



Singapore and the Bay Area

Leveraging Emerging Opportunities in Southeast Asia

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Introduction

As California and Bay Area companies expand and diversify their presence in Asia, Southeast Asia is a region with substantial untapped opportunity compared to its potential. In the last two decades, China has absorbed much of the attention of companies focused on Asia. It is a unique business environment, with a scale that demands engagement on its own terms. Most foreign businesses in China are there either to engage China's manufacturing capacity or to participate in its domestic market; few make it their base for activity in Asia. Today, the growing complexity of China's business environment and policy conflicts with the United States are leading some US companies—particularly mid-sized firms—to explore other places in Asia as the foundation for a long-term Asia-Pacific presence.

In this context, the US relationship with Southeast Asia has also assumed both an economic and a geo-strategic dimension. Shifting Asia-Pacific alignments can be seen in S.2736, the Asia Reassurance Initiative Act (ARIA) passed by Congress and signed by the President in 2018 which, among other commitments to Asia, states the sense of Congress that the United States should "reaffirm the elevation of the United States-Association of Southeast Asian Nations (referred to in this section as 'ASEAN') relationship to a strategic partnership," and should "recognize the value of—(A) ASEAN engagement with economic, political, and security partners in Asia and elsewhere, including Australia, Canada, the European Union, India, Japan, New Zealand, Norway, the Republic of Korea, and Taiwan; and (B) strategic economic initiatives, such as activities under the United States-ASEAN Trade and Investment Framework Arrangement and the United States-ASEAN Connect, which demonstrate a commitment to ASEAN and the ASEAN Economic Community and build upon economic relationships in the Indo-Pacific region."¹

Whether a company's goal is to strategically reposition or to simply expand in Asia, Southeast Asia merits new attention. The ten members of the Association of Southeast Asian Nations (ASEAN) together comprise

a \$2.8 trillion market of 650 million consumers.² While many of those consumers are lower income, the region is home to rapidly expanding middle classes and national economies that rank among the fastest growing in the world. Southeast Asia is also an increasingly competitive field where US companies are encountering Chinese businesses that are aggressively expanding in the region.

ASEAN's economies are highly diverse, ranging from very small (Laos) to large (Indonesia), and from less developed (Cambodia and Myanmar) to more developed (Malaysia) and highly developed (Singapore). Political systems within the group also differ widely. Within the region, Singapore has been uniquely successful in developing its economy, creating a business environment that has attracted multinational companies from around the world. As a result, Singapore has become the leading base for regional business activity in Southeast Asia and an important location for Asia-Pacific business headquarters. Its appeal is supported by a commitment to open markets and the rule of law, investment in both physical and human capital, a high quality of life, and the effective planning and execution of long-term economic strategies. Sustained investment in these assets has placed Singapore in the front rank of Asian economies.

This report assesses the Bay Area's economic and business ties with Southeast Asia, focusing on its leading economies—Singapore, Indonesia, Malaysia, Thailand, Vietnam, and the Philippines—and their potential as markets and economic partners. It focuses in particular on Singapore, which offers a unique platform for business in Southeast Asia and the Asia-Pacific area, and where many Bay Area companies have established major regional operations. In doing so, it looks at the distinctive synergies between the Bay Area and Singapore around technology, innovation, urban development, and other fields where priorities and capacities align.



Capitalizing on Growth and Development in Southeast Asia

As a market, the ten members of the Association of Southeast Asian Nations (ASEAN) comprise a population of 650 million people.¹ Except for disruption during the global economic recession of 2008–09, countries in the East Asia & Pacific region have collectively sustained a high GDP annual growth rate for more than three decades.² Political systems and levels of economic development vary greatly within the group, from Indonesia with a population of 262.8 million to Brunei with a population of 450.6 thousand, and from Singapore with a per capita GDP of over \$94,100 in purchasing power parity (PPP) to Cambodia with \$4,000 (PPP).³ In addition to Singapore, which is addressed in detail, this report looks at five of the region’s fast-growing economies—Indonesia, Malaysia, Thailand, Vietnam, and the Philippines.

What is ASEAN?

The economic success of Singapore can’t be understood without reference to the region it calls home. The Association of Southeast Asian Nations, known as ASEAN, is a regional bloc comprising ten countries: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. ASEAN, much like the European Union and other multinational economic communities, endeavors to increase economic prosperity through economic, political, social, and cultural cooperation.

ASEAN was established in 1967 with the signing of the ASEAN Declaration by the foreign ministers of Indonesia, Malaysia, the Philippines, Singapore, and Thailand; five other countries (Vietnam, Cambodia, Laos, Myanmar, and Brunei) joined between 1984 and 1999.⁴ Its goal at the broadest level was to develop strategies to address shared challenges at a regional level. Accelerating economic growth across the region, while strengthening political cohesion and stability, was at the core and led to agreements to facilitate the freer flow of goods, labor, and capital. The initial focus was on practical initiatives to increase tourism, expand food production, and improve the ability of citizens to travel between member countries. More recent initiatives include the ASEAN Single Window, a program to reduce the cost of trade transactions by standardizing documentation and recognizing a single point of entry for imports.⁵ Another, the Master Plan on ASEAN Connectivity 2025, outlines strategies to address logistics, mobility, sustainable infrastructure, and digital innovation.⁶

The economic, political, and cultural benefits of ASEAN are greater than these sometimes technical projects would suggest: ASEAN gives its members access to each other’s education and research facilities, enables government leaders to collaborate at a regional level, and leverages the bloc’s size when dealing with global partners such as the United States, Japan, China, and Europe.

In 2017, ASEAN celebrated its fiftieth anniversary and affirmed in its celebratory Leaders' Declaration its commitment to the Community Vision 2025 goals of its three "pillars" set forth in the Blueprints for Political-Security Community, Socio-Cultural Community, and Economic Community.⁷ While ASEAN, like the European Union, seeks to integrate its member states into a single market and production platform, it is an inter-governmental organization that does not have the supranational organizational powers of the EU. The ASEAN Charter obliges the member states only to facilitate freedom of movement of goods, services, capital, and labor, and ASEAN does not have the power to legislate (as the European Parliament has) or the power of pooled sovereignty in areas such as trade (as the European Commission has).⁸ Nonetheless, ASEAN has a long history of industrial and trade cooperation projects and agreements to eliminate intra-ASEAN tariffs and facilitate the free flows of skilled labor, services, investment, and capital,⁹ and its ongoing ASEAN Economic Community (AEC) plan reflects a sustained focus on increased economic integration.

Before exploring Singapore's economic success, it is instructive to examine five other economies in the ASEAN bloc that are experiencing fast growth: Indonesia, Malaysia, Thailand, the Philippines, and Vietnam. An understanding of their key economic characteristics, approaches to innovation, and engagement with US businesses suggests distinct economic opportunities. It also places in context the unique role that Singapore plays within the region.

Indonesia

Among ASEAN countries, Indonesia has the largest land area and the largest population, which at 262.8 million¹⁰ is currently the fourth largest population of any country in the world.¹¹ The majority of Indonesians (more than 200 million) are Muslim, making Indonesia the world's largest Muslim nation.¹² Its population is relatively youthful, with more than 40% under the age of 24 and only 7% over the age of 65.¹³ Indonesia's GDP of more than \$1 trillion (official exchange rate)¹⁴ is also the largest in the ASEAN bloc. In 2018–2019, the country's real GDP growth rate was 5.2%.¹⁵

According to 2017 estimates, industrial sectors account for about 41% of Indonesia's GDP: major industries include petroleum and natural gas, textiles, automotive, electrical appliances, apparel, footwear, mining, cement, medical instruments and appliances, handicrafts, chemical fertilizers, plywood, rubber, processed food, jewelry, and tourism. Agricultural products, which account for about 14% of the GDP, include rubber products, palm oil, poultry, beef, forest products, shrimp, cocoa, coffee, medicinal herbs, essential oil, fish products, and spices. Major export commodities include mineral fuels, palm oil, electrical machinery, rubber, and machinery and mechanical appliance parts. Indonesia's primary export partners are China, the US, Japan, India, Singapore, Malaysia, and South Korea. Top import commodities include mineral fuels, boilers, machinery and mechanical parts, electric machinery, iron and steel, and foodstuffs. Indonesia's primary import partners are China, Singapore, Japan, Thailand, Malaysia, South Korea, and the US.¹⁶

Like many countries around the world, Indonesia is looking to build an innovative digital economy. Through its 2020 Go Digital Vision campaign initiated in 2017, the government has mapped out a series of programs to support the digital economy, which has blossomed due to the steady increase of smartphone penetration and the rapid growth of e-commerce, ride hailing, and fintech companies.¹⁷ In 2018, Indonesia had the fourth largest number of Facebook users in the world and the highest number in any Southeast Asian country.¹⁸ McKinsey & Company has projected that Indonesia's e-commerce market, which had \$8 billion in spending in 2017, will grow to \$55–\$65 billion by 2022.¹⁹ IT market intelligence company IDC has predicted that technology spending for Indonesia's financial services industry (fintech) will grow from IDR 12 trillion (more than \$840 million) in 2017 to IDR 23 trillion (approximately \$1.6 billion) by 2022.²⁰

Of the 141 countries listed in the World Economic Forum's 2019 Global Competitiveness Index 4.0, Indonesia is ranked #50—making it the fourth most competitive economy in the ASEAN bloc.²¹

US corporations active in Indonesia range from consumer goods company Proctor and Gamble, which has been there since 1989 and manufactures locally,²²

to oil and gas companies such as ExxonMobil, which has been there since 1898²³ and which negotiated a 2017 memorandum of understanding (MOU) to sell liquefied natural gas to Pertamina, an Indonesian state-owned energy company.²⁴ The country's mining and manufacturing sectors have the largest stocks of foreign direct investment (FDI) from the US to Indonesia.²⁵ Total US FDI stock in Indonesia rose from \$14.6 billion in 2016 to \$15.2 billion in 2017, before sinking to a five-year low of \$11.1 billion in 2018.²⁶

Malaysia

At an estimated \$29 thousand in purchasing power parity (PPP) in 2017, Malaysia's GDP per capita is the second highest (after Singapore) of the ASEAN countries. With the sixth largest land area (329,847 square kilometers) in Southeast Asia, Malaysia has a population of 31.8 million with a median age of 28.7. GDP was slightly more than \$312 billion (official exchange rate)²⁷ in 2017, and the 2018 real GDP growth rate was 4.9%.²⁸ Over 70% of Malaysians live in urban areas.²⁹ While 62% are ethnic Malays and indigenous peoples, about 20% are Chinese and more than 6% are of Indian origin; English is widely spoken, and more than 61% of Malaysians practice Islam (the country's official religion).³⁰

Malaysia's industry sectors account for about 38% of its GDP according to 2017 estimates, and major industries include rubber and oil palm processing and manufacturing, petroleum and natural gas, light manufacturing, pharmaceuticals, medical technology, electronics, and semiconductors. Agriculture accounts for less than 9% of GDP, with palm oil, rubber, cocoa, and rice ranking as major agricultural products.³¹

According to MATRADE, the country's national trade promotion agency, Malaysia's top 10 export sectors (in order) are electrical and electronic products, petroleum products, chemicals and chemical products, manufactured metal products, liquefied natural gas, machinery and equipment, palm oil, optical and scientific equipment, crude petroleum, and rubber products.³² Malaysia's top 5 export markets—which together receive more than half of its exports—are Singapore, China, the US, Japan, and Hong Kong.³³ Malaysia's top 10 import sectors are electrical and

electronic products, chemicals and chemical products, petroleum products, machinery and equipment, manufactured metal products, transport equipment, iron and steel products, crude petroleum, optical and scientific equipment, and processed food.³⁴ China, Singapore, the USA, Japan, and Taiwan together are the source of more than half of Malaysia's imports.³⁵

In 2019, more than 84% of its export products were manufactured,³⁶ suggesting a successful transition from earlier decades when Malaysia was primarily a producer of natural resources. Through the Malaysian Investment Development Authority (MIDA) the government has strongly supported Malaysia's industrial development and the promotion of its manufacturing and services sectors. Sustained investment in infrastructure—ports, airports, rail, and highway—has produced a well-developed transportation system that facilitates the movement of people and goods both internally and among other ASEAN countries.³⁷

Recognizing that there are lower-cost competitors, production is being pushed up the value chain. Industry is concentrated in 500 industrial parks and 18 Free Industrial Zones (export processing zones) that support export-oriented activity. Specialized technology parks include Technology Park Malaysia in Bukit Jalal (Kuala Lumpur) and the Kulim Hi-Tech Park in the northern state of Kedah.³⁸ Malaysia has long been a center for semiconductor and electronics manufacturing, with most production concentrated in Penang—where Intel has a large presence.³⁹

Like its neighbors, Malaysia is transitioning toward a digital economy. Progress has been modest so far, led by growth in ICT (Information & Communications Technology) and e-commerce. Innovation is also a centerpiece in Malaysia's Eleventh Malaysia Plan (2016–2020).⁴⁰ In 2017, the government announced that the country would create a National Artificial Intelligence Framework, to increase AI competitiveness,⁴¹ and in recent years the country has emerged as a center of activity for artificial intelligence, reflected in a growing number of AI startups.

