

# Non-Equity Modes of Trade in ASEAN

Promoting new forms of trade between  
Japan and ASEAN

PAPER 8

J U L Y  
2021

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**ASEAN-JAPAN CENTRE**

ASEAN Promotion Centre on Trade, Investment and Tourism



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## NOTES

The terms “country” and “economy” as used in this study also refer, as appropriate, to territories or areas. The designations employed and the presentation of the material do not express any opinion whatsoever on the part of the ASEAN-Japan Centre concerning the legal status of any country, territory, city or area, or of the authorities, or of delimitations of frontiers or boundaries.

The tables use the following symbols:

- Two dots (..) indicate that data are not available or are not separately reported.
- A dash (-) indicates that the item equals zero or its value is negligible.
- Use of an en-dash (–) between dates representing years, e.g., 2015–2016, signifies the full period involved, including the beginning and end years.
- Reference to S\$ means Singapore dollars and just “dollars” (\$) means United States dollars, unless otherwise indicated.

The series includes 10 papers in total. Eight (Cambodia, Indonesia, Lao People’s Democratic Republic, Malaysia, Myanmar, Philippines, Thailand and Viet Nam) have been published. The other papers are being produced subsequently.

Paper 1. Brunei Darussalam

Paper 2. Cambodia (published in August 2019)

Paper 3. Indonesia (published in March 2021)

Paper 4. Lao People’s Democratic Republic (published in March 2020)

Paper 5. Malaysia (published in July 2021)

Paper 6. Myanmar (published in March 2020)

Paper 7. Philippines (published in March 2018)

**Paper 8. Singapore**

Paper 9. Thailand (published in April 2020)

Paper 10. Viet Nam (published in December 2018)

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## KEY MESSAGES

- Foreign direct investment (FDI) and non-equity modes (NEMs) of trade have a symbiotic relationship in Singapore. They complement each other. Positive network effects exist between FDI and NEMs, which creates a strong feedback loop as FDI and NEMs are mutually reinforcing.
- NEMs could be a key factor in changing the way foreign investment is conducted and consequently the impact on a country's growth and development.
- NEMs are prevalent in new industries that require high technology.
- Remaining agile and not being overly dependent on one industry are important. For instance, Singapore has transitioned from hard disc drives to semiconductors in the electronics industry.
- Singapore hosts the entire semiconductor value chain, involving both FDI and NEMs. NEMs include outsourcing in semiconductor assembly and test companies and subcontracting in the form of contract electronics manufacturing.
- Singapore managed to develop a strong ecosystem in the biomedical sciences industry. This encouraged the development of NEMs such as subcontracting and licensing through contract manufacturing organisations and contract development and manufacturing organisations.
- The development of data centres is a potential source of growth for Singapore and ASEAN. NEMs in the form of leasing play a major role for the data centre co-location market.
- The Singapore hotel industry includes both FDI and NEMs through management contracts. For instance, a Qatar-based company, Katara Hospitality, owns Raffles Hotel, which is managed by AccorHotels, a French multinational hospitality company.
- Key opportunities and challenges for NEMs include geopolitics and free trade agreements. Technology will be a key enabler for the growth of NEMs in Singapore.
- In Singapore, the Future Economy Council has proposed a S\$4.5 billion Industry Transformation Programme tailor made for 23 industries. The Singapore government has also embarked on a national movement called SkillsFuture. These policies will support the growth of NEMs.
- Given the COVID-19 pandemic, NEMs could play a more important role in the future due to the lower risk involved and growing need for diversification.





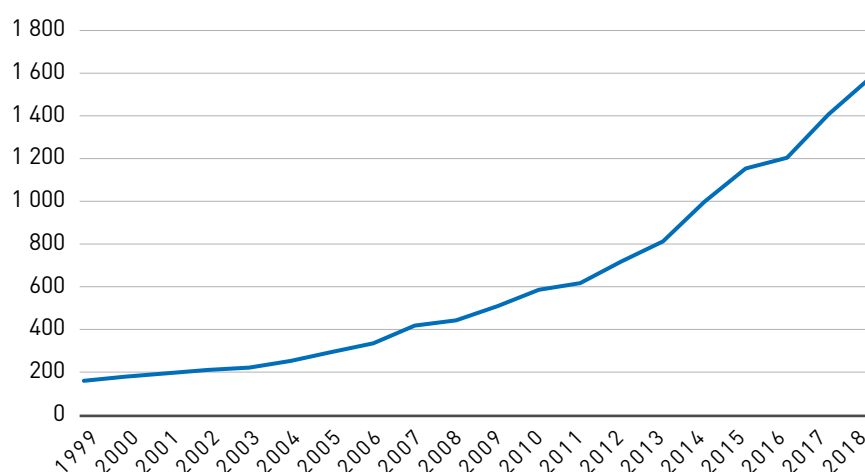
## 1. INTRODUCTION

The study of global value chains (GVCs) has been of great interest in recent years (see Ponte 2019 for a comprehensive review). Improvements in information and communication technology and economic integration have enabled different stages of the production process to be completed across different countries. This gives rise to myriad opportunities for firms to expand across countries in different ways.

Traditionally, firms expand and engage in GVCs through foreign direct investment (FDI), which takes the form of a controlling ownership in a business in another country. However, the use of non-equity modes (NEMs) of trade has increased. Under a NEM, a foreign company controls a domestic company using contract specifications regarding design and quality, production standards or required business model. This includes contract manufacturing, services outsourcing, contract farming, franchising and licensing (UNCTAD 2011).

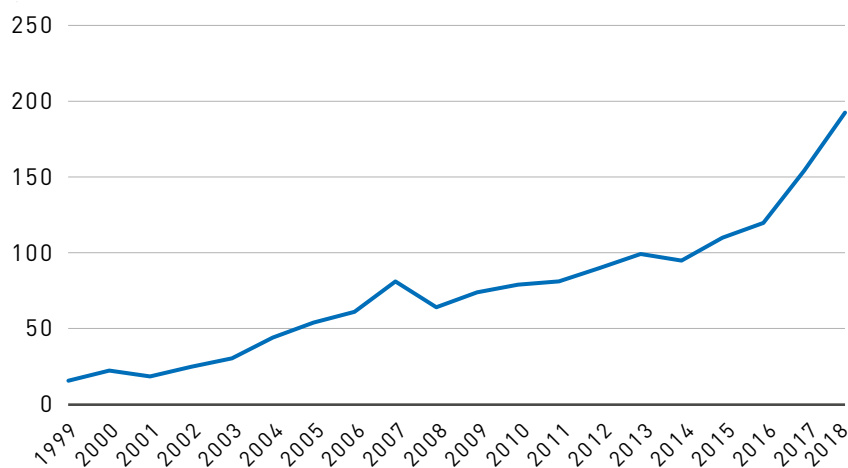
This paper studies the case of Singapore within the overall framework of the NEM project by the ASEAN-Japan Centre (AJC) (box 1). Singapore receives some of the world's largest amounts of FDI, drawing investments globally. Figure 1 presents the annual FDI stock in Singapore from 1999 to 2018. FDI stock in Singapore has been increasing at an accelerating rate. In 2018, FDI stock in Singapore was more than S\$1.5 trillion.<sup>1</sup> FDI earnings were close to S\$200 billion (figure 2). This underscores the confidence of transnational corporations (TNCs) in the Singapore economy.

Figure 1. FDI stock in Singapore, 1999–2018 (S\$ Billions)



Source: Singapore Statistics.

<sup>1</sup> In 2020, S\$1 was approximately \$0.73.

Figure 2. FDI earnings in Singapore,<sup>a</sup> 1999–2018 (S\$ Billions)

Source: Singapore Statistics.

<sup>a</sup> Includes earnings on equity investments and net income on debt.

In addition, Singapore actively invests overseas through its sovereign wealth fund, Government Investment Corporation of Singapore, and investment company, Temasek Holdings. From Vietcombank, the largest bank in Viet Nam by bank capitalization to Greenko Energy Holdings, an Indian renewable energy company, Singapore invests internationally across a wide variety of sectors. This strengthens the position of Singapore as a business gateway and hub for investments. Studying the role of NEMs in a small and open economy like Singapore may yield valuable insights.

While much research has studied the impact of FDI in Singapore (e.g., Le and Le 2020), little work addresses the role of NEMs in Singapore. This study contributes in two ways.

First, the study highlights the importance of NEMs in Singapore. Singapore is unique as its past economic growth model was highly dependent on foreign trade and investment (Lee 2014). In addition, Singapore is a high-income economy with gross domestic product (GDP) per capita of \$65,233 in 2019. It is also a highly capital-intensive economy. We seek to study how non-equity modes of operation could affect advanced industries and the future economy of Singapore as Singapore moves further up the technology ladder.

In the AJC series of papers on “Non-Equity Modes of Operation in ASEAN—Promoting New Forms of Trade between Japan and ASEAN”, evidence indicates that NEMs are prevalent in all three sectors—primary, manufacturing and services—in ASEAN. For instance, contract farming and growing is prevalent in the primary industry. From bananas in the Philippines to chicken meat in Thailand and then rice and bean production in Myanmar, NEM exports play a crucial role in the primary sector. This paper complements the AJC series of papers by focusing primarily on advanced and new industries in Singapore.

In this paper, the focus is on five industries in Singapore that can leverage NEMs. They are electronics, pharmaceutical products, data centres, the food and beverage industry and hotels. Technology will be found to be a key enabler for the growth of NEMs in Singapore. This includes advancements in financial technology (FinTech), artificial intelligence and advanced medical sciences. In addition,

foreign investors use Singapore as a gateway to ASEAN markets to test new concepts. They do so through franchising and management contracts. This includes the food and beverage industry and the hotel industry.

The second contribution of this paper is to underline the relationship between FDI and NEMs. This study finds that Singapore enjoys both FDI and NEMs, which further cements its role in GVCs. Foreign companies leverage the business-friendly environment and supportive government policies in Singapore and set up headquarters in the city state. Through FDI, TNCs create a strong ecosystem and export to the rest of the world through Singapore. To complement the industry, there is a growth in NEMs such as subcontracting, outsourcing and leasing. This strengthens the attractiveness of Singapore as a regional headquarter, attracting more FDI.

As FDI and NEM mutually reinforce each other, a strong feedback loop develops. Consequently, positive network effects arise as the industry grows when more firms enter the market in Singapore and becomes more valuable. For instance, in the growing data centres, while TNCs have built large-scale facilities in Singapore (through FDI), they are insufficient to meet their needs. Hence, they turn to leasing (NEMs). This attracts huge investments in global fibre networks and increases global interconnectivity. A reputation for network reliability led to an increase in demand from other companies as well. In turn, this attracts more FDI and NEMs.

