induced by human behaviour such as drought, floods, typhoons, earthquakes, tsunamis, volcanos, and others. We must learn to live with such disasters. Three important elements for disaster management are preparedness, early responses, and recovery. The region is accumulating good and bad experiences, and countries can learn from each other. The introduction of new technologies such as the use of satellites, early warning systems, and quick rescue schemes should be promoted.

COVID-19 made people think of the risk of GVC disruptions. The best way to make GVCs robust and resilient is to provide more choices for the private sector to extend and diversify its networks. Participation in GVCs by developing countries through improving location advantages and connectivity helps further diversification and better risk management. Our region can be an attractive place for it.

To make GVCs robust and resilient, digitalisation of supply chains and support for trade and market integration are also of great importance. Amongst the immediate actions are investment in digital technologies that can be used for mapping and monitoring supply chains to identify potential risks and bottlenecks. Facilitating cargo clearance and investment in e-commerce platforms will enable fast and secure cross-border movement of goods and services for economic recovery. Supply chains have been built upon the private sector's efforts and activities, and governments have been working towards developing the market environment. Going forward, it might be necessary to work towards a 'quality supply chain' through more public-private coordination, including the standardisation of data sharing and making an ecosystem where not only large companies but all industry players benefit from digitalisation of end-to-end supply chains.



Conclusion

This chapter claims that new development strategies for ASEAN and developing East Asia must be based on four pillars: integration, innovation, inclusiveness, and sustainability.

Integration is always at the core of development strategies. ASEAN and developing East Asia have an advantage in their capability of using three types of international division of labour – i.e. the first to the third unbundling – at the same time. The region should continuously commit to globalisation to accelerate economic development.

Digital technology has changed innovation. ASEAN and developing East Asia must shift their weight from national innovation systems with heavy R&D to accelerating technology deployment. The combination of incremental and disruptive innovation may transform the manufacturing sector into a creative industry again.

Inclusiveness in three dimensions – geographical, industrial, and societal – is an important value for ASEAN and East Asia. Whenever possible, the region should use economic forces to achieve inclusiveness before resorting to income/welfare redistribution.

Sustainability must be achieved with economic growth and enhancement of people's welfare. Decarbonisation, resource management, and disaster management are not only long-term goals but also immediate challenges. The deployment of new technologies will help us with international collaboration.

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