The World Economic Forum's 2019 Global Competitiveness report ranks Malaysia 27th out of the 141 countries analyzed, 8th among 17 Asia-Pacific

counties, and the second most competitive economy in ASEAN after Singapore.⁴²

Reflecting its historical strength in semiconductor and electronics manufacturing, leading US companies in Malaysia include Intel, AMD, Dell, Broadcom, Western Digital, and Altera. Approximately 9,000 engineers currently work for Intel in Malaysia, 4,000 of whom are engaged in chip design. Malaysia also serves as a major hub for Intel's IoT business.⁴³

Thailand

As measured by its 2017 estimated GDP per capita of \$17,900 (PPP), Thailand ranks third among ASEAN countries (after Singapore and Malaysia). Its population of 68.6 million has a median age of 33.1 years, more than 94% practice Buddhism,⁴⁴ and almost half live in urban areas.⁴⁵

Thailand's GDP was more than \$455 billion (official exchange rate) in 2017,⁴⁶ and its 4.5% growth rate in 2018 was slower than that of its neighbors.⁴⁷ This is largely attributable to ongoing concerns over political stability, with a sharply divided electorate and tensions over many years between the military and populist parties. Industry accounts for about 36% of GDP while agriculture accounts for approximately 8%. Major sectors and products range from tourism, textiles and garments, and light manufacturing, to rubber, sugar, and rice. Thailand is the world's second-largest tungsten producer and third-largest tin producer.⁴⁸

Thailand's 2018 top 10 exports are auto parts and accessories, computer equipment and parts, precious stones and accessories, rubber products, plastic pellets, refined fuels, chemical products, electronic integrated circuits, machinery and parts, and iron and steel. Top 10 imports are crude oil, machinery and parts, electrical machinery and parts, chemical products, jewelry, iron and steel, electronic integrated circuits, auto parts and accessories, metal ores, and computer equipment and parts.⁴⁹ Thailand is one of Asia's leading centers for automotive manufacturing, with a production level of 2,167,694 vehicles in 2018, of which 1,140,640 were exported.⁵⁰ Japanese auto companies have a particularly strong presence.⁵¹ China, the United States, Japan, and Malaysia are among Thailand's top imports and exports partners,

and additional export partners include Hong Kong, Vietnam, and Australia.⁵²

Industrial activity is concentrated on Thailand's eastern coast, and particularly in the government-designated Eastern Economic Corridor (EEC). The provinces located within the EEC (Chonburi, Rayong, and Chachoengsao) enjoy a strong manufacturing base but have also been targeted as prime locations for building innovation-based activity. To support this, the government is investing in regional infrastructure by expanding the Rayong's U-Tapao airport and Chonburi's Laem Chabang seaport and by improving road access.⁵³

The country's Twelfth National Economic and Social Development Plan (2017–2021) prioritizes the adoption of technology and support for science, research, and innovation.⁵⁴ Thailand 4.0, the country's 20-year strategy for developing an innovation economy, was launched in 2018, targeting sectors such as aviation and aerospace, next-generation automotive, intelligent electronics, advanced agriculture, biotechnology, food processing, tourism, digital technology, robotics, logistics, and biofuels.⁵⁵

In the World Economic Forum's 2019 Global Competitiveness Report, Thailand ranks #40 out of 141 economies, making it 10th among 17 Asia-Pacific countries and #3 in ASEAN after Singapore and Malaysia.⁵⁶

Under the US-Thailand Treaty of Amity signed in 1966, American companies can hold the majority of shares in Thai-based businesses and are exempt from foreign investment restrictions that apply to most foreign nationals under the Alien Business Law of 1972.⁵⁷

The Philippines

With more than 105.8 million people, the population of the Philippines is the second largest in ASEAN after Indonesia's. The median age is 23.7 and most Filipinos are English speaking.⁵⁸ The Philippines' GDP was more than \$313 billion (official exchange rate in 2017),⁵⁹ and its GDP growth rate was 6.4% in 2018.⁶⁰

Major industry sectors and products range from semiconductors and electronics, business process outsourcing, food and beverage manufacturing, petroleum and fuel, textiles and garments, and transport equipment,

to rice, fish, livestock, poultry, bananas, and coconut/copra. Industry accounts for more than 30% of GDP while agriculture accounts for slightly less than 10%.⁶¹

The Philippines' top 5 export sectors are electronic products; other manufactured goods; machinery and transport equipment; wiring sets used in vehicles, aircraft, and ships; and other mineral products. Its top 5 import sectors are electronic products, mineral fuels and lubricants, transport equipment, industrial machinery and equipment, and miscellaneous manufactured articles. According to August 2019 data from the Philippine Statistics Authority, the United States is the Philippines' largest export market (15.9%), followed by China, Hong Kong, Japan, and Singapore. The Philippines' largest source of imports is China (23.1%), followed by Japan, the US, Indonesia, the Republic of Korea, and Thailand.⁶²

Startup activity is growing, particularly around fintech, enterprise solutions, and AI and machine learning. Like its neighbors, the government is prioritizing innovation. In particular, the Philippine Development Plan 2017–2022 aims to drive innovation by investing in technology startups and more rapidly incorporating technology into existing industries such as agriculture.⁶³ The government is also focused on improving the business climate, through initiatives such as the Ease of Doing Business Act of 2018.⁶⁴ Another strategic initiative, the Philippine Innovation Act signed into law in mid 2019, establishes a National Innovation Council aiming to help micro, small, and medium-sized enterprises become more globally competitive.⁶⁵

The Philippines ranks #64 among 141 economies in the World Economic Forum's 2019 Global Competitiveness Report rankings and is in sixth place among the ASEAN countries.⁶⁶

With strong historical ties, the country hosts a large US corporate presence, led by companies such as Texas Instruments, Hewlett Packard Enterprise, and Citibank. With its young population and English language fluency, the Philippines is also home to a call center and back office sector industry that rivals India's.

Vietnam

Enabled by economic reforms, Vietnam has experienced strong growth since 1986, propelling it from being one

of the world's poorest countries to one of the fastest growing.⁶⁷ The median age of its 97 million population is 30.9 years,⁶⁸ and its middle class is the fastest growing in the region.⁶⁹

Vietnam's GDP was more than \$220 billion (official exchange rate) in 2017,⁷⁰ with an impressive 6.9% growth rate in 2018.⁷¹ Industry accounts for about a third of GDP, with food processing, garments, shoes, machine-building, mining, coal, steel, cement, chemical fertilizer, glass, tires, oil, and mobile phones composing the major industry sectors. Major agricultural products, which account for about 15% of GDP, include rice, coffee, rubber, tea, pepper, soybeans, cashews, sugar cane, peanuts, bananas, pork, poultry, and seafood.⁷²

Leading exports include clothes, shoes, electronics, seafood, crude oil, rice, coffee, wooden products, and machinery. Top imports include machinery and equipment, petroleum products, steel products, raw materials for the clothing and shoe industries, electronics, plastics, and automobiles. Vietnam's top export partners are the United States, China, Japan, and South Korea, and its top import partners are China, South Korea, Japan, and Thailand.⁷³ In the future, the ICT market is expected to see particularly strong growth.⁷⁴

Vietnam has a comparatively low #67 ranking in the World Economic Forum's 2019 Global Competitiveness Report list of 141 countries, putting it at seventh place among the ASEAN countries.⁷⁵

Despite the legacy of the Vietnam War, Americans and American companies are welcomed. Since the restoration of diplomatic relations in 1995 and the lifting of the US trade embargo that was in place since 1975, US companies such as Bank of America, Chevron, Hewlett Packard, Boeing, and Intel have established a presence,⁷⁶ with Intel operating a \$1 billion chip factory in Ho Chi Minh City.⁷⁷ US-Vietnam economic ties are supported by a 2001 bilateral trade agreement, a 2007 Trade and Investment Framework Agreement, and a 2013 US-Vietnam Comprehensive Partnership agreement. Bilateral trade has grown rapidly in recent years, from \$451 million in 1995 to nearly \$52 billion in 2016, making Vietnam America's fastest growing export market in that year.⁷⁸

Transformative Economic Growth

EXHIBIT 1

Singapore and ASEAN's Five Fast-Growing Economies at a Glance, 2017–2018

Measure	Singapore	Indonesia	Malaysia	Thailand	Philippines	Vietnam
Population (millions)	6.0	262.8	31.8	68.6	105.8	97.0
GDP Per Capita (PPP)	\$94,100	\$12,400	\$29,100	\$17,900	\$8,400	\$6,900
Real GDP Growth Rate	3.5	5.2	4.9	4.5	6.4	6.9
WEF Competitiveness Rank	1	50	27	40	64	67

Notes: PPP = purchasing power parity; WEF = World Economic Forum

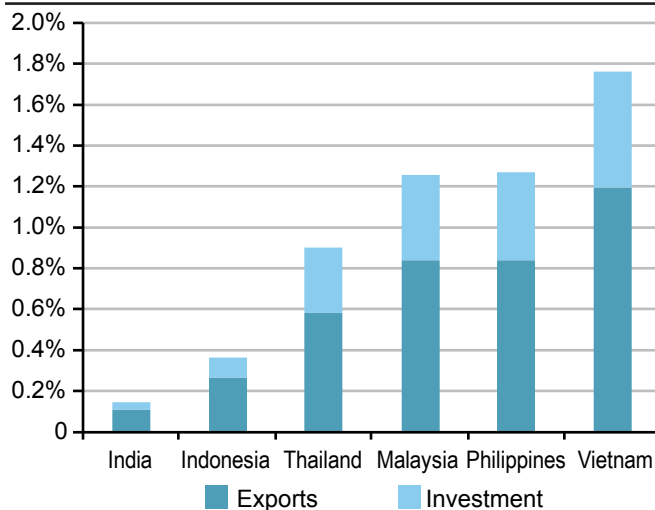
Sources: CIA World Factbook for population and GDP per capita; OECD Development Center for GDP growth rate; World Economic Forum for competitiveness rank among 141 countries worldwide.

Visualization: Bay Area Council Economic Forum

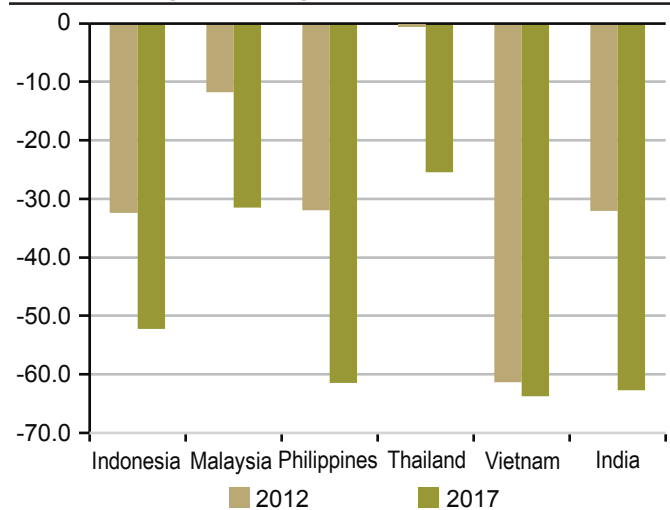
EXHIBIT 2

As production shifts out of China, Southeast Asia will be the major beneficiary.

Potential Gains* From Trade Diversion, % of GDP



Manufacturing Dollar Wages Relative to China



*Assuming economy "captures" 1% of Chinese exports to US or 1% of FDI into China

Source for Potential Gains: IMF, CEIC, PIIE, HSBC Global Research

Source for Manufacturing Dollar Wages: JETRO, World Bank, PricewaterhouseCoopers, HSBC Global Research

In the 1990s and early 2000s, many Southeast Asian economies lost ground to China, whose size and growth attracted international investment at a large scale. Since 2015, however, they have regained ground. This has been driven in part by rising costs in China, trade conflicts with the US and other countries driven

by Chinese industrial and technology policies, and challenges faced by overseas companies in accessing China's market. As US companies look to diversify their Asian presence, economic growth and rising middle classes in Southeast Asia offer an alternative destination in the region. This does not suggest that US companies

can or should ignore China, which due to its size and growth must be taken into account by any global company. It does, however, suggest that companies can find other entry points to Asia's markets that offer growth, diversification, and often greater security.

The US-China tariff conflict spanning 2018–19 has led both Chinese companies and some US companies that operate in China to shift production to Southeast Asia and Vietnam in particular. This hasn't yet happened at a large scale, in part because Chinese supply chains are sticky, with deep networks of suppliers and experience that can't be easily

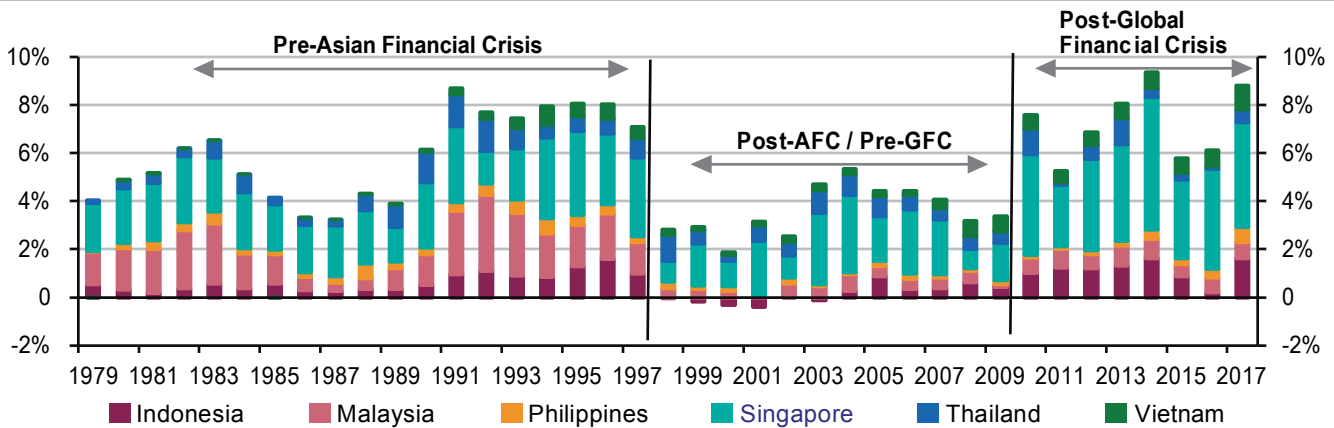
or quickly replicated elsewhere. It is clear, however, that as production shifts out of China, Southeast Asia will be the major beneficiary. HSBC estimates that because of their smaller size, even a small shift in production from China will have an outsized impact in the region's economies.⁷⁹

FDI in the ASEAN region is surging—surpassing FDI in China for the first time in 2018.⁸⁰ Singapore, Indonesia, Vietnam, and Thailand were the main recipients of that increased FDI inflow.⁸¹ From a sector perspective, part of that growth reflects ASEAN's deep integration into Asia-Pacific semiconductor and electronics supply chains.