Studying non-equity modes of trade is important. The impact of FDI on growth and development is ambiguous. On one hand, foreign investments can produce externalities in the form of technology transfers and spillover effects, leading to an increase in productivity in the economy (Romer 1994). On the other hand, Boyd and Smith (1992) show that FDI could actually hurt resource allocation, leading to a fall in economic growth. Empirical studies such as Carkovic and Levine (2003) also show that FDI has little positive impact on economic growth. However, this could be attributed to other factors such as financial intermediation. For instance, Alfaro et al. (2004) show that countries with well-developed financial markets benefited from FDI.

By highlighting the intricate relationship between NEMs and FDI, another channel may be identified in which FDI could influence and enhance further growth and development. Effectively, NEMs could be a key factor in changing the way foreign investment is conducted and consequently affect a country's growth and development.

The paper proceeds as follows: Section 2 explains the characteristics and scope of NEMs by type and studies specific types that are unique to Singapore. Section 3 discusses the opportunities and challenges in selected industries and analyses the implications of NEMs for the Singapore economy. Section 4 concludes by providing policy implications.

#### Box 1. The NEM project of the ASEAN-Japan Centre

Arm's-length relationships and equity holding are not the only means of exerting control over GVCs. Companies can also enter into contractual relationships with other independent firms. Such trade is gaining importance as the system of global production becomes more integrated and value chains form. This is an area in which a lack of knowledge and a huge gap in research exist in ASEAN. An overall analytical framework is needed to assess development impacts and to propose a policy framework for dealing with these transactions.

.../

**Box 1. The NEM project of the ASEAN-Japan Centre (Concluded)**

The fundamental difference from normal trade is that non-equity forms of operations relate to a contractual partnership between private parties. The role of the state in this partnership is limited to setting the framework conditions within which the private parties can freely negotiate the terms of their cooperation. By understanding this phenomenon better, including its scale and scope, and filling in a policy analysis gap, the AJC, through a 10-paper series on NEMs in ASEAN, provides each ASEAN country government with policies to consider to fully benefit from these new forms of trade and from investment.

To understand better the scale and scope of non-equity involvement in major industrial sectors, a case study approach is employed whenever appropriate. The reasons for taking this approach are two-fold: (1) balance of payments and supplementary statistics do not provide the details necessary to accurately measure cross-border non-equity participation, and (2) the relevant microdata are fragmented and disconnected. As much as possible, each case study builds on existing research and statistics.

New opportunities are opening for ASEAN countries through the international innovation networks of TNCs. Although attracting FDI and encouraging foreign TNCs to establish affiliates remain important options for ASEAN countries, governments also need to review current regulatory regimes in the context of these international innovation networks. A key objective of this study is to make recommendations on which policies (investment and industrial) governments should consider to fully benefit from emerging opportunities in NEMs.

Source: AJC.

## 2. CHARACTERISTICS AND SCOPE OF NEMS

This section discusses the key features of the Singapore economy that promote the use of NEMs in Singapore and the types of NEMs in Singapore.

### 2.1 Scale and scope

Singapore has a population of 5.6 million with an area of 728 km<sup>2</sup>. Due to its small domestic market, an economic strategy for Singapore is to develop into a leading hub in Asia. This is achieved in the following ways.

First, the government seeks to create a pro-business environment. In 2019, Singapore was again named the world's most competitive economy according to the World Economic Forum's *Global Competitiveness Report 2019* and the Institute for Management Development's *World Competitiveness Ranking*. Together with New Zealand, Singapore was also consistently named among the top two countries in the World Bank's *Ease of Doing Business* rankings from 2006 to 2020 (World Bank 2020).

Second, Singapore has a strong and reliable intellectual property regime that is recognised globally. In 2019, it ranked fourth among 129 countries on the International Property Rights Index by the Property Rights Alliance. Led by the Intellectual Property Office of Singapore, Singapore aspires to be a global intellectual property hub in Asia. It has forged multiple partnerships with countries around the world and helped Singapore companies access international markets.

Furthermore, strong partnerships have been forged among trade unions, employers, and the government in Singapore. Known as Tripartism, the trade unions, represented by the National Trades Union Congress; the employers, represented by the Singapore National Employers Federation, and the government, represented by the Ministry of Manpower work together on issues such as wages, employment practices and skills upgrading. Such collective action creates a win-win situation for all parties involved.

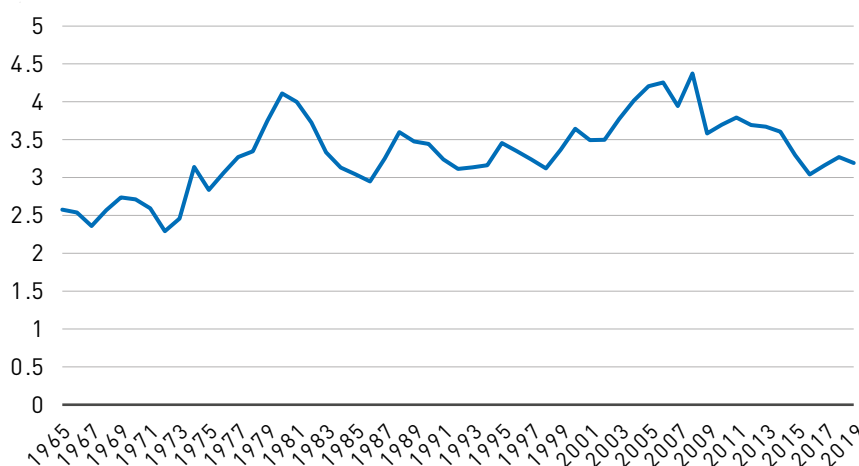
With a competitive economy, intellectual property protection and strong labour force, Singapore has attracted companies to set up their regional headquarters in Singapore. There are 4,200 regional headquarters currently based in Singapore (Ernst & Young 2019). This is the largest number in the Asia-Pacific region. As a hub in the region, Singapore has become a location of choice for firms to expand, which involves both FDI and NEMs.

Physically, Singapore is connected globally through its reputable seaports and airports. As the largest transshipment hub in the world, the port of Singapore is connected to more than 600 ports in more than 120 countries. Changi Airport has also been recognised globally—having been awarded the World’s Best Airport in the Skytrax World Airport Award from 2013 to 2020. According to the DHL Global Connectedness Index 2020, Singapore is the second most connected country in the world, after the Netherlands.

Consequently, Singapore is one of the world’s most open economies. Singapore tops the McKinsey Global Institute Connectedness Index in terms of how countries take part in the inflows and outflows of goods, services, finance, people and data. This is followed by the Netherlands, the United States and Germany (McKinsey Global Institute 2016). According to the INSEAD’s Global Talent Competitiveness Index 2020, Singapore is ranked number one in the Asia-Pacific region and number three globally for talent competitiveness (after Switzerland and the United States).

Singapore is traditionally a “re-export economy” (Choy 2012), and trade openness has been consistently high in Singapore. Figure 3 shows changes in Singapore trade (sum of exports and import) to GDP ratio since its independence in 1965. Singapore trade has been more than three times the size of GDP.

Figure 3. Singapore’s trade to GDP ratio, 1965–2019



Source: Singapore Statistics.

Table 1 highlights the top three exports and imports for merchandise trade and services in 2019. In terms of merchandise trade, the top three sectors are machinery and transport equipment, chemicals and chemical products and miscellaneous manufactured articles. Together, they account for 86 per cent of non-oil merchandise exports and 82 per cent of non-oil merchandise imports in Singapore.

In terms of services, transport, travel and business management are the primary drivers. Together, they account for 48 per cent of total service exports and 54 per cent of service imports in Singapore.

**Table 1. Non-oil exports and imports by major sector, 2019**

<b>Sector</b>	<b>Exports (in S\$ billions)</b>	<b>Exports (as a percentage of total exports)</b>	<b>Imports (in S\$ billions)</b>	<b>Imports (as a percentage of total imports)</b>
<b>Merchandise trade</b>				
Machinery and transport equipment	258.4	58.2	236.8	61.2
Chemicals and chemical products	74.8	16.9	40.8	10.5
Miscellaneous manufactured articles	48.8	11	40.5	10.5
<b>Services trade</b>				
Transport	79.7	28.5	83.4	30.7
Travel	27.4	9.8	36.3	13.4
Business management	27.3	9.8	26.2	9.7

Source: Singapore Statistics.

Nonetheless, NEMs have increased in recent years globally. The United Nations Conference on Trade and Development estimated global NEMs production at more than \$2 trillion in sales in 2010 (UNCTAD 2011). It is therefore of interest to study the growth of NEMs in Singapore. However, the analysis of NEMs is complex, as “the web of directly owned, partially owned, contract-based and arm’s-length forms of international operation of TNCs is tangled, and some of the distinctions between the different modes are blurred” (UNCTAD 2011, p. 130).

Indeed, this paper finds that NEMs and FDI are highly inter-related. While TNCs first set up in Singapore through direct investments, they have subsequently been controlled by other foreign companies (including other TNCs) through different forms of NEMs. This is true for different industries. Furthermore, NEMs grow in tandem with the development of the industry, which is driven by FDI.

Consequently, the analysis here is limited to industries in which NEMs are especially important. Table 2 shows various forms of NEMs in Singapore, which span multiple modes and industries. They include subcontracting in electronics and supply chain management, licensing in pharmaceutical companies, franchising in food and beverage industries, management contracts in hotels and leasing in data centres.

Companies that are involved in NEMs include both TNCs and (local) small and medium enterprises (SMEs). For instance, in contract manufacturing of pharmaceutical products, there is GSK, a large multinational company, and Beacons, a local SME. In franchising in the food and beverage industry, there is Subway, a large U.S. fast-food restaurant, and Ya Kun Kaya Toast, a local SME.

**Table 2. Selected non-equity modes, including examples of typical industries, in Singapore**

<b>Modality</b>	<b>Description (in the international context)</b>	<b>Typical industries</b>	<b>Company examples</b>
<b>Subcontracting</b>	Agreement whereby a TNC contracts out to a host-country firm one or more aspects of product design, processing or manufacturing; includes contract manufacturing and design and outsourcing in the case of services or business processes	Electronics	PCA Technology (Singapore)
			Watson E.P. (Singapore)
		Supply chain management	Celestica (United States)
			Flex (United States)
			Venture (Singapore)
<b>Licensing</b>	Contractual relationship in which a TNC (licensor) grants to a host-country firm (licensee) the right to use intellectual property (e.g., copyrights, trademarks, patents, industrial design rights and trade secrets) in exchange for a payment (royalty); includes brand licensing, product licensing and process licensing (cross-licensing, intra-firm licensing)	Pharmaceutical	Zuellig Pharma (Singapore)
			Bausch Health Companies (Canada)
<b>Franchising</b>	Contractual relationship in which a TNC (franchisor) permits a host-country firm (franchisee) to run a specified business modelled on a system developed by the franchisor in exchange for a fee	Food and beverage	Chateraise (Japan)
			Subway (United States)
			Ya Kun Kaya Toast (Singapore)
		Education	Heguru (Japan)
			I can read (Singapore)
<b>Management contracts</b>	Agreement under which operational control of an asset in a host country is vested in a TNC contractor that manages the asset in return for a fee	Tourism and hospitality	Intercontinental Hotels (United States)
			Marriot International (United States)
<b>Other</b>	Concessions, lease agreements, build-operate-transfer arrangements and the like, in the context of public-private partnerships	Data centres	Singtel Data Centre (Singapore)
			Keppel Data Centre (Singapore)

Source: AJC.