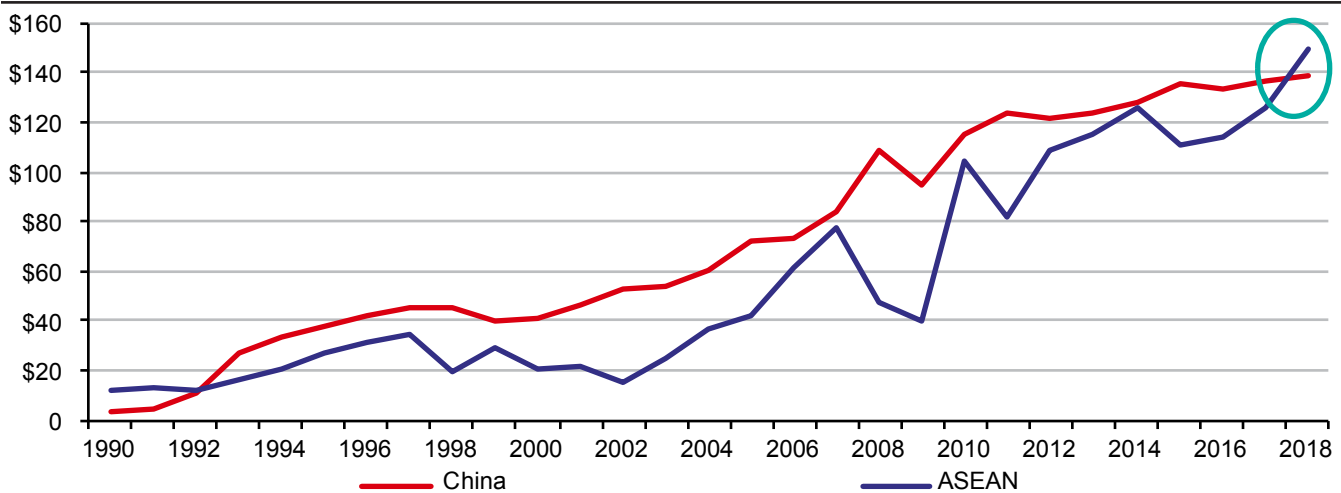
EXHIBIT 3

FDI inflow to ASEAN countries has been growing, with the total surpassing FDI in China for the first time in 2018.

ASEAN FDI by Country, 1979–2017, % of world FDI flow



ASEAN and China FDI Inflows, 1990–2018, US \$ billions

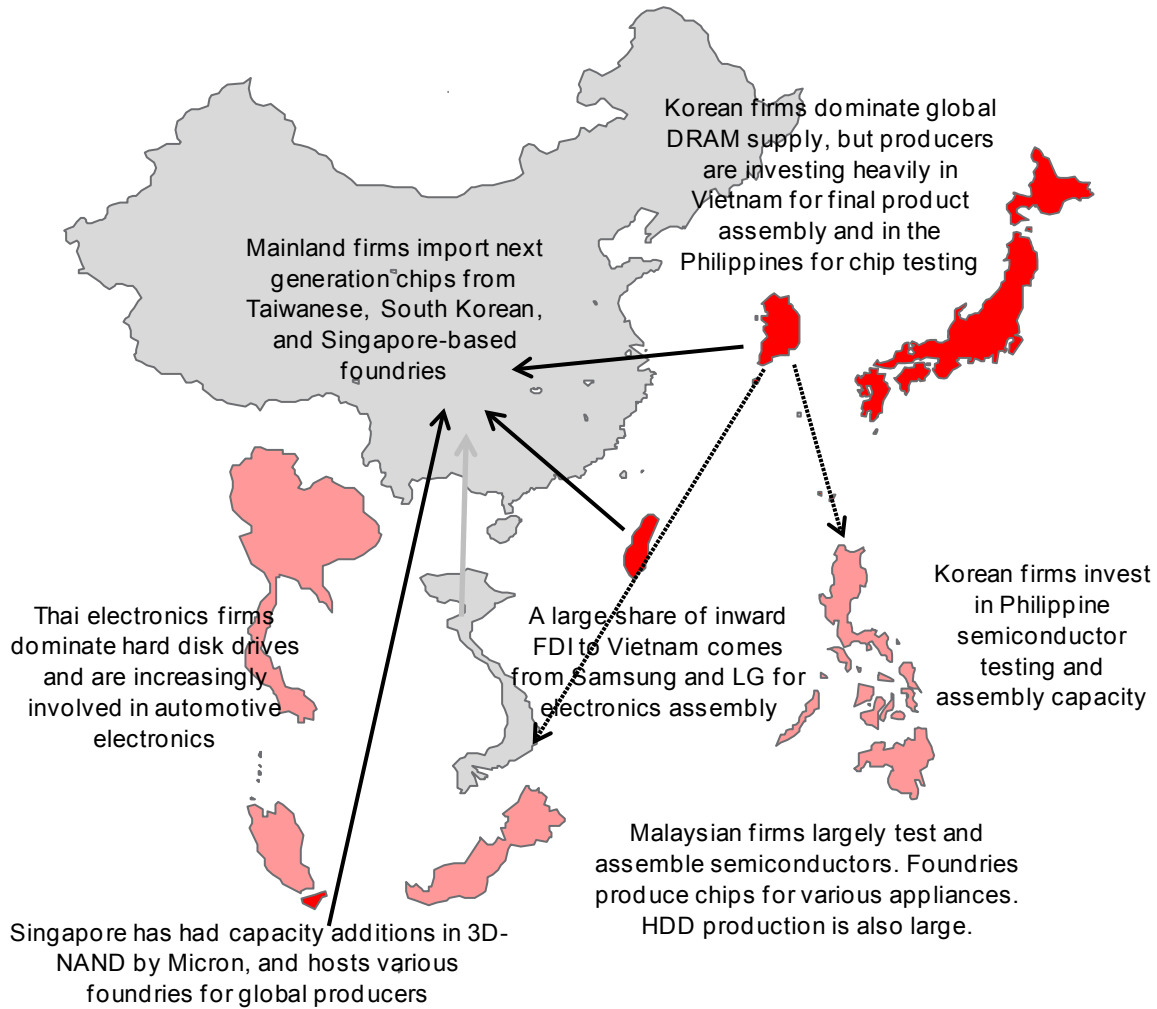


Source: UNCTAD, CEIC, ASEAN stats portal, compiled by HSBC Global Research

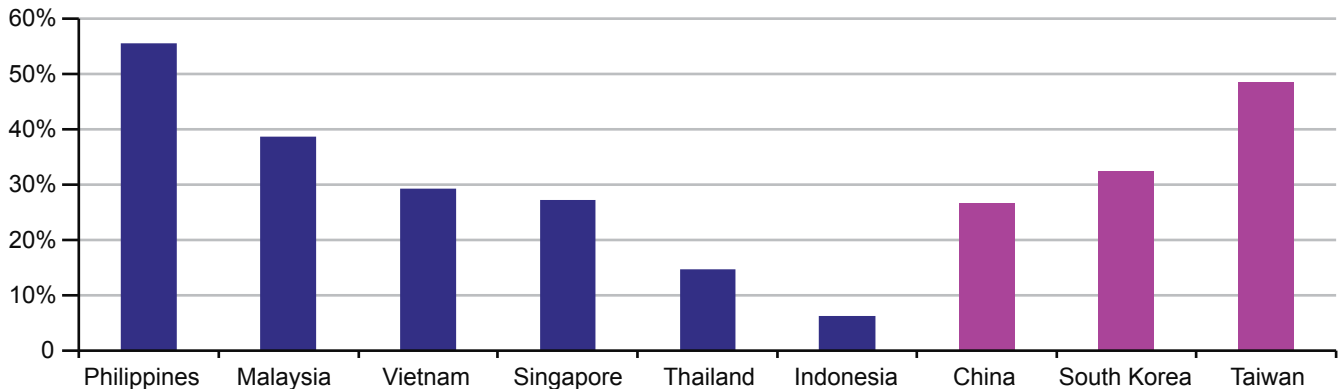
EXHIBIT 4

ASEAN is highly integrated into semiconductor and electronics supply chains.

Integration of ASEAN Countries in the Semiconductor and Electronics Industries



Electronics Exports Share of Total Exports by Country, percent

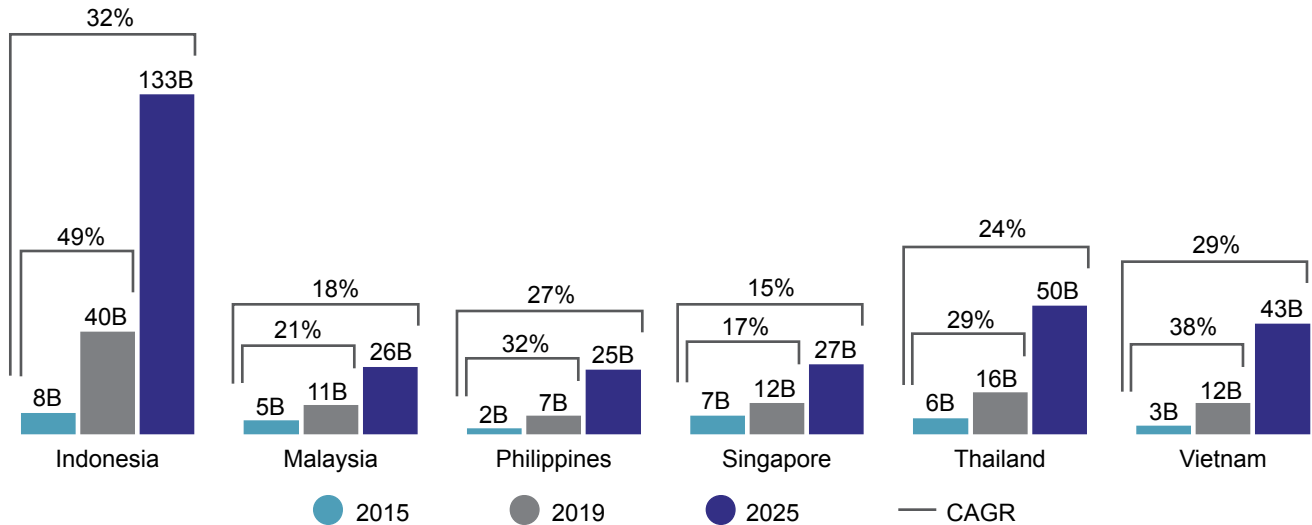


Source HSBC Global Research, 2Q 2019

EXHIBIT 5

Powered by a large and highly engaged user base, Southeast Asia’s internet economy is growing.

Estimated Southeast Asian Internet Economy Market Size, Gross Merchandise Value (GMV), \$ billions



Source: e-Economy SEA 2019 report by Google, Temasek, and Bain & Company

Beyond hardware, the region’s digital economy is also seeing rapid growth. The 2019 Southeast Asia internet economy study⁸² produced by Google, Singapore’s sovereign wealth fund Temasek, and Bain & Company gives the following insights:

- There were more than 360 million internet users across Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam in 2019—100 million more than in 2015.
- More than 90% of Southeast Asians connect to the internet primarily through their smartphones, making Southeast Asia one of the most mobile-first internet regions globally.
- Southeast Asians are the most engaged mobile internet users in the world. Users in Thailand spend more than five hours a day on the mobile internet—more than any other country. Indonesian, Filipino and Malaysian users, who are connected to the mobile internet approximately four hours each day, are also among the world’s top ten countries in terms of internet usage. (By comparison, the global average is three hours and thirteen minutes per day.)

- In 2019, Southeast Asia’s internet economy reached an estimated \$100 billion in gross merchandise value (GMV) across the online travel, e-commerce, online media, and ride hailing sectors—up 40% from 2018.

Looking country by country reveals the following:

- With the largest internet user base in the region (152 million in 2019), Indonesia has the largest and fastest growing internet economy in Southeast Asia (\$40 billion, with a 49% CAGR over 2015–2019.)
- Thailand has the second largest internet economy in the region (\$16 billion in 2019, with a 29% CAGR from 2015–19), driven by a vibrant e-commerce market and online travel sector.
- Vietnam’s internet economy (\$12 billion in 2019, with 38% CAGR from 2015–19) is also growing rapidly, with e-commerce in 2019 almost doubling from one year earlier, and online media (advertising, gaming, subscription music, and video on demand) growing more than 36% from 2018 to 2019.
- Singapore (\$12 billion in 2019, with 17% CAGR from 2015–2019) and Malaysia (\$11 billion in 2019, with

21% CAGR from 2015–2019), the two most advanced economies in the region, are seeing internet economy growth in the range of 20% per year. The online travel sector leads the internet economy in both Singapore (\$6 billion in 2019) and Malaysia (\$5 billion in 2019) with 2018–2019 growth rates of 11% and 12% respectively.

- The Philippines, with 68 million internet users (the second largest user base after Indonesia), has a comparatively small internet economy (\$7 billion in 2019, with a 32% CAGR from 2015–19). Of the six Southeast Asian countries, it has the most room for growth and is experiencing a growth surge in the online media sector, with a 42% CAGR from 2015–2019.

Overall, both e-commerce and ride hailing (including food delivery services) are experiencing an explosion in demand. The number of Southeast Asians who bought and sold items online tripled between 2015 and 2019 (from 49 million to 150 million) and the number of ride hailing users grew five times (from 8 million to 40 million).

“Powered by these fundamental changes in consumer behavior, the Internet economy [in Southeast Asia] continues to grow at an unprecedented pace. It has soared to \$100 billion for the first time in 2019, more than tripling in size over the last four years...By 2025, the Internet economy is expected to grow to \$300 billion.”

—Google, Temasek, and Bain & Company, *e-Conomy SEA 2019*

Internet economy investment in the region has grown at an exponential pace since reaching the \$1 billion mark in 2015. The inward funding flow reached a record high of \$14.1 billion in 2018, and internet firms raised \$7.6 billion in the first 6 months of 2019, about 7% more than in the first half of 2018. Total capital raised between 2015 and the first half of 2019 is close to \$37 billion. A large portion of that funding has gone to Southeast Asia’s eleven unicorns—Bigo, Bukalapak, Gojek, Grab, Lazada, OVO, Razer, Sea Group, Traveloka, Tokopedia, and VNG. Following behind those 11 are almost 70 “aspiring unicorn” companies valued at

\$100 million–\$1 billion, which together have raised \$5 billion since 2016. Beyond those two groups that have received the majority of the funding there are also more than 3,000 internet economy startups that have received more than \$7 billion between 2015 and 2019.⁸³

All of the region’s leading countries have adopted policies designed to create digital, innovation-led economies. In Thailand, for example, the National Innovation Agency (NIA) and Digital Economy Promotion Agency (DEPA) are working to build the country’s technological capacity through the Thailand 4.0 initiative. NIA aims to raise Thailand’s ranking to the top 30 of the Global Innovation Index by 2030. Results can be seen in a growing number of multinational companies investing or opening offices, including Alibaba (China), JD.com (China) and Grab (Singapore). The country’s digital innovation hub, True Digital Park, recently partnered with Google to create a tech academy, and has launched a Bangkok Cyber Tech District with the goal of hosting 20,000 local and international startups. Blockchain and crypto-currency are a focus and have active support from government.

As part of this transition, in 2017 Thailand moved to chip-embedded welfare cards to replace cash payouts for government support; topped up with credit every month, the cards can be used to buy groceries at designated stores and for bus and train service. The government’s Net Pracharat program provides free broadband access using fiber-optic cable to approximately 25,000 villages that are too remote for commercial service, is developing a digital identity card to reduce the paperwork required for transactions, and is exploring how better to use big data for public benefit. Among other benefits, digitalization is seen as a tool to reduce widespread corruption by eliminating middlemen.⁸⁴

Similarly, Vietnam’s government is developing regulatory frameworks to enable growth in the digital economy, including the sharing economy and fintech.⁸⁵ It has also made modernizing the nation’s payments system a top priority, with the related goal of 70% of Vietnamese aged 15 or older also having bank accounts. Increased use of credit cards and digital payments are key parts of the strategy. The prime minister has directed banks to reduce cash transactions to less than 10% by the end

of 2020. It's an ambitious goal, given that just 31% of Vietnamese adults today have bank accounts, just 4.1% of Vietnamese have credit cards, and 95% of payments are made with cash or gold. The country's young population is tech-savvy, however, with 70% using smartphones and access readily available to digital payments offered by local startups.⁸⁶ Statista estimates that the number of internet users will grow from 54.7 million in 2018 to 63.6 million in 2020 and 75.7 million by 2023.⁸⁷ Separately, the government launched the Initiative for Startup Ecosystem in Vietnam (IESV) in 2016, with the goal of creating a favorable environment for the creation and growth of new enterprises with high growth potential based on IP and new business models. Focal points include establishing or improving the legal environment for startups and venture capital, creating a national startup portal (startup.gov.vn), and supporting 2,000 innovative business projects and 600 startups, of which 100 succeed in securing follow-up investment with a total value of \$100 million.⁸⁸

Singapore-based startup tracker e27⁸⁹ paints the picture of a young but maturing startup environment across the region:

Indonesia: 847 startups in 2018, of which 46 raised a total of \$4.07 billion, with an average deal size of \$88 million. The top verticals by number of deals were ecommerce (10), fintech (9), enterprise solutions (3), education (3), and healthtech (3), while the top verticals by average deal size were logistics and supply chain (\$2.7 billion), ecommerce (\$1.1 billion), fintech (\$182 million), platform (\$30 million), and enterprise solutions (\$19 million). Beyond Jakarta, startup centers include Jakarta Bandung and Jogjakarta, both of which host leading universities and branches of Singapore's incubator BLOCK71 (for details on BLOCK71 see Chapter 2).

Malaysia: 1,592 startups in 2018, of which 30 raised a total of \$232 million, with an average deal size of \$11.2 million. The top five verticals by number of deals were fintech (6), e-commerce (4), consumer (3), enterprise solutions (3), and healthtech (2). The top five verticals by average deal size were media (\$133 million), automotive (\$19 million), fintech (\$6.8 million), cybersecurity (\$45 million) and consumer (\$2.5 million). Applications to accelerators are rising.

Beyond the capital of Kuala Lumpur, Penang is a major center of activity.

Philippines: 499 startups in 2018, of which 21 raised \$304.2 million, with an average deal size of \$14.5 million. The top five verticals by number of deals were enterprise solutions (5), data & analytics (2), fintech (2), and ICT (2). The top five verticals by average deal size were ICT (\$107.5 million), fintech (\$20.4 million), insurtech (\$9 million), enterprise solutions (\$2.6 million), and food & beverage (\$2.3 million). For a country of its size, the startup sector in the Philippines is relatively underdeveloped.

Thailand: 515 startups in 2018, of which 19 raised a total of \$92.9 million, with an average deal size of \$4.9 million. The top verticals by number of deals were fintech (4), consumer (2), human resources (2), and mobile (2). The top verticals by average deal size were mobile (\$17 million), food & beverage (\$10 million), hardware (\$7.7 million), platform (\$7 million), and fintech (\$5.4 million). Beyond Bangkok, Chiang Mai is emerging as a tech hub, with a growing number of co-working spaces and online entrepreneurs. A shortage of engineers and government censorship of the internet are constraints.

Vietnam: 336 startups in 2018, of which 23 startups raised a total of \$193.8 million, with an average deal size of \$8.4 million. The top five verticals by number of deals were e-commerce (7), enterprise solutions (3), education (2), fintech (2) and travel (2). The top five verticals by average deal size were consumer (\$51 million), education (\$26.6 million), e-commerce (\$10.5 million), travel (\$3.2 million), and logistics/supply chain (\$2.4 million). Hanoi and Ho Chi Minh City are the leading startup hubs.

Singapore: 2,089 startups in 2018, of which 189 raised \$7.5 billion, with an average deal size of \$29 million. The top verticals by number of deals were fintech (21), enterprise solutions (20), e-commerce (14), healthtech (13), big data (12), and consumer (12). The top verticals by average deal size were automotive (\$1.3 billion), ICT (\$300 million), entertainment (\$200 million), e-commerce (\$150 million), and aerospace (\$50 million). The standout automotive investment amount was largely driven by Grab.

ASEAN countries cover a broad spectrum when measured by the Global Innovation Index, which bases its ranking on criteria such as political environment, regulatory environment, business environment, education, research, general infrastructure, IT and telecom infrastructure, ecological sustainability, market and business sophistication (knowledge workers, innovation linkages and knowledge absorption), knowledge and technology outputs, and creative outputs.⁹⁰

As this suggests, the economic environments in ASEAN are diverse, and for Bay Area tech and internet companies, some countries present challenges that could discourage deeper engagement. In 2018, Vietnam adopted one of the world's most restrictive internet laws, requiring internet companies to store their Vietnam-based users' data on servers inside the country. The law also requires overseas internet companies to open offices in Vietnam and to remove content within 24 hours at the government's request, raising concerns about privacy and potential government crackdowns on opponents. Bay Area companies including Facebook, Google, Apple, Yahoo, and Twitter have voiced their opposition.⁹¹

While in many respects Southeast Asia represents an economic frontier in Asia, the region is far from being undiscovered, as Chinese companies are actively investing and penetrating markets. From this perspective, Southeast Asia is a landscape where US, Chinese, and other companies will increasingly compete for market share and leadership. China's Alibaba Group, for example, has invested \$4 billion for a controlling stake in Singapore's leading e-commerce company Lazada. As described by Alibaba co-founder and Lazada CEO Lucy Peng, "With a young population, high mobile penetration, and just 3% of the region's retail sales currently conducted online, we feel very confident to double down on Southeast Asia."⁹² In 2017, Alibaba led another \$1.1 billion investment in Indonesia's leading online marketplace Tokopedia.⁹³

Recognizing this regional dynamism, Singapore—the most developed, open, and globally connected economy in Southeast Asia—has positioned itself as a bridge, offering a platform that extends not just to Southeast Asia but to the larger Asia-Pacific region.

EXHIBIT 6

ASEAN countries cover a broad spectrum when measured by the Global Innovation Index.

	2018 Rank	2019 Rank
Singapore	5	8
Malaysia	35	35
Thailand	44	43
Vietnam	45	42
Brunei	67	71
Philippines	73	54
Indonesia	85	85
Cambodia	98	98

Source: Global Innovation Index 2018 and 2019 by Cornell University, INSEAD, and WIPO



Singapore's Economy: Planning, Execution, and Open Markets

Since its independence in 1965, Singapore has evolved from a small trading center to become a major transshipment port, an international financial center, a regional base for multinational corporations, and a production center intimately linked to global supply chains. It is now aspiring to become a regional center for technology and innovation. Strategically, its economy has been moving progressively toward higher value activities.

While its role as a regional economic hub isn't new, the focus is changing. For decades, Singapore has successfully positioned itself as a platform economy for multinational corporations doing business in Asia, and in Southeast Asia in particular. A commitment to open markets and the rule of law, combined with minimal corruption and efficient governance, provides a foundation that has been attractive to global businesses. Most multinationals operating in Singapore use the city as their Southeast Asia or Asia-Pacific regional headquarters, a role that can include R&D, marketing, procurement, supply chain, and media activity.

The evolution of Singapore's economy can be seen physically in the Port of Singapore Authority (PSA) Tanjong Pagar Container Terminal, which opened in 1972 with the arrival of a ship carrying 300 containers. Located on the city's central waterfront, Tanjong and other terminals developed in the 1980s and early

1990s¹—Keppel Wharves, Brani Terminal, and Pasir Panjang Wharves—handled 33.7 million twenty-foot equivalent unit (TEU) containers in 2017,² making the Port of Singapore the busiest transshipment port in the world.³ In 2018, Tanjong was closed, and operations moved to a new multi-billion port complex across the island at Tuas, with the other center-city port operations including Pasir Panjang set to follow as the new facility is developed between now and 2040. The historic port property is being redeveloped as a new residential and commercial hub, Greater Southern Waterfront City.⁴ In 2018, Port of Singapore container volumes grew to 36.6 million TEU, an increase of more than 8.6% from the year before, making Singapore the world's second largest container port⁵ and maintaining its title as the world's top transshipment port.⁶

Global Rankings

Global indexes consistently rank Singapore among the world's most competitive and innovative economies.

- The **Global Innovation Index 2019 (GII)** ranks Singapore #8 in the world, after Switzerland, Sweden, the United States, the Netherlands, the United Kingdom, Finland, and Denmark. It also ranks as #1 in the Asia-Pacific region, followed by South Korea and Hong Kong in second and third places. Scores in the Index are based on a

range of criteria including political environment, regulatory environment, business environment, education and research, general infrastructure, IT and telecommunications infrastructure, ecological sustainability, market and business sophistication (knowledge workers, innovation linkages, knowledge absorption), knowledge and technology outputs, and creative outputs. The GII also ranks Singapore among the world's top cluster economies for science and technology, at number 28.⁷

Outside Singapore, the 2019 GII sees progress across the ASEAN region on innovation indicators, but with significant variation between countries. While Singapore ranks highest overall, Vietnam leads in the categories of expenditure on education, trademarks by origin, and high-tech imports, while Indonesia leads in gross capital formation, and Thailand and Malaysia together lead in creative goods exports.⁸

- Another innovation ranking, the **2019 Bloomberg Innovation Index**, lists Singapore as the world's 6th most innovative economy on a curated list of 60. The ranking is based on seven factors that contribute to innovation, including research and development, manufacturing capability, and concentration of high-tech companies.⁹
- The **Global Power City Index 2019**, which focuses on global competition between cities and ranks them based on their ability to attract people, capital, and enterprises from around the world (using as measures economy, R&D, cultural interaction, livability, environment, and accessibility), places Singapore as #5, after London, New York, Tokyo, and Paris.¹⁰
- A broader competitiveness index, the World Economic Forum's 2019 **Global Competitiveness Index 4.0** places Singapore as the #1 most competitive (overtaking the United States for the top position) among 141 economies studied. The index uses 103 indicators of productivity and ecosystem competitiveness organized within 12 category "pillars": institutions, infrastructure, ICT adoption, macroeconomic stability, health, skills, product market, labor market, financial system, market size, business dynamism, and innovation capability. Singapore leads on the infrastructure pillar

with world-class transport infrastructure, services, and connectivity. It also tops the health pillar due to a healthy life expectancy of 74.2 years (ahead of Japan) and scores second (behind Hong Kong) in terms of market efficiency due to its trade openness. Singapore also tops the labor market and financial system pillars and ranks second (behind Finland) for the quality of public institutions.¹¹

- The World Bank's 2019 **Ease of Doing Business Rank** places Singapore at #2, behind New Zealand and ahead of Denmark and Hong Kong, in a comparison of business regulation for domestic firms in 190 world economies. This ranking is based on ease of doing business scores in 10 areas: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency.¹²

Singapore also emerges as a leader in two studies of global economies published by the McKinsey Global Institute in the fall of 2018. The first study identified 71 emerging economies that were experiencing strong and sustained growth. Singapore and three other ASEAN countries—Thailand, Indonesia, and Malaysia—are among the 18 of those economies that outperformed global benchmarks and their peers in achieving rapid sustained growth. All four qualified as long-term outperformers that achieved GDP per capita growth of more than 3.5% annually for 50 years.¹³ In the second study, McKinsey examined global economic "superstar" firms, sectors, and cities that have a substantially greater share of income than peers and are pulling away from those peers over time. Out of 3,000 cities studied, Singapore is among the 50 selected as superstars that are outpacing global peers in terms of per capita GDP growth and contribution to global GDP. It is also among the subset of those 50 that are cities pulling rapidly away from their peers and posting exceptionally strong income and population growth. Other Southeast Asian cities included among the 50 superstars are Bangkok, Jakarta, Kuala Lumpur, and Manila.¹⁴

Connectivity, based on sustained investment in infrastructure, is part of Singapore's business competitiveness formula. Singapore's Changi Airport

has connecting flights to over 200 destinations worldwide, with 5,000 arrivals and departures a week by 80 international airlines, and was rated the top airport in the world for the seventh consecutive year by travelers voting in the 2018–2019 World Airport Survey.¹⁵ Singapore's modern and efficient ports are connected by 200 shipping lines to 600 ports in 23 countries.¹⁶

Government Strategies

Singapore's government engages deeply in economic planning and has been extraordinarily effective in the development and execution of medium and long-term strategies. In contrast to many countries, execution is a priority and existing plans are closely monitored and adapted as conditions change.

At the highest level, the **Strategy Group** in the Prime Minister's Office focuses on national priorities with a time horizon of up to twenty years, coordinating agencies to ensure that the necessary resources are available. Priorities include infrastructure upgrades: for example, port expansion to accommodate mega-vessels and growing Asian demand; planning for how to operate facilities such as Singapore's airport in a labor-scarce environment by using greater automation; planning for autonomous vehicles; and the development of high-speed rail between Singapore and Kuala Lumpur. Specific initiatives are implemented by a range of ministries and agencies that support strategic priorities in fields ranging from resource planning to lifelong learning, government efficiency, and economic agility.

NEWater, for example, focuses on reducing Singapore's dependence on imported water through water capture and recycling, taking into account how water availability may be affected by climate change.

Another plan, **SkillsFuture**, focuses on upgrading worker skills. An app and website, the MySkillsFuture.sg portal, connects users to supporting resources, and every citizen in Singapore is entitled to a SGD 500 stipend for whatever skills training they desire. To de-risk the management by businesses of employment transitions, under the Professional Conversion Programme the government pays part of the cost of training when companies take on new employees in their 30s or 40s

who are switching careers, or when existing employees are developing new skills; companies across different sectors share advance information on the skills they need. The SkillsFuture initiatives connect to sectoral transformation master plans.

Macro-level economic spatial planning is built on a "polycentric approach" to economic development, through geographically dispersed themed districts and clusters: examples include the Jurong Innovation District for advanced manufacturing, the central business district for fintech, Fusionopolis for new media, and Biopolis for biotech (see below).