## 2.2 NEMs by modality

Many foreign firms and TNCs do business via NEMs with local partners in various industries in Singapore. Their involvement in NEMs and their contribution to the economy vary by modality and industry.

This sub-section examines the outsourcing, subcontracting, leasing, franchising and management contract modalities by focusing on particular industries that rely on those modalities. For each NEM, there are a few case studies that are representative of the industry.

### (1) Outsourcing and subcontracting: electronics

The electronics industry is a key pillar of the Singapore economy. Electronics include integrated circuits, disk drives, diodes, transistors and consumer electronics. In 2019, the industry accounted for S\$100 billion, which is more than a quarter of manufacturing GDP in Singapore. More than 2,900 companies currently employ 70,000 workers in this industry. (See Iswaran 2017 for a review of the past and future of the electronic industry.)

The semiconductor sector is one of the most important sectors in the electronics industry. Semiconductors are used in the manufacture of different electronic products and have a wide range of application due to their efficiency and reliability. While TNCs make up the majority of the 60 semiconductor companies in Singapore, Singapore hosts the entire semiconductor value chain, involving both FDI and NEMs. The value chain can be broken down into the following stages (Tan 2019).

The first stage for the semiconductor sector is substrate manufacturing. This involves the heating, melting and slicing of silicon into thin polished wafers. Companies in substrate manufacturing include Soitec Singapore and Siltronic Singapore. Founded in 2006, Soitec Singapore is owned by French company Soitec. Siltronic Singapore is a subsidiary of German company Siltronic. Both Soitec and Siltronic are global leaders with advanced production facilities in Singapore and are successful examples of FDI.

The second stage is the design of integrated circuits. Companies that focus primarily on design are also known to be fabless companies. They focus on the design of semiconductor chips and outsource production to contract manufacturers such as local foundries and assembly and test firms. Fabless companies include U.S. companies Xilinx and Broadcom, which have subsidiaries in Singapore. Both companies belong to the top 10 fabless companies in the world and is testimony to Singapore's ability to attract FDI.

Next is wafer fabrication and device manufacturing. This is where the manufacturing takes place. Companies that focus primarily on manufacturing are also known as foundries. This includes Singapore-based company Systems on Silicon Manufacturing and U.S. company GlobalFoundries. GlobalFoundries has five manufacturing plants (three in the United States, one in Germany and one in Singapore). This allows the company to meet the dynamic needs of its clients globally.

The last stage involves packaging and testing. In this stage, printed wafers are cut into small chips and then tested and packaged into electronic devices. Companies include outsourcing providers STATS ChipPAC and United Test and Assembly Center (UTAC), which are founded in Singapore.

Some companies are involved in the entire value chain. Also known as integrated device manufacturers (IDMs), these companies offer a full suite of services. IDMs include U.S. company Micron, European chipmaker STMicroelectronics, German semiconductor firm Infineon and Dutch semiconductor firm



NXP Semiconductors. These companies have expanded in recent years. In 2019, STMicroelectronics set up its new wafer fabrication facility, more than doubling its capacity to produce 8-inch wafers. Having invested more than \$15 billion (S\$21 billion) over the years, Micron recently expanded its facility to produce advanced 3D Nand flash memory chips in Singapore as well.

The world's leading semiconductor manufacturing companies manage to create a conducive ecosystem in Singapore, driving the growth of related companies in the industry. This takes the form of NEMs of trade such as outsourcing and subcontracting.

Outsourcing is a form of NEM in which a company hires another company to manage a specific business function. We first examine outsourcing in semiconductor assembly and test companies. STATS ChipPAC Singapore, which established itself as the first outsourced semiconductor assembly and test provider in 1994, is a case in point. It is currently a leading global semiconductor integration packaging and test provider, providing a wide range of assembly services to meet customer needs. According to the company's webpage, its customers "are some of the largest wafer foundries, integrated device manufactures (IDMs) and fabless companies in the United States, Europe and Asia".

There are also home-grown companies, such as UTAC, which provide outsourcing services in the form of assembly and test services in four product categories in semiconductors. These include analog, mixed signal and logic, memory and others. According to UTAC's 2019 annual report, the top 10 customers by revenue are Analog Devices International, Broadcom, Elmos Semiconductor, Formosa Advanced Technologies, Maxim Integrated, Microchip Technology, ON Semiconductor, Panasonic, STMicroelectronics and Texas Instruments.

Besides outsourcing, growth in subcontracting has taken the form of contract electronics manufacturing. This is a form of NEM in which companies manufacture goods on behalf of their clients. The growth in the electronics sector has led to the expansion of new contract electronics manufacturing companies being founded locally in Singapore. Companies here include PCA Technology and Manufacturing Integration Technology Ltd.

PCA Technology was established in 1990. The company provides a whole range of services from prototyping to integrated circuits assembly and packaging. According to its webpage, it currently serves "major names in the global computer peripheral, telecommunication, industrial products, household products and consumer electronic industries". Manufacturing Integration Technology Ltd. was founded in 1992 by Mr Tony Kwong. In 1999, it became a public listed company on the Singapore Exchange. It is a leading provider of integrated automation solutions. These companies seek to complement and meet the needs of TNCs in the electronics sector.

Furthermore, local companies have grown to provide additional value-added services, such as value chain management and technology ecosystems. For instance, Venture, a Singapore-based start-up company, has developed into "a leading global provider of technology services, products and solutions". Globally, it employs more than 12,000 people throughout the world.

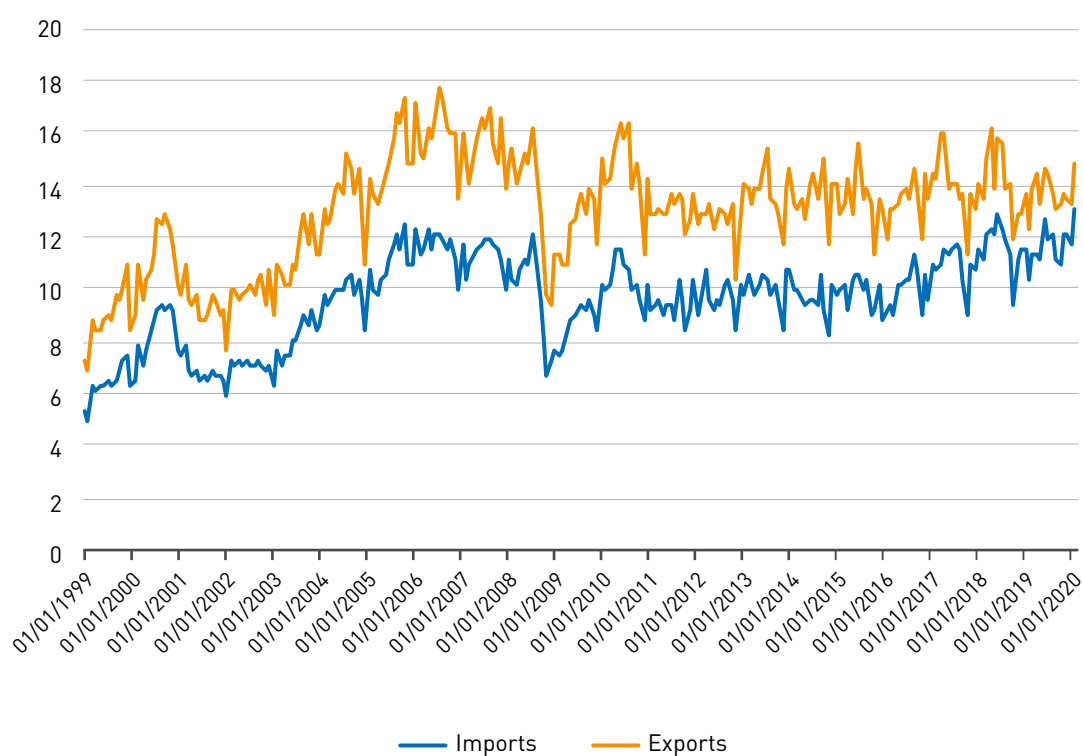
In addition, United States-owned Flex has located its international headquarters in Singapore. Flex is the third largest global electronic manufacturing services and original design manufacturer in the world. Flex provides a "Sketch-to-Scale" model that helps its clients develop a product from ideation to manufactured product. As a large company, it can exploit substantial economies of scale and leverage its strong supply chain. Here, we have a company that uses FDI as a business strategy to invest in Singapore and promote its services through NEMs out of Singapore.

Both SMEs and TNCs give firms various options based on their individual needs. Clearly, FDI and non-equity modes of trade complement each other. The development of new applications in electronics

such as autonomous vehicles and artificial intelligence suggest that the industry has huge potential to grow and develop. Nonetheless, embracing innovation for continual growth is important as risks are also involved.

Traditionally, electronics have powered economic growth in Singapore. Figure 4 presents changes in total electronics exports and imports from 1999 to 2019. While growth has taken place in the sector overall, the composition and type of electronics that Singapore has produced have changed significantly over the years.

**Figure 4. Total amount of monthly electronics exports and imports, 1999–2020**  
(S\$ Billions)



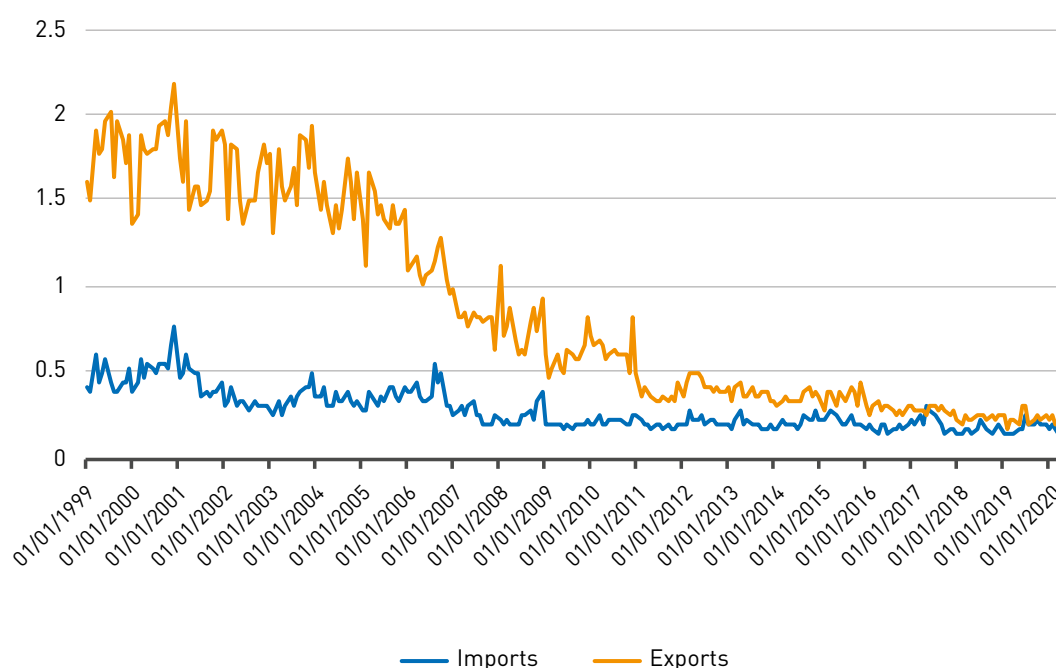
Source: Singapore Statistics.