Parallel with these plans, the government is developing regulatory frameworks conducive to growth and innovation. It is doing this in part through the creation of regulatory "sandboxes" where companies and the government engage to determine which regulations work and later develop appropriate frameworks. Current focal points include emerging fields such as fintech, autonomous vehicles, drones, and healthtech. Other initiatives include a national AI program, a national robotics program, and a government technology program designed to harness technology to address government challenges.

Smart Nation

The Smart Nation initiative was established under the Prime Minister's Office in 2014 to coordinate digital strategies across multiple government agencies and to develop policies, standards, and platforms designed to digitalize and improve the quality and efficiency of government systems. Its OneService app, for example, consolidates the tracking and oversight of citizen complaints regarding services provided by 11 agencies and 16 town councils. Another app, Moments of Life, integrates and bundles government services for families—such as immunization records, medical appointments, geolocation and vacancy information for schools, and government benefits and merchant discounts for seniors—through one user interface. The initiative rests on an open data system built on the principle that data is an asset that can be shared and leveraged for public benefit, and where data sets accumulated by government are made accessible

to businesses and the public through online portals. Data.gov.sg serves as a one-stop portal for publicly-available datasets from 70 public agencies. The Land Transport Authority's DataMall, for example, has made approximately 100 data sets available, resulting in the development of more than 40 mobile apps and services. Because residents who are not technologically oriented may lose the benefit of some of the services, the government is endeavoring to systematically educate residents on technology use across Singaporean society.¹⁷

Industrial Transformation

Between 2016 and 2018, the government created 23 Industry Transformation Maps (ITMs)¹⁸ designed to help stakeholders identify sector-specific opportunities and challenges at the industry level. Companies can also use two model factories operated by the Agency for Science, Technology and Research (A*STAR) to test new manufacturing technologies prior to deployment at their own facilities.¹⁹

Smart Industry

Singapore's Economic Development Board (EDB) supports advanced manufacturing and industrial innovation more broadly through the Singapore Smart Industry Readiness Index, the world's first Industry 4.0 tool designed to systemically help companies make the digital transition. Launched in 2017 and validated by a panel of academic and industry experts, the Index serves as a diagnostic tool that companies of all sizes and across all industries can use to better understand Industry 4.0 concepts, evaluate the state of their facilities, scale the adoption of new technologies, and architect internal transformations.²⁰ To that end, the EDB conducts public workshops and has funded 300 two-half-day internal company assessment workshops, facilitated by assessors.²¹ Both Singaporean and multinational companies are eligible to participate.

Smart City

With the third highest population density in the world, at 20,000 people per square mile,²² urban planning is a priority for Singapore, with the government devoting major resources to sustainability and mobility. These efforts have for the most part been successful, with minimal traffic congestion compared to other Asian

cities, clean air and water, and ample open space—all attractive features for expats and multinationals as well as locals. For example, one goal of the Urban Redevelopment Authority's Master Plan for Singapore's development is that by 2030 more than 90% of households will live within 400 meters of a public park.²³ Other focal points include e-government (digital government services), the development (with supporting legislation) of infrastructure to support autonomous vehicles, and the provision of open datasets to enable citizens—through research and app development—to co-create solutions for a range of urban challenges.²⁴

McKinsey Global Institute ranks Singapore among the world's leading digital cities, with high marks for its smart city technology base (which includes a critical mass of smartphones and other sensors connected by high-speed communications networks, as well as open data portals) and for its smart applications use (which includes smart tools for mobility, security, healthcare, energy, water, waste, economic development and housing, and engagement and community). In the Asia-Pacific region, Singapore ranks first for its technology base (ahead of cities such as Seoul, Shanghai, Melbourne, Hong Kong, and Beijing), number two in smart city applications deployment (behind Seoul and ahead of Shenzhen, Beijing, Tokyo, and Shanghai), and number nine for citizen awareness, usage, and satisfaction with the applications implemented in their cities.²⁵

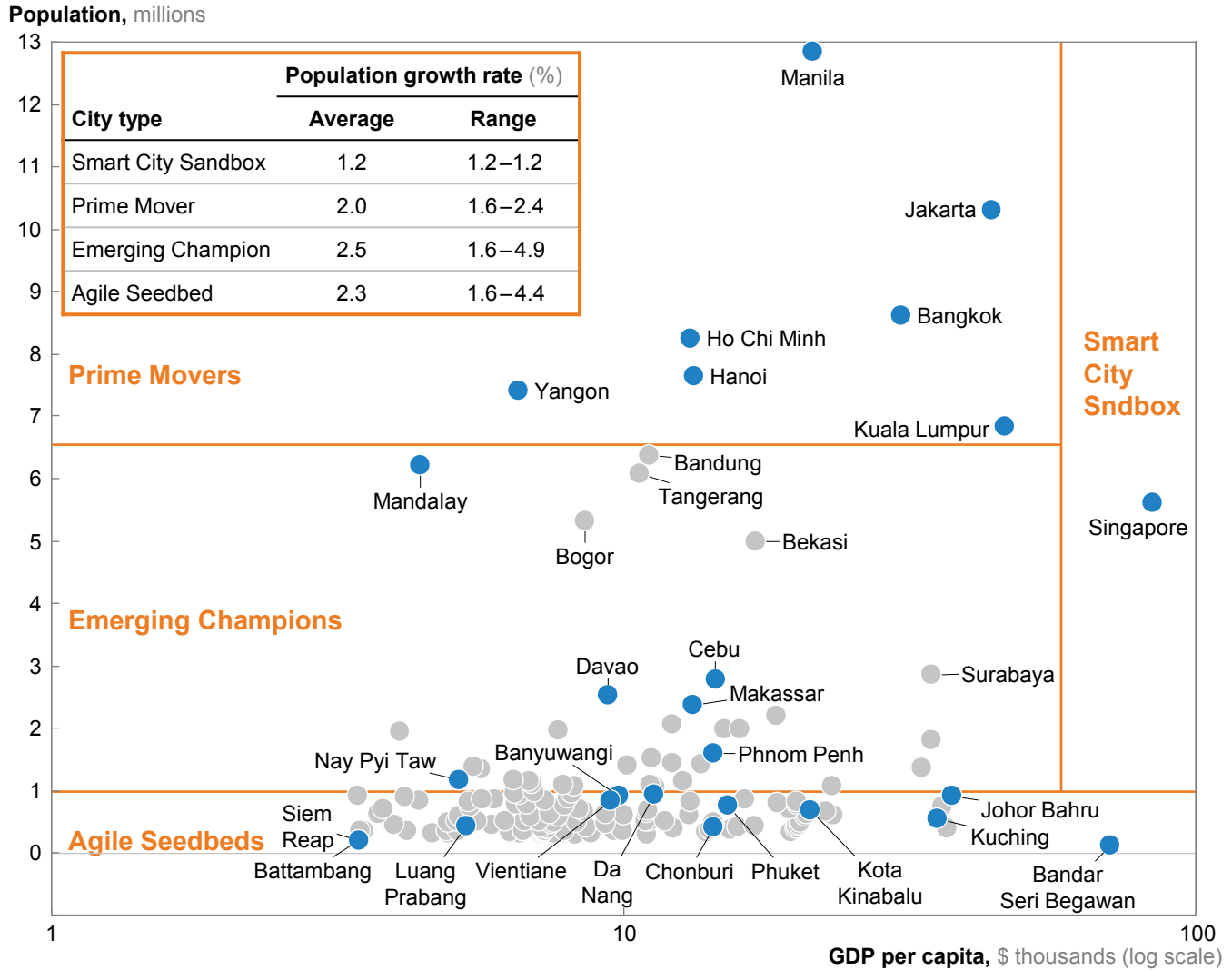
In a 2018 study of how smart cities in Southeast Asia could evolve, McKinsey concluded that the adoption of smart technologies could have substantial impact in the region as a whole through using utilities and built environment solutions that could eliminate up to 270,000 kilotons of greenhouse gas emissions annually; implementing mobility, crime prevention, and better emergency response solutions to save some 5,000 lives lost each year to accidents, fires, and homicides; using intelligent traffic and transit solutions to save up to eight million man-years in annual commuting time; deploying smart healthcare solutions capable of reducing the region's disease burden by 12 million disability-adjusted life years; creating more efficient and productive environments for business and hiring which could add almost 1.5 million jobs; and enabling better housing options and lower energy bills which could save as much as \$16 billion annually.

EXHIBIT 7

The McKinsey smart city study's four archetypes reflect how a city's unique characteristics and the state of its systems influence the impact that various smart solutions can deliver.

City Archetypes Across Southeast Asia

● ASEAN Smart Cities Network cities



Note: National GDP per capita figures used for Bandar Seri Begawan, Battambang, Siem Reap, Luang Prabang, and Phuket due to limited data availability. Source: MGI CityScope database; McKinsey Global Institute analysis

Singapore is a leader in implementing smart city strategies, particularly in terms of mobility (the flip side of congestion). Mobility strategies are one example. Since Singapore introduced dynamic congestion pricing through the Electronic Road Pricing System in 1990, traffic congestion has fallen 15% and public transit use has risen from 45% to 65% of daily commutes. Looking to Singapore as a model for other

cities, McKinsey notes that technology solutions alone are seldom enough to make a city truly livable, and that good execution and an understanding of how to adapt and integrate systems to deliver outcomes is critical to success.²⁶

Here too, Singapore is an outperformer, constituting what McKinsey describes as “a smart city sandbox.”

To achieve the archetypal smart city sandbox status, “a city must have already built robust and comprehensive high-speed communication networks and implemented dozens of smart applications covering every domain of urban life,” which then allows that city to “turn to developing next-generation technologies and creating new and better experiences for residents.” The smart city sandbox archetype is the most advanced of four categories (with “prime movers,” “emerging champions,” and “agile seedbeds” as the second, third, and fourth archetypes) that emerged in the McKinsey “Smart Cities in Southeast Asia” study; Singapore is currently the only city in the region to achieve smart city sandbox status and also ranks among the most advanced smart cities globally.²⁷

The government has taken its urban focus to the world stage to present Singapore as a model smart city that embraces digital technology and the use of data for an array of public services, can pilot new technologies, and can export its experience. The Center for Liveable Cities (CLC) is its vehicle for distilling and sharing key learning points. Since 2008, CLC has collected and presented data on cities, focusing on Singapore’s transformation since independence and on strategies to combat problems that are common to urban development globally. In addition to research, the Center has hosted the World Cities Summit, advised on urban development in cities such as Colombo (Sri Lanka), and conducted practitioner-oriented training sessions on Singapore’s urban governance model for over 700 Singapore and international visitors.²⁸

The Push for Innovation

Singapore’s government is attempting to build a local innovation ecosystem. A work in progress, its push builds on several initiatives.

Research

Singapore started building its capacity for scientific research in the 1990s, with the initial goal of co-creating technologies built on baseline technology brought in by multinational companies. Singapore’s universities at that time were largely teaching universities and not engaged in research. To guide

the transition, Singapore formed the National Science & Technology Board in 1991, which subsequently transformed into the **Agency for Science, Technology and Research (A*STAR)**, with the objective of accelerating the development of Singapore’s own research and innovation capacity. Two councils composed of Singaporean and global experts were created—a Science and Engineering Research Council and subsequently a Biomedical Research Council—to advise on global trends in their respective fields and to propose the areas of research that Singapore should pursue. The executive offices of the Councils in turn support a range of research centers; A*STAR is thus acting as both a funding agency and also as the research performer.



CREATE laboratory buildings

A*STAR initiatives today include A*ccelerate, which manages the technology commercialization and technology transfer of A*STAR's research. A*ccelerate's focus has grown from an early emphasis on providing gap funding and the licensing and management of IP, to a newer emphasis on product co-development with partners. In the last ten years, A*ccelerate has contributed to the IP portfolios of approximately 100 companies and has raised over \$200 million for startups. A*STAR also collaborates directly with companies in research projects, and facilitates the transfer of technology through joint IP ownership and development of know-how and manpower skilled in these technologies.

Creation of a domestic base of scientists and researchers is supported by the A*STAR Graduate Academy (A*GA), which develops collaborative research platforms with universities and provides undergraduate, PhD and post-doctoral scholarships and fellowships.

In the early 2000s, Singapore launched two additional initiatives to deepen its research capacity.

The first initiative, the **National Research Foundation (NRF)**,²⁹ was set up—with initial funding of SGD 5 billion in the National Research Fund—to set national R&D strategy and policy and fund R&D initiatives with the goal of further transforming Singapore into an R&D hub and knowledge-intensive innovation economy. Funding for R&D expanded over the years, and by 2016, the government was committing SGD 19 billion (approximately \$14 billion) over the five-year period 2016 through 2020 to support and translate research, leverage science and technology to address national challenges, and help build the innovation and technology adaptation capacity of Singaporean companies. A wide range of programs are supported, including funding A*STAR and its research institutions, as well as R&D in universities and academic medical centers. NRF has to date made 98 awards under its Competitive Research Programme, supported 99 NRF fellows, and supported the establishment of 14 corporate laboratories in universities.³⁰ Co-investment with private venture capital firms through matching funds provides a bridge to startups. The current focus is on “deep tech” startups that are rooted in science and go beyond the already well-funded digital space.

NRF also launched the **Campus for Research Excellence and Technological Enterprise (CREATE)**, a facility housing research centers run by leading global universities including the Swiss Federal Institute of Technology (ETH); MIT; Technical University of Munich; Hebrew University of Jerusalem; the University of California, Berkeley; Shanghai Jiao Tong University; Cambridge University; and the University of Illinois at Urbana-Champaign. Interdisciplinary research at CREATE focuses on four major themes: human systems, energy systems, environmental systems, and urban systems. In 2013, CREATE was named the Laboratory of the Year by R&D Magazine, based on excellence in laboratory design, planning, and construction.³¹

Wei Yang Cheong, Deputy CEO of the National Research Foundation, describes the ultimate goal: “We’re not looking to rival places like the Bay Area or Boston. What we want to do is engage them. By linking to key nodes in the global innovation ecosystem, we want Singapore to become a place where technology companies can form multinational teams and a base from which companies can expand in Southeast Asia—and, more broadly, Asia—growing their businesses out from Singapore.”³²

BLOCK71 Singapore

In 2011, NUS Enterprise (the entrepreneurial division of the National University of Singapore), Singtel Innov8, and the Media Development Authority of Singapore led the creation of BLOCK71, an initiative to provide Singaporean startups with one-stop access to supportive services.³³ Originally housed in a converted industrial building in Singapore's one-north area (Block 71), the program has since expanded to include seven buildings that now house more than 250 startup companies and 30 incubators and venture capital firms.³⁴ Not limited to Singaporeans, it welcomes entrepreneurs from ASEAN and other countries. To leverage different ecosystems and help ideas flow in both directions, it has opened five additional facilities in Asia: three in Indonesia (in Jakarta, Yogyakarta, and Bandung) and one in Suzhou (China).³⁵ In 2015, it opened a facility in San Francisco to better connect Singapore's nascent startup ecosystem with the Bay Area's.