At the start of the millennium, Singapore was one of the world's largest hard disk drive makers. Up to 35 per cent of the world's hard disks were made in Singapore, driven by huge investments from TNCs such as Seagate, Maxtor, Western Digital, Quantum and IBM. New plants were built, hiring thousands of assembly line workers. However, the production processes were shifted out of Singapore to neighbouring countries such as Malaysia and Thailand, which offer a lower manufacturing cost (Hiratsuka 2011).

Figure 5 shows the overall decrease in the total amount of hard disk drive exports and imports from 1999 to 2019. In August 2006, around 3,500 workers became unemployed when Maxtor closed its plant in Singapore (after merging with its competitor Seagate). This highlights the risk of overreliance on one specific sector and the importance of diversification and innovation.

For long-term growth, the Singapore government developed the Electronics Industry Transformation Map, which identifies innovation, productivity, skills and internalization as strategic drivers. This will propel the industry forward and reduce the risk of becoming obsolete or reliant on one sector (see Section 4.1). Consequently, this will lead to sustainable growth in both FDI and NEM in the industry.

**Figure 5. Total value of monthly hard disk drive exports and imports, 1999–2020**  
(S\$ Billions)

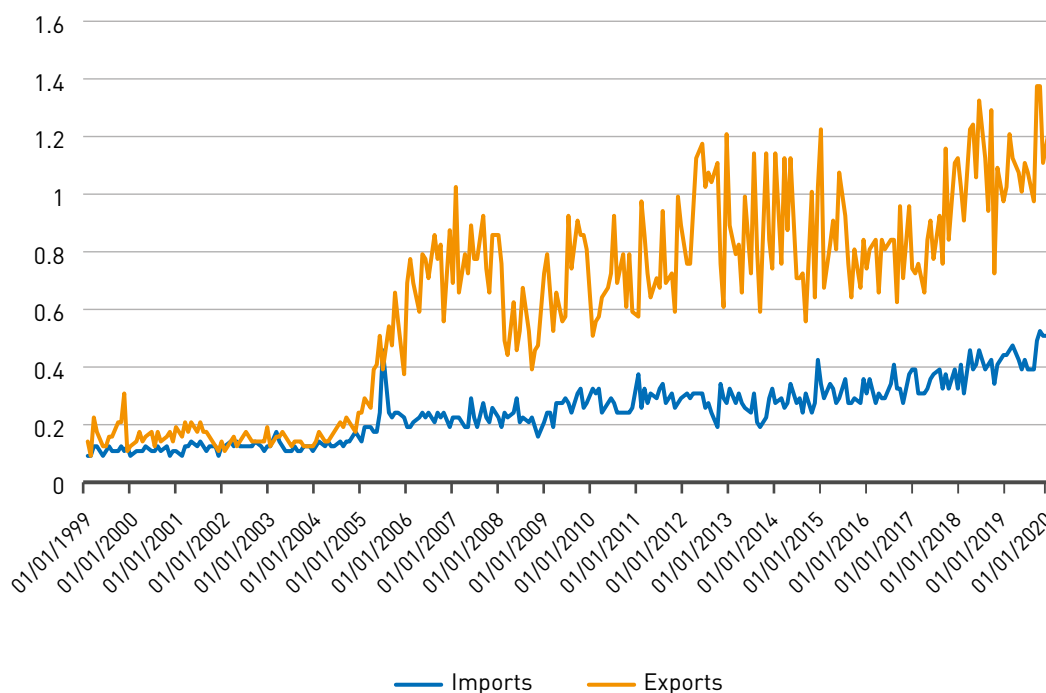


Source: Singapore Statistics.

**(2) Subcontracting and licensing: pharmaceutical industry**

In addition to electronics, Singapore has a growing biomedical sciences industry. Figure 6 presents the increase in exports and imports of pharmaceutical products from 1999 to 2019. The total value of exports of pharmaceutical products from Singapore was close to S\$11.2 billion (\$8.1 billion) in 2019. This is approximately 5 per cent of the GDP of Singapore.

Figure 6. **Total amount of monthly pharmaceutical exports and imports, 1999–2020**  
(S\$ Billions)



Source: Singapore Statistics.

The past decade's growth has been exponential due to the Singapore government's efforts to promote the biomedical hub. Indeed, foreign companies are attracted by the strong track record of quality and regulatory compliance in Singapore and the infrastructure in place. This is particularly important for pharmaceutical products where reputation and reliability are of utmost concern.

This growth is attributed to increases in both FDI and NEMs. Over the years, Singapore has attracted many international companies. Currently more than 50 leading biomedical sciences focusing on different facets of the sector have operations in Singapore. These include biologics, cell therapy and medical nutrition.

Furthermore, eight of the top 10 pharmaceutical companies have a manufacturing presence in Singapore. These include GlaxoSmithKline (GSK), Merck Sharp & Dohme, Pfizer, Novartis, Roche, Sanofi, AbbVie and Amgen. Currently, four of the top 10 prescription drugs by global revenue are produced in Singapore.

Global giant GSK from the United Kingdom is a pioneer in the biomedical sciences industry in Singapore and has invested more than S\$1.5 billion to date. GSK currently has a vaccine manufacturing facility and two global manufacturing supply sites in Singapore and is involved in both FDI and NEMs (see box 2). United States-based biopharmaceutical company Amgen has also built state-of-the-art biomanufacturing plants in Singapore. Its revolutionary next-generation biomanufacturing facility leverages modern technologies to produce denosumab, which is needed in medicine such as Prolia and XGEVA for osteoporosis and bone-related disorders in cancer patients.

**Box 2. GlaxoSmithKline**

GSK is a British multinational pharmaceutical company that is based in London, United Kingdom. It has been ranked as one of the world's top 10 largest pharmaceutical companies according to Forbes and the Fortune Global 500.

Singapore is the regional headquarters of GSK's Emerging Markets and Asia Pacific businesses for pharmaceutical and healthcare products. To date, GSK has invested more than S\$1.5 billion in FDI and employs close to 2,000 workers in Singapore.

GSK currently has a vaccine manufacturing facility and two global manufacturing supply sites in Singapore. Here, GSK makes use of state-of-the-art technology such as continuous manufacturing. As compared with the usual batch production, the technology will improve capacity and reduce environmental costs by 50 per cent.

The new technology was used to produce Daprodustat, an oral treatment for patients with anaemia due to chronic kidney disease. In June 2020, Daprodustat was approved by the regulatory authorities in Japan after the clinical development programme. As one of the latest innovations and development by GSK, Daprodustat is marketed under the brand name Duvroq.

In addition to the production and development of its own products, GSK also provide contract manufacturing to other countries from Singapore. Hence, GSK also engages in NEMs in Singapore.

For contract manufacturing, GSK provides fully integrated supply chain support for both small molecule and biopharmaceutical products. In Singapore, the Quality Road Manufacturing Plant produces Amoxicillin Trihydrate and Monosodium Ticarcillin. As one of the world's largest Amoxicillin manufacturing plants in the world, GSK supplies customers worldwide through contract manufacturing.

This shows that FDI and NEMs play complementary roles. While GSK is one of the first investors in Singapore through FDI, it also supports NEMs through contract manufacturing.

The success of GSK in Singapore is due to the strong partnership between GSK and the Singapore government. For instance, they have developed a GSK-Economic Development Board 10-year Singapore Manufacturing Roadmap. This supports the sustainability of the company and ensures that manufacturing remains a competitive edge for GSK.

Led by investments from the large pharmaceutical companies, Singapore managed to develop a strong ecosystem in the biomedical sciences industry. This encouraged the development of NEMs such as subcontracting and licensing through contract manufacturing organisations and contract development and manufacturing organisations.

Contract manufacturing in the pharmaceutical industry is a form of NEM in which a manufacturing firm produces drugs on behalf of companies. This industry is expected to grow rapidly. According to Frost & Sullivan (2020), the market for the global pharmaceutical contract manufacturing is expected to reach \$102.14 billion by 2024.

In 2020, Samsung Biologics invested \$1.5 billion in a fourth pharmaceutical plant in Incheon and seeks to increase its production capacity by 70 per cent by the end of 2022. According to its CEO Tae Han Kim, "Contract manufacturing for pharmaceutical products is yet to meet demand" (Hosokawa 2020).

Contract manufacturing has been growing in popularity as it increases the efficiency of production and reduces the risk of overcapacity. Consequently, pharmaceutical companies can focus on their core business and reduce their investments in production facilities and improve cash flow.

Both local and foreign companies are involved in contract manufacturing in Singapore. They include global companies such as Lonza and domestic companies such as CellVec, DynaLynk Pharma and Beacons Pharmaceuticals. These companies complement existing pharmaceutical giants. They provide flexible capacity options for companies that would like to expand their existing production, or to venture into new modes such as cell and gene therapies.

Lonza is a Swiss multinational company that has invested in Singapore since 2005. As a global leader in custom manufacturing and product development, it has supported many companies to develop and commercialize their products in the global market. In Singapore, Lonza manages a mammalian cell culture manufacturing facility to produce monoclonal antibodies, cellular therapeutics and other recombinant proteins.

Founded in 2006, DynaLynk Pharma is a pharmaceutical contract manufacturer that specializes in semi-solid topical dosage forms. This includes creams, lotions, ointments, gels and balms. It also provides a wide range of services such as filling, quality control testing and secondary packaging. DynaLynk Pharma is a subsidiary of local pharmaceutical company Lynk Biotechnologies Pte Ltd, a Singapore-based pharmaceutical company that was spun off from the Yong Loo Lin School of Medicine in the National University of Singapore by Associate Professor Lee Chee Wee.