Programs at BLOCK71 are evolving to support priority fields. This includes the launch in 2018 of the Innovation

Cyber Security Ecosystem at BLOCK71 (ICE71), which serves as the country's first integrated cybersecurity hub. The initiative is supported by the Cyber Security Agency of Singapore (CSA) and the Infocommunications Media Development Authority (IMDA), which are endeavoring to strengthen Singapore's cybersecurity ecosystem competency and technology base. ICE71 also connects to the National Cybersecurity R&D Laboratory and the NUS-Singtel Cyber Security Research and Development Laboratory, which were established in 2016 to develop advanced technological solutions for cybersecurity risks. Outside Singapore, it also connects to CyLon, a London-based cyber security accelerator, and to the Bay Area through BLOCK71's startup launchpad and Singtel's co-located office.³⁶

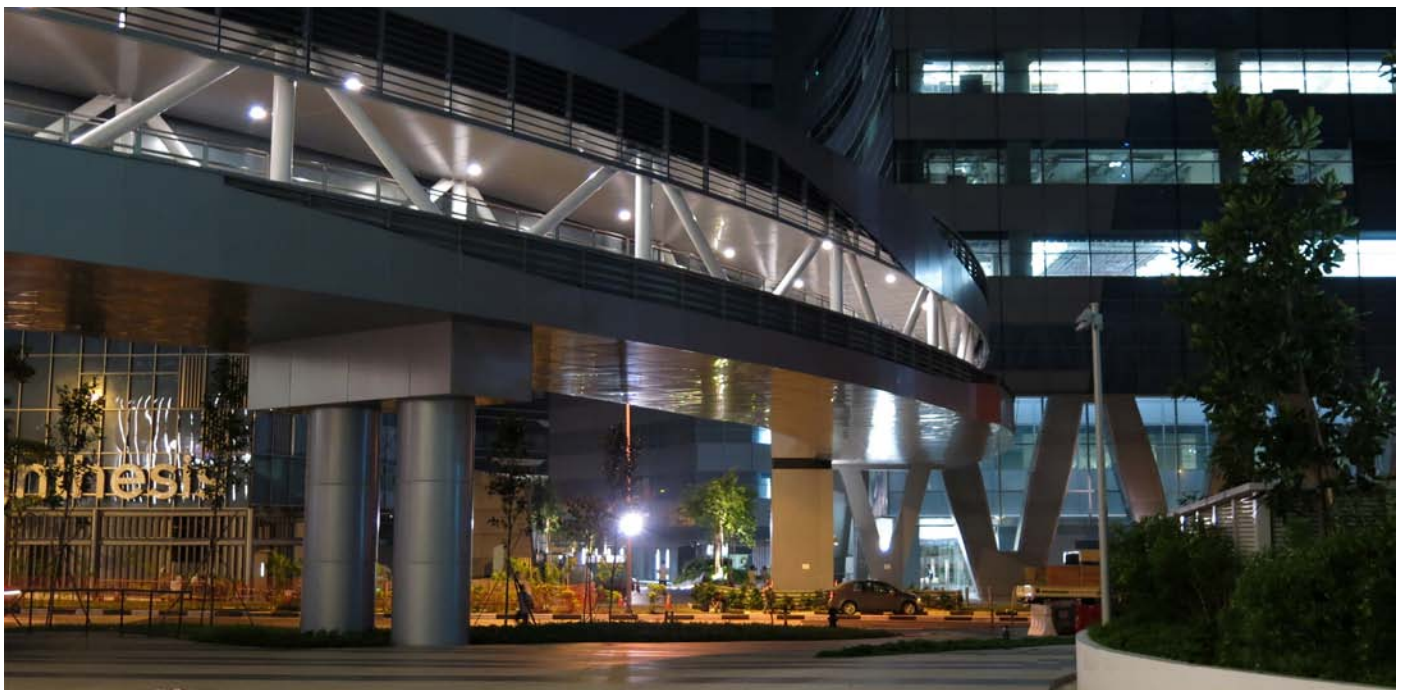
Biopolis and Fusionopolis

Technology companies in Singapore cluster in one-north, a business park in Queenstown (a satellite town on the southwestern edge of the Central Region of Singapore) where strategic investments also reflect the government's priorities. The park was launched in 2001 with the goal of creating a global talent hub, and high tech sectors with a major presence include

ICT, biomedicine, and media; activity is anchored by two major centers. Biopolis, a biomedical R&D facility, clusters public and private research organizations. Fusionopolis located nearby, clusters activity in ICT, media industries, and engineering. Both are designed to stimulate concentrated technology clusters.³⁷

Unified Ecosystem Support: Startup SG

An initiative of Enterprise Singapore, the government agency that works with companies of all sizes to build capabilities, innovate, and internationalize,³⁸ Startup SG provides comprehensive support for startup development in Singapore. It offers a host of programs through a single platform to meet the various needs of entrepreneurs, from mentorship to funding, to infrastructure and global connections.³⁹ Established in 2017, Startup SG is supported by a network of industry partners, government agencies, and innovation enablers. In 2018, Startup SG Network was launched with a specific focus on Singapore's tech startup community to help expand growth opportunities by providing a virtual platform that allows local tech startups to profile and put themselves on the radars of both local and global ecosystem players.⁴⁰



Fusionopolis Two laboratories complex

Startup Funding: EDBI, Singtel Innov8, SGInnovate, and SEEDS Capital

The portfolio of EDBI, the investment arm of the Singapore's Economic Development Board, comprises a broad range of companies, including tech, that align with Singapore's priorities. Overall, it seeks companies that can be Singapore champions or game changers in their respective markets. With its newest investments in the deep tech, ICT, and healthcare sectors, EDBI is strategically working to bring digital enterprise solutions and digital health capabilities to Singapore.⁴¹

Singtel Innov8, the corporate venture arm Singapore's majority-government-owned telecom carrier Singtel, is a \$250 million fund that focuses its investments on game-changing technologies and solutions in network capabilities, next generation devices, digital content services, and customer experience enhancements. Its current portfolio includes 65 companies in Singapore, the US, China, Australia, and Israel.⁴²

SGInnovate, wholly owned by the Singapore government, is the country's primary technology and startup investment arm, with the mission to enable Singaporean entrepreneurs to launch and build global technology companies. Founded in 2016, it invests primarily in younger companies with core IP in fields of interest to Singapore, usually at the seed or Series A stages. In the last two years, it has increasingly focused on "deep tech" or companies with research-based technologies that generate IP, in the belief that these companies have longer time horizons and need more funding support than commercial app-based companies.

To date, SGInnovate has invested in approximately 50 pre-seed, seed, or early-stage companies in Singapore, the US, and Europe, and is considering investment elsewhere in Asia. Besides venture investment, an internal team focuses on "venture building" to help portfolio companies expand. That activity includes talent development (helping companies find the talent they need), helping early stage companies bridge to the next round of funding, assisting with introductions to industry, and help with branding (for example, assisting companies to raise their profile through participation in global conferences).⁴³

A second Singapore government vehicle that primarily invests in early-stage technologies is SEEDS Capital, the

investment arm of Enterprise Singapore. SEEDS Capital supports the growth of promising Singapore-based startups in nascent and strategic industries outlined in the Research, Innovation and Enterprise 2020 Plan (RIE2020), the government's roadmap for research and development.⁴⁴ It partners with startups to help them commercialize and expand globally by leveraging the expertise and strategic networks of its co-investment partners. SEEDS Capital works with more than 500 deep tech startups, and over 40 incubators, accelerators, and venture capital firms, focusing on startups in the four key RIE2020 technology domains: Advanced Manufacturing and Engineering (AME), Health and Biomedical Sciences (HBMS), Urban Solutions and Sustainability (USS), and Services and Digital Economy (SDE).⁴⁵

SEEDS Capital and SGInnovate together co-invested close to SGD 36.5 million, with Enterprise Singapore's Startup SG co-investment partners, in 52 startups, catalyzing about SGD 118 million in private investments in 2018 through the Startup SG Equity program. To generate more investment into deep tech startups, SEEDS Capital recently appointed seven new co-investment partners for agrifood tech, bringing its total number of partners to 26. SGInnovate also appointed five new partners to co-invest in early-stage deep tech startups in fields such as AI and medtech.⁴⁶ In the first three quarters of 2019, SEEDS Capital and SGInnovate invested in 56 deals through Startup SG Equity, catalyzing SGD 160.5 million of private sector investment into various sectors through their appointed co-investment partners. Investments in startups in the three domains of Advanced Manufacturing and Engineering, Urban Solutions and Sustainability, and Health and Biomedical Sciences began to gain traction, but they still made up less than 4% of total capital investment, in part due to lack of lead investors with the experience and expertise to back deep tech startups.⁴⁷

Sovereign Funds: GIC and Temasek

Government Investment Corporation (GIC) and Temasek, Singapore's sovereign wealth funds, invest globally in both listed companies and startups. Where SGInnovate and EDBI focus on advancing companies and technologies of strategic interest to Singapore, GIC and Temasek primarily seek investment returns. While portfolio companies don't need an active

Singapore connection, both funds provide assistance where connections can be useful.

With \$390 billion in assets under management in 2018, GIC is the world's eighth largest sovereign wealth fund,⁴⁸ with investments in 40 countries⁴⁹ and about 30% of its portfolio in Asia.⁵⁰ While it has invested in technology for more than thirty years, recent investments have included emerging entrepreneur-led companies with disruptive potential. As examples, in 2017 it led a \$200 million funding round for US consumer lending company Affirm;⁵¹ in 2018 it participated in a \$535 million SoftBank-led funding⁵² of Bay Area meal delivery service DoorDash; and in early 2019 it was a participant in another \$400 million Series F DoorDash financing round.⁵³ China is also a focus, where GIC participated in a 2017 Tencent-led \$4 billion financing round for Chinese e-commerce platform unicorn Meituan-Dianping⁵⁴ and in a \$1.1 billion investment round for leading smartphone maker Xiaomi in 2014.⁵⁵

With a portfolio value of about \$230 billion in early 2019, Temasek is a wholly state-owned investment company that functions as an owner investor with a long-term horizon. It invests worldwide in a broad spectrum of industries including financial services, telecommunications, media and technology, consumer and real estate, transportation and industrials, life sciences and agribusiness, and energy and resources. Temasek's portfolio is allocated 60% to mature economies and 40% to growth economies; the top geographic regions represented are Singapore (26%), China (26%), North America (15%) and Europe (10%).⁵⁶ Temasek has been active outside Singapore since the 1990s, opening offices in Brazil and Mexico in 2008, and later in London, New York,⁵⁷ San Francisco, and Washington, DC. Its recent activity includes leading (along with Dragoneer Investment Group) the 2019 DoorDash Series F funding round⁵⁸ and (along with Lilly Asia Ventures) the early 2019 \$85 million Series B investment round for China's Suzhou-based biomedical company Graycell Biotechnologies.⁵⁹ In the previous year, it participated with SoftBank in a \$500 million investment round for the Chinese unit of US co-working space provider WeWork.⁶⁰

Startups and Investors: The Challenge of Scale

While Singapore is on the path to becoming a regional and global startup hub, it is still early in that journey. One major challenge is scale, as its home market is small and scaling outside Singapore is a necessity. Startups therefore need to design their businesses from the outset with cross-border growth in mind, starting most often in the ASEAN region. With Singapore being one of the world's more expensive cities, high costs can also be a problem.

More significantly perhaps, despite government investment, including programs to send students abroad, Singapore's base of technical and entrepreneurial talent remains thin in both numbers and depth. Several factors explain this: a past lack of focus on scientific research, the country's small size, methods of education that have emphasized information over critical thinking, and a business culture that has yet to prioritize risk taking of the kind seen in Silicon Valley. While a growing number of Singaporeans are starting companies, until recently being a founder has rarely been considered a primary career option. Experienced mentors who can help guide startups are also hard to find, a shortage that is particularly pronounced as young companies scale up and need larger, more experienced teams.