CellVec is a gene therapy contract development and manufacturing organisation that focuses on the research and manufacturing of gene transfer vectors. Founded in 2018 by a group of Singaporean scientists, it seeks to transform cell and gene therapy. Both DynaLynk Pharma and CellVec are testaments to the success of biomedical innovation in Singapore as the Singapore government seeks to promote entrepreneurship in biomedical sciences (Yeoh 2007).

Some companies also extend their production to contract manufacturing. For instance, Beacons Pharmaceuticals, a local SME founded in 1970 focused primarily on the manufacturing of generic pharmaceutical and health products. It recently turned to contract manufacturing, serving clients in the region and beyond. Its clients include companies in Brunei Darussalam, Cambodia and the United States.

Contract manufacturing in the pharmaceutical industry in Singapore is expected to grow in the years ahead. Both local and foreign companies plan to expand their operations here. For instance, WuXi Biologics, a Chinese pharmaceutical company, has confirmed its plans to build a \$60 million plant in Singapore for contract manufacturing. The bioreactor capacity will be around 4,500 L, supporting clinical and small-volume commercial production.

Another form of NEM is licensing. Licensing occurs when a company gives another company the right to use its brand or other intellectual property rights. Built on the strong intellectual property regime in Singapore (as highlighted in Section 2.1), many companies have chosen to focus on licensing in Singapore.

Moreover, companies involved in NEMs in the pharmaceutical industry need to comply with the regulations laid down by the Health Sciences Authority in Singapore and the internationally recognised Pharmaceutical Inspection Cooperation Scheme. This provides patients with quality assurance and adds on to the comparative advantage of Singapore.

In terms of licensing, companies such as Zuellig Pharma have obtained multiple exclusive licences for the region. In 2015, it partnered with Korean pharmaceutical company Boryung Pharmaceutical to launch and market the antihypertensive drug Kanarb in 13 Southeast Asian countries. In 2017, it partnered with Switzerland-based company Vifor Consumer Health to distribute and sell Perskindol, a topical painkiller, across Asia.

### (3) Leasing: data centres

“The world’s most valuable resource is no longer oil, but data”—The Economist (6 May 2017). Indeed, with the confluence of the Internet of things, artificial intelligence and edge computing, an unprecedented amount of data is available. This gives rise to the importance of data centres. If data is the new gold, data centres are the new gold vaults.

In the new data economy, data centres are instrumental to the success of a business. Data centres are responsible for the storing, processing and disseminating of a company’s data. They also provide data backup and networking services. As data centres hold proprietary and confidential information, data security is of paramount concern.

According to the Cushman & Wakefield’s Data Centre Competitiveness Index 2019, Singapore is the third most robust data centre market globally. In Southeast Asia, it is the only mature data centre market. This can be attributed to a confluence of factors: high-speed connectivity, political stability and low risk of natural disasters.

Many companies have built their own data centres in Singapore (through FDI). They include Google, Microsoft and Amazon Web Services. Google has invested in three data centres in Singapore, which brings its long-term investment in Singapore data centres to \$850 million. Facebook has also made plans to invest \$1 billion (S\$1.4 billion) in a new data centre in Singapore. This is its first data centre in Asia and is expected to open in 2022.

Despite the large investments, capacity for these companies (known as hyperscalers) remains insufficient. According to Structure Research (2019), hyperscalers currently own 27 per cent of the capacity in Singapore. They lease the remaining 73 per cent from the co-location market.

A co-location data centre allows a company to lease servers and other computing hardware at a third-party provider’s facility. Structure Research (2019) estimates the Singapore co-location market’s revenue in 2018 to be around S\$1.1 billion. It is expected to grow to \$1.95 billion by 2023.

Consequently, NEMs in the form of leasing play a major role for data centres. Table 3 presents the type of companies that are leasing co-location capacity. Companies providing co-location data centres include both foreign and Singaporean investors: 1-Net (Japan), Digital Realty (United States), Equinix (United States), Global Switch (Hong Kong SAR), Harbour MSP (Australia), Keppel Data Centres (Singapore), NTT (Japan), Singtel (Singapore), ST Electronics (United Kingdom), Tata (India), Telehouse (Japan) and Terremark (United States).

**Table 3. Users of co-location capacity in Singapore, 2018**

Type of companies	Share (%)
Network and IT services	28
Hyperscalers	20
Financial services	20
Government	14
Content and digital	12
Other enterprises	6

Source: Structure Research (2019).

Note: IT = information technology.

These companies offer customised services with security. For instance, at Keppel Data Centre, the spaces are built to order in terms of power requirements and sizes. There are also strategies for business continuity and disaster recovery, providing customers with reassurance and peace of mind (see box 3). Through a strong network of 10 cloud-enabled data centres in Singapore, Australia and Hong Kong SAR, Singtel data centres offer a plethora of agile information technology services.

### Box 3. Keppel Data Centre

Keppel Data Centre (DC) is owned by Keppel Telecommunications and Transport (Keppel T & T), and Keppel Land, both subsidiaries of Keppel Corporation, a publicly listed Singapore conglomerate. It has data centres in Asia Pacific (including Australia, China, Indonesia, Malaysia and Singapore) and Europe (Germany, Ireland, Italy, Netherlands and the United Kingdom).

Currently, six data centres are in four locations in Singapore. Keppel DC can meet the needs of both SMEs and TNCs through its unique offering of built-to-suit and co-location services. With built-to-suit, companies can lease and customise the land parcel to their individual specific requirements. This provides companies with the flexibility to scale up and down when needed, resulting in less waste of resources.

Other issues include the huge usage of energy and the carbon footprint of data centres. Keppel DC overcomes the issue with state-of-the-art technology in managing sustainability and has received awards such as the ISO 50001 energy management system and the Singapore Standard for Green Data Centres. Consequently, this makes leasing even more attractive as experienced professionals can run the data centres with higher efficiency and availability.

NEMs in the form of leasing are expected to stay. Keppel DC is currently building a floating Data Centre Park that is environmentally friendly and alleviates the constraints of land. In addition, it features a modular design that can be scaled based on the needs of the lessor. These innovations will make leasing even more attractive.

As of end 2020, Keppel DC Real Estate Investment Trust announced that it enjoyed a portfolio occupancy rate of 97.8 per cent and a weighted average lease expiration of 6.8 years. The total amount of assets under management was approximately S\$3 billion, which is expected to grow even more with the growing demand for data centres.

Indeed, many opportunities exist for ASEAN in the co-location data centre market. According to Cushman & Wakefield (2019), the region will experience the fastest growth in co-location data centres from 2019 to 2024. The market size is expected to grow by a compounded annual growth rate of 13 per cent. NEMs in the form of leasing have the potential to accelerate the development of the market.

## (4) Franchising: food and beverage

The reputation of Singapore as a food paradise is well documented. As a multiracial country, it serves a large diversity of cuisine that meets the palate of different tastes and preferences. According to the Mastercard survey on consumer dining habits, Singapore ranks among the largest spenders in Asia Pacific when it comes to dining out. In 2020, the hawker culture in Singapore was officially nominated to be in the United Nations Educational, Scientific and Cultural Organization's Representative List of the Intangible Cultural Heritage of Humanity.

Singaporeans are always excited to try new food. When Shake Shack, an American fast-food restaurant opened in Singapore in 2019, queues were on average two hours long. With a penchant



for trying new food and experiences, Singapore provides an ideal launchpad for countries to expand in the region.

One of the most popular form of expansion is through a particular NEM: franchising. A franchise is established when a franchisor grants (or sells) the franchisee the right to operate the business of the franchisor in a particular area. Most world-famous brands such as McDonalds and 7 Eleven Convenience stores operate as franchises.

The popularity of franchising lies in the fact that both franchisees and franchisors benefit, creating a win-win situation. The franchisee has an established product and service to work with and access to training by the franchisor. The franchisor can expand rapidly, enjoying economies of scale and a stable income stream. This overcomes the traditional hurdles of expansion such as being unfamiliar with local customs and the regulatory environment. Chateraise, a patisserie chain operator from Japan is a case in point (box 4).

#### Box 4. Chateraise of Japan: franchising as a springboard for ASEAN businesses

Based in the Yamanashi Prefecture in Japan, Chateraise procures raw materials from contracted farmers before producing cakes and pastries in their factories throughout Japan. Chateraise currently has around 500 locations in Japan. Faced with declining sales in Japan, Chateraise turned to Southeast Asia.

To expand overseas, Chateraise first expanded to Singapore in 2015 through franchising. Franchising allows the franchisee to set up stores selling Chateraise products and to use its existing business branding and marketing resources. In return, the franchisee will pay a fee to Chateraise. This frees up resources and reduces the risk involved for Chateraise.

To ensure consistency across outlets and quality of the different products, all goods are shipped from Japan to the franchisee. Through automation and centralisation, Chateraise can also minimise the cost of production. It has currently close to 30 outlets in Singapore.

The success of Chateraise in Singapore spurred the company to expand in the region through franchising. According to Shutaro Watanabe, who leads overseas marketing for Chateraise, "Singapore is trendsetter in the region and people in neighbouring countries want to bring what they see in Singapore into their homes" (Nagae 2018).

Since then, Chateraise has expanded to eight countries including Indonesia, Thailand, Malaysia, Viet Nam and the Philippines. Already in 2017, it announced its plans to open 200 shops abroad. Doing so would boost the company's overseas sales to 50 per cent of its revenue in the next decade. Currently, the waiting list for would-be Chateraise franchisees is long, which is a testament to the success of the NEM of franchising for Chateraise.

The Franchising and Licensing Association (Singapore) supports franchising in Singapore, which is one of the founding members of the World Franchise Council and a member of the Asia Pacific Franchise Conference. It recently launched a Franchise Competency Framework and a diagnostic assessment toolkit to help companies assess their capacity.

Besides Chateraise, many other companies in the food and beverage industry leverage franchising. This includes Old Chang Kee (a homegrown Singapore company that sells curry puffs) and Old Town White Coffee (a Malaysian company that sells Malaysian delicacies from white coffee to noodles). Table 4 lists food and beverage companies that leverage franchising in Singapore.

The Singapore government has also launched several initiatives to help Singaporean SMEs internationalise and run franchises overseas. Supported by Enterprise Singapore, the Local Enterprise and Association Development Programme seek to provide a systematic platform for companies to establish franchises overseas. Local food and beverage companies such as Tung Lok, Bread Talk and Ya Kun Kaya Toast have successfully expanded overseas through the franchising model. For instance, Ya Kun Kaya Toast has franchises outlets across the region, such as in Cambodia, Indonesia, Thailand and Viet Nam.

Table 4. Franchises in Singapore

Company name	Country	Products
Bread Talk	Singapore	Bread
Chateraise	Japan	Patisserie
Krispy Kreme	United States	Doughnut
Little Sheep Hot Pot	China	Hot pot
Long John Silver	United States	Fast food
Marble Slab Creamery	United States	Ice cream
Old Town White Coffee	Malaysia	Malaysian delicacies
Old Chang Kee	Singapore	Curry puff
Subway	United States	Sandwich
Tonkotsu Kazan	Japan	Ramen
Tung Lok	Singapore	Seafood
Ya Kun Kaya Toast	Singapore	Kaya toast

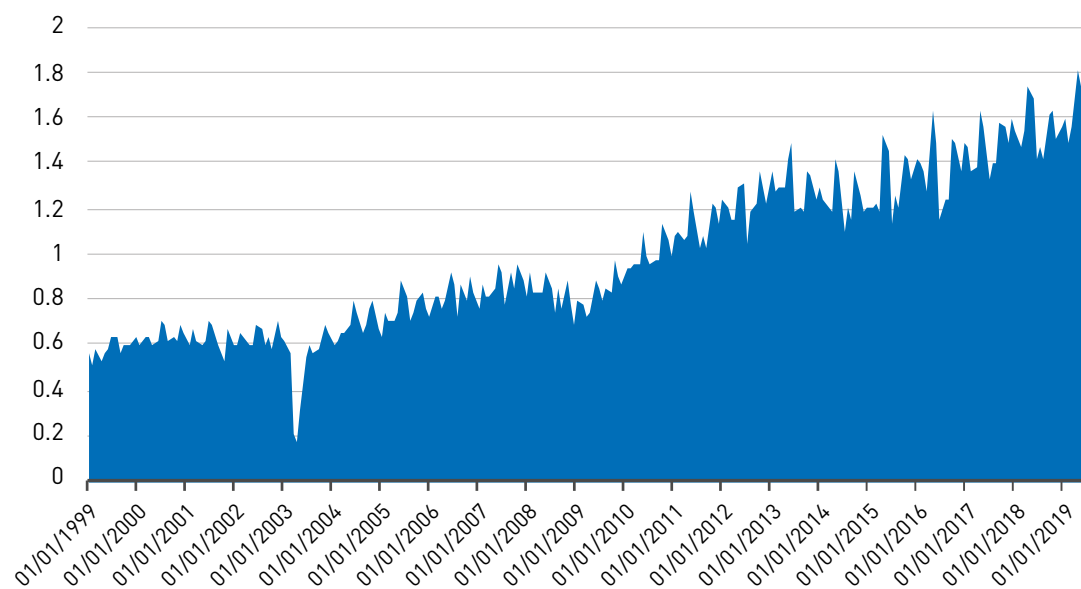
Source: AJC.

### (5) Management contract: hotels

Within a seven-hour flight radius of half the world's population, Singapore is at the heart of the growth in regional travel. In addition, Singapore is highly rated as a meetings, incentives, conferences and exhibitions (MICE) destination. It has hosted many international events and conventions. According to the International Congress and Convention Association Global Rankings (2019), Singapore ranked as Asia Pacific's top meeting city for the 18th consecutive year.

Figure 7 shows that the number of tourism arrivals from 1999 to 2019 increased steadily. In 2019, around 19.1 million international travellers visited Singapore. This is more than three times the population of Singapore, 5.6 million. Most of the visitors come from the region. The top markets include China, Indonesia, India, Malaysia, Australia and Japan.

Figure 7. Total number of monthly tourism arrivals, 1999–2019 (Millions)



Source: Singapore Statistics.

Table 5 breaks down tourism receipts based on such components as accommodation, food and beverage, shopping and entertainment (including sightseeing and gaming) from 2007 to 2019. In 2019, tourism receipts were estimated to be S\$27.7 billion. Around S\$5.5 billion (20 per cent) is allocated to accommodation, S\$2.5 billion (9 per cent) to food and beverage, S\$5.6 billion (20 per cent) to shopping and S\$6 billion (22 per cent) to entertainment.

This has attracted many investors to the hotel industry in Singapore. Table 6 shows an increase in the number of gazetted hotels in Singapore. From 198 hotels in 2013, the number grew 30 per cent to 263 hotels in 2019. The standard average occupancy rate remained high at more than 80 per cent during this period. The hotel room revenue was approximately S\$4.2 billion dollars in 2019.

The Hotels Act and Hotels Licensing Regulations govern hotels in Singapore. Foreign investors can operate a hotel in Singapore through direct ownership or management contracts. Management contracts are a NEM that takes the form of a legal agreement between the hotel owner and operator. The operator manages the hotel on behalf of the owner, leveraging the owner's experience and brand name. This form of NEM has become increasingly popular in recent years because separating ownership and capital allows companies to specialise based on their expertise. Owners can focus on investing in real estate, while hotel management companies can expand without a huge capital outlay. This creates a win-win situation.

In the case of a foreign company, it can enter a new country to build brand loyalty in locations where their guests travel frequently at a much lower cost. By exporting their brand of hotels (without buying a hotel property), they can reach economies of scale without the risks associated with foreign investments.

Global hotel chains such as Marriott, InterContinental and Sofitel have adopted this strategy. Table 7 highlights several well-known hotels in Singapore that have made use of management contracts.

Table 5. Tourism receipts by major component, 2007–2019 (S\$ millions)

Tourism component	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total	14 772	15 475	12 642	18 341	22 277	23 081	23 469	23 560	21 777	25 748	26 807	26 942	27 689
Accommodation	3 289	3 608	2 839	3 623	4 390	5 038	5 332	5 309	4 680	5 916	6 016	5 666	5 529
Food and beverage	1 664	1 848	1 512	1 903	2 239	2 246	2 294	2 263	2 319	2 787	2 649	2 593	2 497
Shopping	4 073	3 982	3 377	3 971	4 489	4 588	4 553	4 116	3 913	5 958	6 172	5 385	5 640
Sightseeing, entertainment and gaming	144	177	201	3 423	5 391	5 240	5 471	5 823	5 093	5 348	5 618	5 859	5 997
Other	5 603	5 861	4 712	5 421	5 768	5 970	5 819	6 049	5 772	5 739	6 352	7 440	8 026

Source: Singapore Statistics.

Table 6. Statistics of hotel industry, 2013–2019

Variables	2013	2014	2015	2016	2017	2018	2019
Number of gazetted hotels (at end-year) (number)	198	220	223	237	243	250	263
Standard average occupancy rate (per cent)	84.9	84.2	83.9	83.1	84.9	86	86.9
Available room-nights (number)	16 311 580	17 344 820	17 982 254	19 180 599	20 163 658	21 256 272	21 826 961
Standard average room rate (S\$)	239.5	242.3	231.8	222.9	217.1	218.5	220.9
Hotel room revenue (S\$ thousands)	3 321 026	3 546 269	3 507 568	3 560 565	3 715 831	3 995 662	4 198 738

Source: Singapore Statistics.

Table 7. Hotel operations in Singapore

Hotel	Management	Owner
Grand Park Orchard	Park Hotel (Hong Kong)	Bright Ruby Resources (China)
Intercontinental Singapore Robertson Quay	Intercontinental Hotels Group (UK)	RB Capital (Singapore)
JW Marriott South Beach	Marriott (USA)	Hong Leong (Singapore)
Raffles Hotel	AccorHotels (France)	Katara Hospitality (Qatar)
So Sofitel Singapore	Sofitel (France)	Royal Group (Singapore)

Source: AJC.

Nonetheless, there are strict requirements imposed by the hotel chains. These include the design and colour scheme used in the hotel and service standards. Redesign could be costly. In 2016, the Hong Leong Group spent more than S\$20 million to redevelop South Beach Hotel to meet the requirements of JW Marriott. The hotel has since been renamed JW Marriott South Beach.

The Singapore hotel industry includes both FDI (ownership) and NEMs (management contracts). The example of Raffles Hotel [box 5] illustrates their dynamic interlocking relationship across different countries in different time period.

#### Box 5. Raffles Hotel: changing ownership

Raffles Hotel is arguably one of the most iconic hotels in Singapore. Established by the Sarkies Brothers in 1887, it is named after the founder of modern Singapore (by the British), Sir Thomas Stamford Raffles. It has been designated as a national monument of Singapore and prides itself for its high standard of service and accommodation. It is currently owned by Katara Hospitality, a company owned by the Qatar government. Previously, it was owned by Colony Capital, an American international investment firm.

Since 2016, AccorHotels, a French multinational hospitality company has managed Raffles Hotel. This came about after AccorHotels took over FRHI Hotels and Resort, a global hotel management company based in Canada.

Management contracts form the main modes of expansion for foreign investors in the hotel industry as in other ASEAN countries (see the other papers in this series). However, the motivation differs for different countries.

As countries such as Cambodia and Myanmar do not allow foreign ownership of land, foreign hotel companies must rely on management contracts (or franchise agreements) to enter the country. In contrast, there are no restrictions on foreigners acquiring commercial or industrial properties in Singapore (as highlighted by the Singapore Land Authority). Nonetheless, foreign hotel companies still tend to choose management contracts over direct investment as their preferred form of entry in Singapore. This highlights the attractiveness of NEMs in Singapore.

### 3. OPPORTUNITIES AND CHALLENGES

This section analyses the opportunities and challenges the Singapore economy faces in promoting and utilizing NEMs (see table 8). Table 9 also shows opportunities and challenges, but by specific issues local firms involved in NEMs face. These include continuity (footlooseness) issues, NEM-specific characteristics, capacity building and local firms' initiatives and local embeddedness. We then focus on three key considerations in relation to the opportunities and challenges for the growth of NEMs in Singapore.

**Table 8. Opportunities and challenges for select NEMs in Singapore**

Opportunities	Challenges
<b>Subcontracting: electronics manufacturing</b>	
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Knowledge spillovers</li> </ul>	<ul style="list-style-type: none"> <li>• Cost competitiveness</li> <li>• Competition among Asian countries</li> <li>• Dependence on TNC business model</li> </ul>
<b>Subcontracting: supply chain management</b>	
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Knowledge spillovers</li> </ul>	<ul style="list-style-type: none"> <li>• Cost competitiveness</li> <li>• Competition among Asian countries</li> </ul>
<b>Licensing: pharmaceuticals</b>	
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Externalities to the bio-pharmaceutical industry</li> </ul>	<ul style="list-style-type: none"> <li>• Competition among Asian countries</li> <li>• Demand comes from outside the country</li> </ul>
<b>Franchising: food and beverages</b>	
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Management know-how</li> </ul>	<ul style="list-style-type: none"> <li>• Localisation</li> <li>• Training</li> </ul>
<b>Management contract: hotels</b>	
<ul style="list-style-type: none"> <li>• Job creation</li> <li>• Knowledge spillovers</li> <li>• Externalities to MICE industry</li> </ul>	<ul style="list-style-type: none"> <li>• Localisation</li> <li>• Substantial investment required from locals</li> </ul>

Source: AJC.