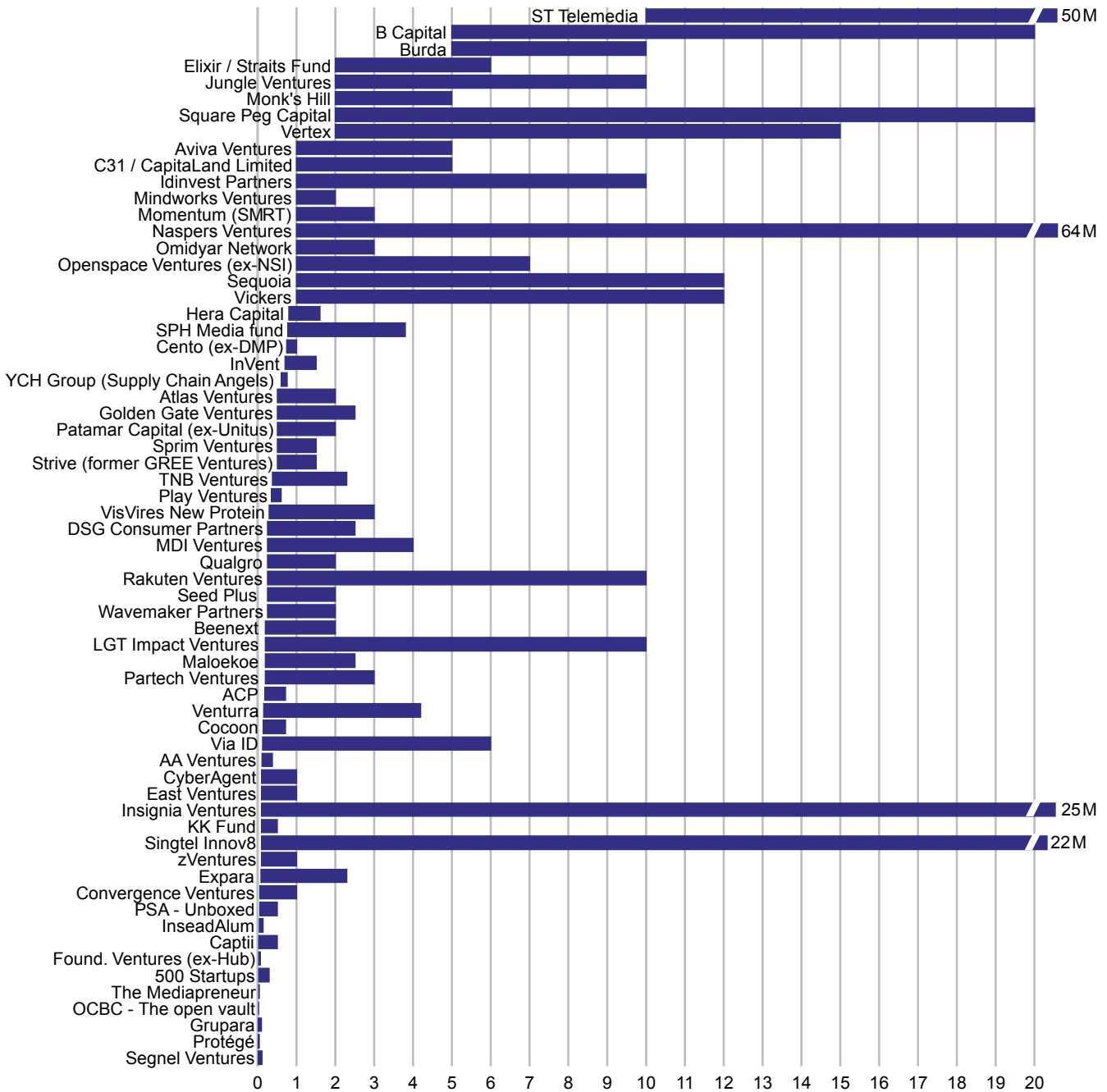
A last challenge concerns exits. While in the United States there are many IPOs and the resulting wealth is spread to new investments, in Southeast Asia IPOs are relatively rare and most exits happen through acquisition—constraining liquidity.

None of these challenges is intractable, however, and Singapore's startup environment is evolving rapidly, with an expanding talent base, increased access to venture capital, and a growing number of successful founders who can serve as models and mentors. To help address the remaining gap in entrepreneurial experience, the government is working to recruit Singaporean and other engineers from Silicon Valley. The presence in Singapore of Bay Area companies such as Google and Facebook also contributes to talent development, as employees learn on the job what it takes to build and run a company; many have also gained experience working in Silicon Valley.

EXHIBIT 8

VCs Corporate VCs, and Government VCs in Singapore for Pre-Seed, Series A, Series B, Series C and Growth Stage Rounds

Verified or Declared Data on Venture Capital First Check Size in Singapore as of Mid-December 2019, US \$ millions

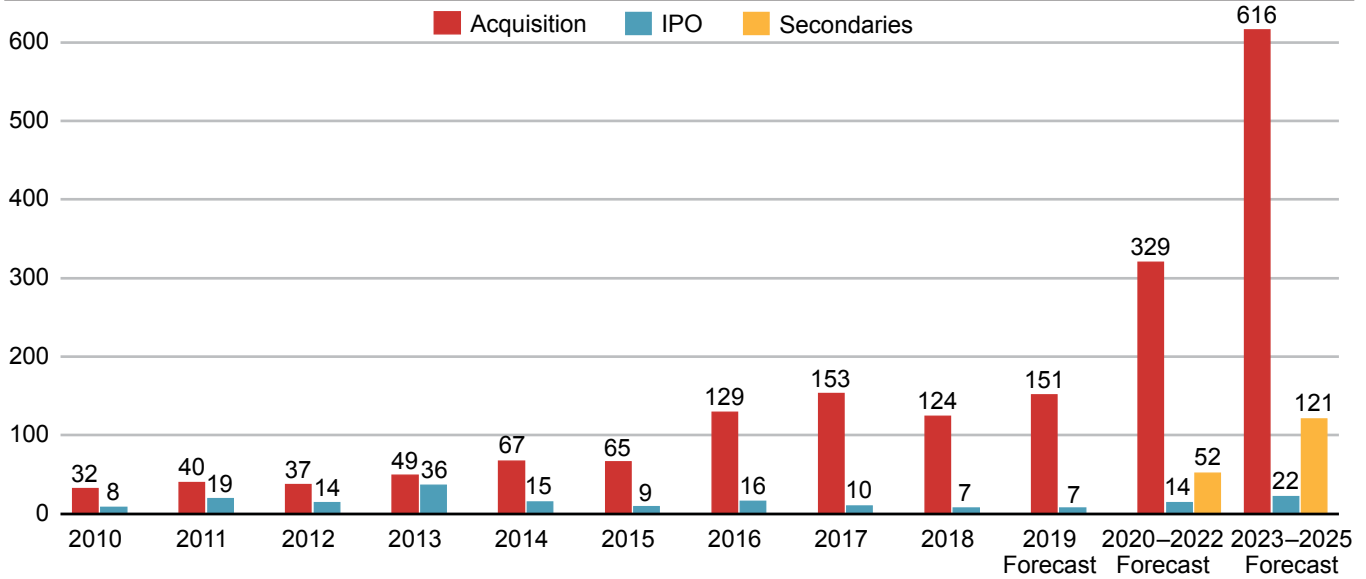


Source: Map of the Money (Amaud Bonzom and Florian Cornu)

EXHIBIT 9

Southeast Asia startup exits via acquisition are rising, largely driven by regional tech giants seeking to expand market reach or product range.

Number of Southeast Asian Startup Exits by Type, 2010–2018 and 2019–2025 Forecasts



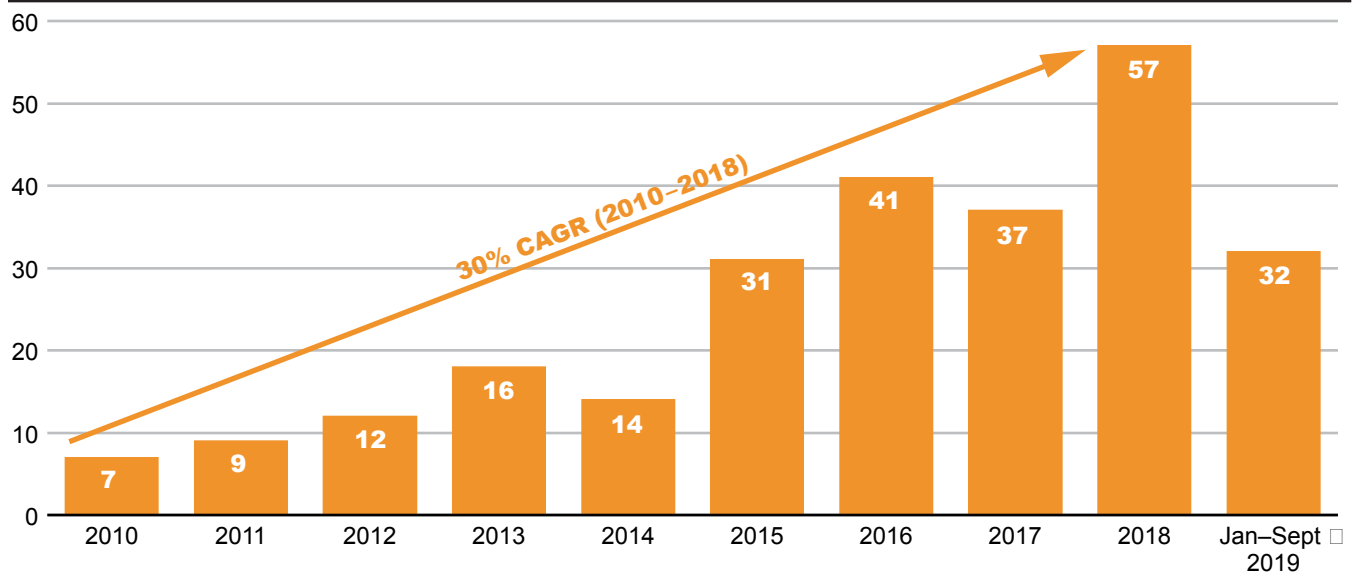
Source: Golden Gate Ventures and INSEAD

Visualization: Bay Area Council Economic Institute

EXHIBIT 10

Global private equity funds are increasingly active in Southeast Asia.

Number of Investments Per Year Made in Southeast Asia by Global Private Equity Firms, 2010–2019



Source: Golden Gate Ventures and INSEAD

Visualization: Bay Area Council Economic Institute

Successful home-based unicorns are also changing the dynamic, inspiring founders by their example. They are also expanding across the region. Hooi Ling Tan, co-founder of Singapore-based ride-hailing company Grab, recalls, "When we first started, Southeast Asia wasn't well-known for startup activity and it was very difficult to get the attention of global investors. It felt like we were constantly swimming upstream. Everybody told us that what we were trying to do was impossible but we persisted..." On doing business regionally she notes, "Building products and services that work across Southeast Asia is very challenging, because the countries and cities are so diverse in terms of customer pain points, preferences, levels of development, and supporting infrastructure. You really have to solve for hyper-local problems, but also identify the commonalities and fundamentals that eventually allow for scale across the region."⁶¹

Siu Rui Quek, co-founder of peer-to-peer marketplace company Carousell, tells a similar story: "Six to seven years ago there was almost nothing in the tech ecosystem in Singapore—close to zero. When BLOCK71 started, it was almost empty. Since then, the complex has expanded enormously and there has been an acceleration of access to venture capital—in Singapore but also across Southeast Asia. In Southeast Asia alone, we have over 600 million neighbors, almost 400 million of them not connected to the internet. That's a lot of potential. We're reaching out to a generation of internet users who leapfrogged the desktop, creating an environment where we can take a mobile-first approach to solving unique local problems."⁶²

The venture capital landscape is also growing. There is ample funding at the angel, seed, and Series A levels, but risk capital declines steeply at the later stages. Most fund managers come from traditional corporate backgrounds (such as shipping, construction, or natural resources) and lack experience as angel investors or entrepreneurs. Growing a company from stage to stage—from idea to exit—is a particular challenge. Apart from the government's sovereign wealth funds, above the Series A level (\$25 million or more) most risk capital must be sourced externally. Another barrier is that limited partners from overseas are often reluctant to invest in an area without a track record of startups that have grown to scale. Historically, this has been a

problem for Southeast Asia, where the pool of successful growth companies is small. But here again, the landscape is changing as the success of unicorns—such as Singapore's Grab and Indonesia's motorcycle hailing and delivery service platform Gojek and e-commerce company Tokopedia—is attracting new investor interest. Backers of Gojek include KKR and Google.⁶³

This reflects a young but maturing and increasingly attractive and vibrant ecosystem for early-stage technology companies in Southeast Asia. A September 2019 analysis by Golden Gate Ventures in partnership with INSEAD estimated that at least 700 startup exits will occur in the region between 2023 and 2025, most through acquisitions. Regional unicorns will become major acquirers (Gojek bought majority stakes in seven other startups between 2017 and 2019), supported by increased activity from corporate venture arms (in the last eight years the number of regional CVCs has increased five-fold, with a 63% increase in the volume of investments over the same period). North Asian CVCs and global private equity funds are also increasingly active. Supported by this later stage investment, more startups are expected to reach the growth stage, becoming acquisition targets. Reflecting this, regional stock exchanges are expected to support more startup listings.⁶⁴

Though not alone, Singapore is central to this process, accounting for 75% of all 2018 funding deals in Southeast Asia,⁶⁵ and with four unicorns—Grab, Sea (formerly known as Garena), Lazada, and Razer.⁶⁶ Between 2006 and 2016, Singapore recorded 40 exits totaling \$530 million.⁶⁷ Promising sectors include e-commerce, logistics, and digital payments. Venture and private equity investors from China, the United States, and Japan are active.

Jungle Ventures is representative of the new breed of Singaporean VCs. With three funds⁶⁸ and a leadership team with Bay Area experience at companies such as Hewlett Packard, eBay, and Yahoo!, Jungle makes seed, Series A, and Series B investments, including co-investing with SGInnovate. Closing at \$240 million in the fall of 2019,⁶⁹ the Jungle Ventures III fund raised more than double the amount raised for the firm's second fund and makes Jungle Ventures one of the largest venture capital firms in Southeast Asia. **Golden Gate Ventures** is another Singapore-based venture firm led by Silicon Valley alumni. An early-stage investor

with a focus on Southeast Asia, to date Golden Gate Ventures has invested in more than 30 companies in Singapore, Indonesia, Vietnam, Thailand, Malaysia, and the Philippines, as well as the United States and elsewhere in Asia. With a focus on Seed, Series A and Bridge Rounds, typically in the \$1–5 million range, it invests primarily in internet and mobile startups in e-commerce, payments, mobile applications, content portals, IoT, and SAAS platforms.⁷⁰ **SeedPlus**, another Singapore venture firm, focuses on pre-seed and seed-stage deals in Asia. At the pre-A stage, SeedPlus helps companies with capital and the strategy needed to raise follow-on rounds. The SeedPlus network of partners includes Jungle Ventures, Eight Roads, Cisco, Accel Partners, and SGIInnovate.⁷¹

SeedPlus advisor Michael Smith Jr., a Bay Area native and former Director of Global Tech Initiatives at Yahoo!, recommends that portfolio companies put their regional headquarters in Singapore, even if their engineering is done elsewhere: “Most startups are not here for the Singapore market, but are instead targeting regional markets. A common law system, which exists in both Hong Kong and Singapore, is important for startups. In other parts of Southeast Asia, tax rates and regulations can be barriers. In the end, with less complexity here companies can come to Singapore without needing to spend as much on local representatives.” When it was launched, SeedPlus benefitted from Startup SG Equity matching funds, with government funds accounting for a large component of early deals. Smith recounts, “In a \$1 million deal, for example, a venture firm might have invested \$100,000 and the government \$900,000. The ratio has changed, from 10:90 to roughly 70:30, but the support is still there.”⁷²

With home bases in Singapore and Jakarta, and an office in Vietnam, **Monk’s Hill Ventures** invests in post-seed tech startups across Southeast Asia⁷³ and is closely connected to the Bay Area through its founding partners who have backed and built global companies in both Silicon Valley and Asia.⁷⁴

A Regional Platform Economy

Building on its innovation initiatives, on sustained investment in infrastructure and education, and on

business-friendly tax and economic policies, Singapore has established itself as a platform economy for both ASEAN and the larger Asia-Pacific region.