**Table 9. Opportunities and challenges for local firms engaged in NEMs**

Opportunities	Typical industries concerned	Challenges
<b>Continuity (footlooseness) issues</b>		
Easier to find TNC partners both in and outside the country through, for example, matching events (because TNCs do not directly invest in the business).	Electronics manufacturing, supply chain management	Easier for TNCs to terminate the contract, and long-term relationship is not guaranteed, if quality of services or goods do not meet TNC's standards and if local firms in other countries are more competitive.
<b>NEM characteristics issues</b>		
Easier to enter new market or new area even where demand is not present in the country. Skills, talents or resources that are available in the country but are not required there can be usefully utilized outside the country.	Pharmaceuticals	Demand and markets are outside the country. Demand from TNCs may change depending on the interest and taste of their clients.

Table 9. Opportunities and challenges for local firms engaged in NEMs (Concluded)

Opportunities	Typical industries concerned	Challenges
<b>Continuity (footlooseness) issues</b>		
Easier to find TNC partners both in and outside the country through, for example, matching events (because TNCs do not directly invest in the business).	Electronics manufacturing, supply chain management	Easier for TNCs to terminate the contract, and long-term relationship is not guaranteed, if quality of services or goods do not meet TNC's standards and if local firms in other countries are more competitive.
<b>NEM characteristics issues</b>		
Easier to enter new market or new area even where demand is not present in the country. Skills, talents or resources that are available in the country but are not required there can be usefully utilized outside the country.	Pharmaceuticals	Demand and markets are outside the country. Demand from TNCs may change depending on the interest and taste of their clients.

Source: AJC.

### 3.1 Ownership and control

The first issue in terms of the opportunities and challenges of NEMs in Singapore relates to the intricate relationship between ownership and control. While TNCs do not have direct ownership (through equity) in NEMs, TNCs can control operations of local firms in different ways, including through quality, design and operations requirements. For instance, if local firms cannot meet the requirements of TNCs, the contract could be terminated.

Furthermore, the contracts between foreign firms and NEMs might not be renewed for various reasons. One such reason is cost considerations. Singapore is not a cheap city for businesses. The Economic Intelligence Unit Worldwide Cost of Living Survey has ranked Singapore as the most expensive city for expatriates to live in for consecutive years. According to a study by ECA International, Singapore is among the top five most expensive locations in Asia for business travel. In 2018, it is estimated to cost around \$468 per day. In comparison, the cost of Johor Bahru in Malaysia (which is connected to Singapore via a bridge) is less than half the price at just \$184 per day. The unit labour cost in Singapore has also increased over the years (Foo 2015).

Moreover, local firms are subject to the vagaries of the business cycle and to specific demands of TNCs. As highlighted earlier in this study on the electronics sector, Singapore used to be the world's leading hard disk drive maker at the start of the millennium. However, with a rise in land and labour costs, and competition from other countries, Singapore's hard disk exports lost their appeal.

While Singapore was able to reinvent itself and focus on other segments of the value chain, this is a reminder that Singapore should continually innovate to stay relevant. Furthermore, Singapore should not be overly reliant on one sector.

Capitalizing on the growth of FDI and NEMs, local firms do have many opportunities to develop and expand. In particular, they can scale up and gain economies of scale and scope. With a population of 5.6 million, Singapore is a small economy with a lack of hinterland and natural resources. Unlike large countries such as China (1.3 billion) and India (1.1 billion), Singapore cannot produce at a large scale for its domestic market. Unlike cities like Hong Kong SAR, it lacks a natural hinterland.

Consequently, Singapore firms will be able to increase their output to meet the demands of the world with NEMs. This will allow the firms to invest in research and development, improving the quality of goods at a lower cost. Nonetheless, to sustain their operations without overly relying on TNCs, firms in Singapore should then internationalize and set up external wings. In this case, they would not be vulnerable to the demands of TNCs.

An example is PSA, the port operator in Singapore. While it started with just a container port in Singapore, PSA is now a global logistics player that participates in port operations globally (across Asia, Europe and the Americas). As it does not just serve the domestic market in Singapore, it is not highly dependent on one specific company or country.

### 3.2 Geopolitics and free trade agreements

The second consideration concerns geopolitics and free trade agreements (FTAs). There is a trend towards deglobalization, which is causing tectonic shifts in the global economy and global supply chains. With trade tensions between China and the United States intensifying in recent years, the role of NEMs in the region will transform.

The World Trade Organization estimates that global trade may fall by 17 per cent if tariffs returned to the levels that predated the multilateral trading system. This is larger than the fall during the Great Recession in the late 2000s (Seow 2019).

Indeed, tariffs imposed by the United States in recent years have led to companies shifting their supply chain out of China. According to the World Economic Forum's The Global Risks Report 2019, geopolitical tensions are one of the greatest threats for global supply chains. With an increase in protectionism and uncertainty stemming from the United Kingdom's exit from the European Union, companies are reassessing their supply chains.

Nonetheless, this could provide Singapore with many NEM-related opportunities. For instance, Singapore could become more attractive in terms of the outsourcing and subcontracting of electronics (Section 2.2.1) or pharmaceuticals (Section 2.2.2).

First, Singapore is an open economy with a large network of more than 23 FTAs, including bilateral FTAs with major economies such as China, India, Japan, the Republic of Korea, the European Union and the United States. In addition, Singapore is part of regional free trade areas. This includes the free trade agreements with ASEAN, which has multiple trading partners, such as Australia, China, Hong Kong SAR, India, Japan, Republic of Korea and New Zealand.

With FTAs, exports from Singapore will be more price competitive as import duties are reduced. In addition, FTAs provide business stability while allowing for easy access to export markets. Coupled with the fact that Singapore is highly connected to global markets, NEM companies in Singapore are expected to increase.

Singapore can also serve as a gateway for the ASEAN market. With a population of 650 million, ASEAN is one of the fastest-growing consumer markets in the world. In comparison, the European Union and the United States have populations of 450 million and 330 million, respectively. With geopolitical tensions in other parts of the world, much attention has shifted to ASEAN.

Exports from ASEAN have increased. For instance, the exports of Viet Nam to the United States surged in 2019, after the United States imposed tariffs on Chinese exports. In addition, Chinese firms have shown interest in investing in the ASEAN region. In 2019, Singapore Exchange, United Overseas Bank (the third largest bank in Singapore by assets and deposits) and the China Chamber of International Commerce signed an agreement to help Chinese companies expand into ASEAN markets. With a critical mass, this will promote the growth of NEMs in the outsourcing and leasing industries in Singapore as highlighted in Section 2.



### 3.3 Technology and FinTech

Finally, technology will be a key enabler for the growth of NEMs in Singapore.

Technological advancements provide Singapore with new challenges. Jobs could be replaced by automation, and local firms without technology might lose their competitive edge. Income inequality could increase, with high economic rents enjoyed by dominant firms. In the context of NEMs, the global supply chain would change. And the skills of domestic workers could become obsolete overnight. Singapore needs to continually upgrade the skills of workers and stay ahead of the curve.

Nonetheless, Singapore could exploit new opportunities, which would complement the growth of NEMs. One such opportunity is in FinTech (see Agarwal and Chua 2020 for a review of the effects of FinTech on three aspects of household finance: payments, lending and portfolio decisions). FinTech, which involves the use of technology to provide new and innovative financial services, is part of Singapore's ambition to become a smart nation. FinTech can promote NEMs in at least two ways:

- First, FinTech companies in Singapore provide services to other countries primarily through NEMs. This includes outsourcing, subcontracting and leasing. More than 1,000 FinTech firms and 40 innovation labs currently operate in Singapore. In 2019, more than S\$1 billion was invested in the FinTech industry. With a strong reputation in standards and intellectual property protections, Singapore can attract global FinTech companies. This is further supported by initiatives such as the SG Patent Fast Track Program and the ASEAN Patent Examination Co-operation.
- Second, FinTech can promote the use of different forms of NEMs and reduce the barriers to international financing. In the case of trade finance, Singapore has embarked on digitalization. For instance, the Monetary Authority of Singapore has worked with the Hong Kong SAR monetary authority to embark on a global trade connectivity network. Using distributed ledger technology, the network seeks to create a cross-border infrastructure. This will reduce the inefficiency and risks of fraud that are inherent in the existing paper-based arrangement.

Looking ahead, Singapore is supporting the next phase of growth by issuing licences in digital banks. This will strengthen the role of Singapore as a regional financial centre. In addition, it will support financial inclusion by supporting individuals and businesses that lack access to traditional banking (Chua 2019).

The proliferation of digital payments can accelerate the master plan for connectivity among ASEAN Member States. ASEAN's digital payment system is expected to increase from \$600 billion in 2019 to \$1 trillion in 2025 (Google and Temasek/Bain 2019). With an increase in cross-border transactions, this will facilitate NEMs in the region.

## 4. POLICY IMPLICATIONS AND RECOMMENDATIONS

Through its economic and manpower policies, the Singapore government is dedicated to creating a pro-business environment. Led by the Economic Development Board, Singapore seeks to attract foreign investments and to become a global hub for businesses. To take Singapore forward in the new economy, the government has identified several strategies that are mutually reinforcing.

This section first evaluates how existing policies can affect the growth and development of NEMs in Singapore by considering the challenges identified in the previous section, and then considers the implications of a post COVID-19 world for NEMs.

## 4.1 Enhancing the capability of local firms

In Singapore, the Future Economy Council is charged with driving the growth and transformation of the economy. As each industry has different needs, the Council proposed a S\$4.5 billion Industry Transformation Programme tailored for 23 industries in 2016. For manufacturing, this included aerospace, precision engineering, electronics, energy, chemicals and marine and offshore engineering (Economic Development Board 2017).

We examine an example of this Industry Transformation Map through the lens of the electronics industry. Here, the pillars of transformation include jobs and skills, productivity and innovation and internationalisation, which could potentially support the growth of NEMs.

For jobs and skills, the government developed a skills framework for continual learning. The skills framework provides two career pathways for management and technicians/engineers. By including 58 specific skills and competencies and the relevant training required, the skills framework seeks to facilitate the learning of workers in the electronics sector. Moreover, industries such as artificial intelligence and the Internet of things are highlighted as emerging skills and competencies. This will support the professional development of workers and promote NEMs.

For productivity and innovation, companies are encouraged to adopt robotics and automation and to focus on high value-added manufacturing. Furthermore, the industry is encouraged to diversify into new growth markets, including urban mobility and healthcare. To do so, the government works with industry partners such as the Singapore Semiconductor Industry Association to support the expansion of the industry. The association has also developed a leadership programme to groom the next generation of local leaders.

For internationalisation, working and partnering with such industry and business associations provide access to new international markets. SME will be supported to identify international partners. As emerging global trends bring in new growth opportunities, NEMs play a key role to help the industries seize the opportunities and transform.

Consequently, the Industry Transformation Map for electronics will be able to support the growth of NEMs in this sector. By enhancing the skills of workers and increasing productivity and innovation, the sector will continue to be attractive. This is similar for the other industries as well. With a targeted approach, it will accelerate the development of NEMs.

Furthermore, the Singapore government has created platforms to encourage collaboration among TNCs, SMEs and start-ups. This is done through initiatives such as the Partnerships for Capability Transformation. Linking incubators with established partners will allow knowledge transfer. Consequently, this will position Singapore as an innovation hub and strengthen the innovation ecosystem. This will allow NEMs to grow.

## 4.2 Enhancing the skills of workers

Besides the transformation of industries, Singapore needs a dynamic labour force that is adaptable to changes in demand. For the growth of the NEM sector, local firms' capabilities in technological and management skills should be enhanced so that they can meet TNCs' current and potential demand. This is particularly important for Singapore as it focuses on advanced sectors that require highly skilled labour and capital.

With the acceleration of technological advancements and business transformation, skills quickly become obsolete. Consequently, workers will need to develop themselves continually. Learning should continue even after graduation from schools.

To encourage lifelong learning for individuals, the Singapore government has embarked on a national movement called SkillsFuture. All Singaporeans aged 25 years and older were given a starting credit of S\$500 in the form of SkillsFuture Credit, which was introduced in 2015. In Budget 2020, the government announced a credit top-up of S\$500. Mid-career Singaporeans (aged 40 to 60 years) received an additional top-up of S\$500. The SkillsFuture Credit can be used for a wide range of courses for individuals to learn new skills.

In addition, a statutory board, Workforce Singapore, was established to help workers meet their career aspirations and secure quality jobs in the changing economic landscape. Under the “Adapt and Grow” programme, it helps workers who are planning for career transition through professional conversion programmes. In these career conversion programmes, professionals, managers, executives and technicians can undergo skills development before being placed into new jobs.

These initiatives seek to help workers develop new capabilities and support the growth of NEMs in new industries in Singapore. For instance, the National Research Foundation in Singapore launched a national programme in artificial intelligence (AI), known as AI Singapore. It seeks to develop local talent and be a bridge among skilled workers, research institutions and companies. One example of talent development is through the AI Apprenticeship Programme, a full-time structured programme that allows the apprentice to solve real-life problems. Participants receive a monthly stipend of S\$3,500 and are provided with mentorship by seniors.

This creates a natural talent pool of workers and a strong support network in AI, helping start-ups to grow and develop and encouraging the development of NEMs. Foreign companies will be interested to work with these start-ups, tapping into the expertise in this area. In the short run, they may choose the NEM route as they are less risky than FDI and provide foreign companies the ability to grow and develop their strengths.

### 4.3 Improving the institutional setting

This study highlights the importance of NEMs in Singapore. Both FDI and NEMs play an important role in the Singapore economic landscape and positively affect one another. Singapore has adopted policies to attract FDI and developed roadmaps to drive the transformation of many industries. In turn, this has supported the growth of NEMs.

Nonetheless, some policy implications emerge from these characteristics. Besides promoting FDI policy, Singapore could adopt strategies specifically targeted at NEMs as well. Gaps could occur if NEMs are not explicitly addressed. The needs of FDI and NEM industries could differ in some instances (as highlighted in box 1).

In this case, the Singapore government could set up a working group within each industry transformation programme to see how NEMs could be explicitly promoted. For skills training, the ministries and statutory boards should also consider NEMs in their frameworks.

Currently, no one-stop shop provides information on NEMs in Singapore. For instance, no specific legislation governs franchising and outsourcing (though sector-specific guidelines exist). Having a platform to provide clarity and strengthen the regulatory environment in this area would be useful.

Looking forward, it will be useful for the government to evaluate the state of NEMs in Singapore and benchmark itself with other countries. Table 10 highlights some policy pillars. Adapted from the corporate code of conduct of the Tokyo Chamber of Commerce and Industry, this checklist is consistent with proposals for the other ASEAN economies in this series of papers.

Establishing policy pillars will provide consistency and benchmarking of countries in the region. With consistency among countries, they can work together to create an environment that directly promotes the growth of NEMs in the region. This will increase the economic integration of countries.

**Table 10. Checklist for NEM agreements and operations to maximize benefits from and minimise costs of NEMs**

NEM policy of the Singapore government	Compliance with laws	Whether there is an agreement on contract performance
		Whether there is an agreement on contract terms (durations)
		Whether there is an agreement on contract termination and its process
		Whether there is an agreement on contract arrangement (additional contract) and its process
	Respect for human rights	Whether there are rules on non-discrimination
		Whether there are rules on basic human rights
		Whether there are rules on harassment (power balance between local NEM firms and TNCs)
	Environmental considerations	Whether there are guidelines on air pollution by local NEM firms
		Whether there are guidelines on water contamination by local NEM firms
		Whether there are guidelines on environmentally friendly goods or services by local NEM firms
	Work environment	Whether there are employment rules (laws) on ages under the NEM agreement
		Whether there are employment rules (laws) on gender under the NEM agreement
		Whether there are guidelines on a safe and pleasant work environment for local NEM firms
Whether there are employment rules (laws) on working environments under the NEM agreement		
Whether there are employment rules (laws) on working conditions		
Whether there are employment rules (laws) on working hours under the NEM agreement		
Whether there are employment rules (laws) on taking holidays under the NEM agreement		
Whether there are employment rules (laws) on treatment of absence under the NEM agreement		
Whether there are employment rules (laws) on maternity-related leave under the NEM agreement		
Whether there are guidelines on provision of support system of childcare and nursing care		
For local firms' development	Whether there is a program that local NEM firms can take to improve their technology/capacity	
	Whether there is a program through which local NEM firms' employees can learn	
	Whether there is a program that local NEM firms can take to understand NEM policy	
	Whether there is a program that local NEM firms can take to understand the business environment of the industry	
Subcontractors/Suppliers	Whether there are guidelines for similar NEM policies for local subcontractors and suppliers	

.../

**Table 10. Checklist for NEM agreements and operations to maximize benefits from and minimise costs of NEMs (Concluded)**

For TNCs, required by the Singapore government	Earning the trust of customers and consumers	Whether there are guidelines for TNCs to provide correct information on their products or services
	Mutual growth with partner companies	Whether there are guidelines for TNCs to respect free and fair trading rules
		Whether there are guidelines for TNCs to provide relevant information required for trading
		Whether there are guidelines for TNCs to develop relationships based on trust with local NEM firms
Coexistence with local communities	Whether there are guidelines for TNCs to establish and maintain good relationships with the local community in which local NEM firms are located	

Source: Adapted from the Tokyo Chamber of Commerce and Industry (2013).

#### 4.4 Gaining perspectives from the COVID-19 pandemic

The COVID-19 pandemic has disrupted global economic activities. As an open economy that depends heavily on trade, Singapore has been most badly affected. From April to June 2020, Singapore's quarterly GDP fell by 13.2 per cent year on year. Early evidence indicates that companies are closing, and unemployment is expected to increase. With a fall in tourism, industries related to the travel industries such as airlines and hotels are severely hurt.

The pandemic has also affected economic globalisation. According to the United Nations Conference on Trade and Development, FDI flows are expected to fall by 30 to 40 per cent in 2020/2021 globally. With restrictions in physical meetings and disruptions in supply chains, things will be done differently as countries seek to reduce their reliance on one country.

Looking forward, NEMs are expected to play an increasingly important role in the new normal. Due to the lower risk involved and the need to diversify across countries, NEMs could be the preferred choice of investment. While investments across countries could fall, this could be substituted through NEMs.

With the growing use of electronic transactions, contracts are now signed virtually without physical meetings. NEM can take place without physical meetings and can support industries in expanding quickly through subcontracting or outsourcing. Unlike equity investments where site visits are preferred and that take longer time, NEMs provide a timely alternative.

The global pandemic also provides countries with the opportunity to reinvent themselves. Given the growing uncertainties, the Singapore government has committed almost S\$100 billion in four budgets (Budget 2020, Resilience Budget, Solidarity Budget and Fortitude Budget) to help businesses, workers and households. This seeks to propel Singapore forward in a post-COVID-19 world.

Since its independence in 1965, Singapore has weathered many crises. From oil shocks in the 1970s, to the Asian Financial Crisis in 1997, the Severe Acute Respiratory Syndrome outbreak in 2003 and the Global Financial Crisis in 2008, Singapore has responded well and bounced back with new ideas and strategies.

Indeed, while COVID-19 has disrupted social and economic activities, it has also created opportunities in industries that could potentially drive the future economy in Singapore. Capitalizing on the strengths Singapore has built over the years, potential exists for NEMs to grow more quickly.

In the light of social distancing measures due to COVID-19, many workplaces implemented work-from-home arrangements and schools and universities embarked on online learning. In both cases, individuals turn to conferencing applications such as Zoom to connect with one another. This requires a larger bandwidth for Internet and data centres for storage.

Consequently, this led to a huge growth in demand for the data centre industry. In August 2020, Zoom, one of the most popular conferencing applications based in the United States, opened a data centre in Singapore. By allowing paid Zoom customers to choose Singapore to be the data centre to host its meetings and webinars, it seeks to build on the strong reputation of Singapore in allaying privacy and security concerns.

While Zoom currently has 18 data centres worldwide, this is Zoom's first foray into Southeast Asia. With the new data centre, it seeks to increase employment and scale its business in the region. Building on the economic strength and trusted international reputation of Singapore, immense potential exists in this industry for FDI and NEMs to grow symbiotically.

In addition, Singapore can leverage its current strengths to move the economy forward. While both the tourism sector and the MICE industry were hit hard, the rigorous testing regime and reputation for reliability in Singapore could spur future growth in NEMs. Particularly, efforts in Singapore to address the COVID-19 pandemic have been widely lauded and will allow Singapore to showcase itself in the new normal.

The biomedical sciences have also received much attention in the COVID-19 pandemic. This enables Singapore to tap its strength in pharmaceuticals, attracting more NEMs in the future. For instance, a potential COVID-19 drug is currently being developed by the biotechnology company Tychan, and Phase 3 clinical trials for the antibody, TY027, have begun. This antibody could potentially expedite the recovery of COVID-19 in patients. These developments could strengthen the standing of Singapore in the biomedical sciences.

Amid the pandemic, companies could also identify new opportunities and create synergies between industries. In the electronics sector, companies have transformed in many ways (Tang 2020). For instance, Certact Engineering, a local company in Singapore that specialises in metal parts for semiconductors suffered a fall in sales revenue by 40 per cent in 2019. Nonetheless, it managed to shift focus to plastic engineering by producing parts for DNA sequencing machines. It now expects to double its annual sales revenue in 2020 to S\$8 million.

In conclusion, NEMs are expected to play an increasingly important role in Singapore as the country taps its comparative advantage in a post-pandemic world. Together with FDI, they will reinforce the strengths of Singapore in electronics and biomedical sciences. In the new economy of technology, data centres and artificial intelligence, NEMs are poised to support the growth of the industries.

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