Global Connections

The **Global Innovation Alliance (GIA)** is a network of Singapore and overseas partners in major innovation hubs and key demand markets, with a focus on technology and innovation. It is a joint initiative between Enterprise Singapore and the Economic Development Board (EDB) that helps launch innovative startups to the international market and drive cross-border exchanges.

The creation of the Global Innovation Alliance was a key recommendation in the Singapore government’s Committee on the Future Economy 2016 report, which aimed to strengthen linkages and partnerships with leading innovation hubs around the world, increasing access and opportunities for Singapore enterprises and students. From a business perspective, this helps strengthen Singapore’s connections to major innovation hubs, allowing Singapore-based startups to network and find partners, new business connections, and more in other innovation ecosystems. The GIA network now has connections to 13 cities in 10 countries: China (Beijing, Shanghai, Suzhou), France (Paris), Germany (Berlin and Munich), India (Bangalore), Indonesia (Jakarta), Japan (Tokyo), Thailand (Bangkok), Vietnam (Ho Chi Minh City), the UK (London) and the US (San Francisco).⁷⁵

Multinational Presence

In addition to regional headquarters, Singapore is attracting a growing number of R&D centers established by multinational corporations. The broad pattern is that companies may operate a number of R&D facilities outside their home countries to take advantage of the distinct assets (human capital, research capacity, or access to regional markets) offered by different locations. Particularly for digital technologies, the first overseas location is Silicon Valley. As these networks expand, facilities may be established in additional cities, typically Shanghai, Tel Aviv, Toronto, London or another European location—and Singapore.



The Bay Area and Singapore: Expanding Economic Ties and Business Opportunities

“With instability in the world growing, Singapore will increasingly look like ASEAN’s Switzerland.”

—Chris Leubkeman, Fellow & Global Foresight, Research and Innovation Leader, Arup (San Francisco)

Southeast Asia’s robust and relatively open economies, including Singapore’s, present growing business opportunities, particularly as US companies look to diversify their Asian presence outside of China. In this respect, Southeast Asia represents an economic frontier in Asia, with a large market that has to a degree been overshadowed by the US focus on China.

This is not to say, however, that US companies will find an undiscovered market. As noted already, Chinese companies are increasingly active in the region, particularly as technology companies that compete intensely inside China are looking to global markets for growth. Southeast Asia, a near neighbor with large ethnic Chinese populations is a logical area for expansion. From this perspective, Southeast Asia is emerging as a landscape where US, Chinese, and other global businesses will compete for leadership.

US and Bay Area companies also face home-grown competition. Uber, for example, which for several years had competed toe-to-toe with its Singapore counterpart Grab, exited the regional market in 2018, ceding the field to Grab in exchange for a 27.5% stake.¹

SoftBank, an investor in Uber, is also an investor in Grab, which operates in 200 cities in eight Southeast Asian countries. Grab’s average rides numbers have increased significantly—from 2.5–3.5 million rides daily in 2017 to 6 million rides daily in 2018.² Not content with being a transportation company, Grab is expanding its digital wallet service GrabPay, with the goal of replacing cash at shops and restaurants, and is venturing into consumer and small business loans. GrabShuttle, like a public bus, provides service along points on a fixed route. In Indonesia (where traffic can be extremely congested), its app can be used to hail motorbike taxis.³

Indonesia-based Gojek, a ride-hailing rival, competes head-to-head with Grab, fielding a fleet of more than one million cars and motorcycles. Its apps offer rides but also services such as massages on demand and motorbike parcel deliveries.⁴ Outside Indonesia, Gojek operates in Vietnam, is entering into the Thailand and Singapore markets, and plans further expansion into Malaysia and the Philippines in 2020.⁵ Major investors include Google and Tencent.⁶ In online retail, Shopee, a Singaporean shopping platform owned by consumer internet company Sea, has grown to become one of Southeast Asia’s leading e-commerce platforms, with operations in Thailand, Malaysia, Vietnam, the Philippines, and Indonesia. In the second quarter of 2019, it recorded 246.3 million orders across the region, with merchandise volume of \$3.8 billion. Reflecting that

growth, Shopee opened a new six-story regional headquarters in Singapore in September 2019 with 1,500 employees (up from ten in just four years) and room to accommodate 3,000.⁷

An Important Trade and Investment Relationship

Despite its small population, Singapore is an outsized trading partner. A free trade agreement between the United States and Singapore has been in place since 2004, supporting two-way market access in goods, services, investment, and government procurement.⁸ Under the agreement, US goods exports to Singapore are subject to zero tariffs, and US service exports receive national treatment (meaning that US service suppliers are treated the same as domestic suppliers).⁹

Two-way trade, already strong before the agreement was signed, has continued to grow, reaching \$90 billion in goods and services in 2018, with a positive trade balance. According to the Department of Commerce, those exports supported an estimated 213,000 US jobs in 2015 (the latest year for which data is available). Combining goods and services, US exports totaled \$54.1 billion and imports \$35.9 billion in 2018. Goods exports were \$33.1 billion (making Singapore the 12th largest global market for US goods), and imports were \$27.3 billion. Services exports were \$21 billion, and imports were \$8.6 billion. US goods exports to Singapore have risen 100% and services exports 246% since 2003 (pre-FTA).¹⁰

Singapore is California's 12th largest global export market, with sales of \$4.435 billion in 2018. Of that export total, computers and electronic products accounted for the largest share at 28.6% (\$1.27 billion) and machinery was in second place at 23.7% (\$1.05 billion).¹¹

According to SelectUSA (the US Commerce Department's foreign direct investment facilitation program) Singapore was the 6th fastest-growing source of foreign direct investment (FDI) in the United States in 2018. The stock of Singaporean FDI in the US totaled \$54.2 billion in 2018, while the stock of US FDI in Singapore totaled \$218.8 billion. In 2017 (the latest year for which analysis is available), SelectUSA estimated that US affiliates of majority Singaporean-owned firms

supported 46,700 US jobs and were responsible for \$403 million in R&D expenditures.¹²

The Bay Area in Singapore

Along with other global companies, Bay Area companies have a substantial presence in Singapore, making it a business hub for Southeast Asia whose reach also extends to East Asia, Australia, and in some cases to India. Many factors lie behind this, including favorable tax policies, a high quality of life for expatriates, and a central location in Southeast Asia with access to efficient transportation networks. One factor affecting the decisions of some multinationals is uncertainty over the future of Hong Kong, which has historically served as the Asia-Pacific region's leading headquarters city. Concerns include Beijing's growing political assertiveness and influence inside Hong Kong, and the loss of independence and openness that could result. From this perspective, Singapore's open economy and rule of law is seen as offering a stable long-term base.

“You won't find a nation that is more committed to integrity than Singapore. Ethical, lawful behavior is core for them. It's part of the culture and makes the city-state work.”

—Tim Hoxie, Partner, Jones Day

Singapore serves as the Asia-Pacific regional headquarters for many tech multinational companies and is also Google's Asia Pacific headquarters. Google employees in Singapore are working across sales, partnerships, marketing, and other fields, with a focus on customer service and new products and projects across Asia. It also has a growing engineering team in Singapore, announced on 2016, to develop products for future users.

Barbara Navarro, Head of Google Cloud government Affairs and Public Policy for APAC, observes that “In many ways, Singapore feels like the best place to do this. It is hyper-connected, with some of the fastest Internet speeds in the world. And, it sits at the center of a region with half of the world's current Internet users, and more new Internet users coming online every day than anywhere else in the world.”

Google started building its first Southeast Asia data center in Singapore in 2011, expanding quickly to a second building in 2015 due to the rapid growth in users and usage in the region. The pace of growth has continued with more businesses also getting online, leading Google to expand its Google Cloud Platform (GCP), which has also grown quickly. To keep pace with that demand, Google has started work on a third Singapore facility, located in Jurong West. This expansion will bring Google's long-term investment in its Singapore data centers to \$850 million. The multi-story facility will feature the latest machine learning technology to reduce energy use, will use recycled water, and will divert 100% of the data center's waste away from landfill.

In Feb 2019, the company announced the opening of the Developer Space @ Google Singapore—a space that brings together resources to help Southeast Asian developers, entrepreneurs, and community groups grow plus earn more with their businesses. This is the first physical space dedicated to developers that sits inside a Google office, enabling participants to benefit from mentorship and networking opportunities with the various teams working at its headquarters.

Policy perspectives also align. Singapore has a supportive approach to cross-border data flows and is actively supporting rules within ASEAN that will enable a framework that facilitates the flow of data within the region. That contrasts with more restrictive policies in China, Vietnam, and India that would require data generated within a country to be stored there (and accessible to government). Perspectives on this issue vary from country to country within ASEAN, as Indonesia, Thailand, and others are considering data localization measures.¹³

Other Bay Area companies and companies with a major Bay Area presence that have significant Singapore footprints operate in a variety of sectors.

■ 3D Technology and Software

3D design and engineering software company **Autodesk**, based in San Francisco, has its Asia-Pacific headquarters at Fusionopolis in Singapore.¹⁴

■ Biotechnology and Life Sciences

Guardant Health, a precision oncology testing company based in Redwood City, launched its

Asia, Middle East, and Africa regional headquarters in Singapore in 2018. The company is scaling commercialization of its liquid biopsy test in the region and conducting clinical studies in the Asian patient population.¹⁵

Illumina, a producer of technology for genetic testing and analysis, which is headquartered in San Diego but has a large presence in the Bay Area, has had its Asia-Pacific headquarters in Singapore since 2003, supporting major commercial, manufacturing, and R&D operations. Illumina contracts for manufacturing services with Singaporean contract manufacturer Venture Corporation Limited.

Hercules-based life sciences company **Bio-Rad Laboratories** has operated a major manufacturing plant in Singapore since 2007. Singapore is also the home of Bio-Rad's Asia-Pacific region headquarters, which opened in December 2005.¹⁶

Genentech, the biologic manufacturing company headquartered in South San Francisco, has engaged in large-scale cell culture manufacturing in Singapore since the mid 2000s. In 2007, it purchased a plant in Singapore's Tuas Biomedical Park from Lonza Biologics Singapore, which it combined with another facility to create a key node in its parent company manufacturing network.¹⁷

■ Cybersecurity and Web Performance

Cybersecurity services company **Symantec**, headquartered in Mountain View, supports its local customers and operates its cyber intelligence networks from regional offices in five ASEAN countries: Indonesia, Malaysia, the Philippines, Thailand, and Singapore.¹⁸

Palo Alto Networks doubled its previous Singapore office space by opening a new 35,000 square foot Asia-Pacific headquarters office in the heart of Singapore's central business district in 2017. The office serves as a base for its regional cybersecurity systems engineers, systems analysts, and threat intelligence specialists.¹⁹ Singapore is also home to the company's APAC Wildfire Cloud, which delivers threat analysis and prevention capabilities to Asia-Pacific customers while addressing their privacy concerns with a regionally-based cloud.²⁰

Cloudflare, the web performance and security company headquartered in San Francisco, opened its Singapore office in 2015.²¹ Since then, the office has expanded into a larger space that is home base to its Cloudflare Asia team of almost a 100 people from 19 nations.²²

■ Enterprise Software, Communications, and Customer Service

Integrated applications and platform services provider **Oracle**, headquartered in Redwood City, has offices in nine of the ten ASEAN countries (all except Myanmar). In Singapore, Oracle collaborates through its Oracle Partner Program with more than 100 partners and solutions providers who work to integrate their technologies and services with Oracle's solutions that target a rapidly growing e-business market.²³

Palo Alto-based technology company **Hewlett Packard Enterprise**, after more than 40 years in Singapore, in May 2017 moved its Asia-Pacific and Japan (APJ) headquarters to a new office campus there, launching a new growth phase that includes

an InnovateNext incubator to support promising local startups in collaboration with the Singapore Economic Development Board (EDB).²⁴

San Francisco-based customer relationship management company **Zendesk** has its Asia-Pacific headquarters in Singapore and in 2017 announced the deepening of its presence there through the expansion of its Chat Development Centre.²⁵

San Jose-headquartered networking, telecommunications, and high tech services company **Cisco** has had a presence in Singapore since 1993 and established its Greater Asia headquarters there in 1998.²⁶ In early 2019, the company launched two new centers there: its Co-Innovation Center is the company's first Southeast Asian innovation center and focuses on regional issues in cybersecurity and IoT; and its Cisco Cybersecurity Centre of Excellence (CCX) comprises a new threat intelligence headquarters and security operations center to boost the company's threat research and response capabilities.²⁷

SPOTLIGHT

Salesforce

In 2004, San Francisco-based Salesforce began operations in Singapore, which serves as the hub for the company's Asia business and operations. Salesforce sees Asia as being key to its future growth and Singapore as being uniquely positioned between East and West and a gateway to Southeast Asia. Focused on customer relationship management (CRM), Salesforce products support leading Asian companies such as AirAsia, AXA, Cathay Pacific and Gojek.

In a 2017 white paper titled "The Salesforce Economy Forecast," IDC estimated that Salesforce activity will cumulatively contribute \$2.9 billion to Singapore's GDP between 2016 and 2022, supporting more than 11,000 direct and indirect jobs.²⁸ Strategic investments include an AI hub to enable stronger engagement and support in the ASEAN region, where customers include five airlines, five banks in Thailand, and major conglomerates in the Philippines.

Commenting on the Asian market, Renzo Taal, Senior Vice President APAC, observes, "There's just so much

innovation here in Asia and particularly Southeast Asia. We ran a survey asking close to 500 C-Suites in Southeast Asia about their thoughts on innovation, particularly which region they predict will be an innovation driver, and it was a pretty stunning result. It was unanimously agreed that Asia will drive some of the global innovation trends. And I have to say, working closely with C-Suites here in Asia, I see that."

Asked what the challenges are for the region, Taal notes that "One of the biggest challenges we face is the impact of transformation and change. We're in the midst of the Fourth Industrial Revolution and as we know, the AI revolution is here and jobs will transform and change. The imperative is to make sure that our workforce is ready for this transformation, and that they are learning skills that can prepare them for the future. Our research shows that the workforce in Asia is very motivated to learn—particularly Singaporeans (clocking in at 63%) who indicated that they want to upskill themselves. It's really up to us as corporate organizations to make sure that our workforce receives the right form of training and if there are ways where the government can help support that, even better."²⁹

■ Financial Services and Payments

Singapore is the Asia-Pacific headquarters for **Visa**, which operates an R&D center with both a regional and a global product focus. The Visa Singapore Innovation Center, opened in 2016, is a collaborative space for partners to work with Visa to create payment solutions, particularly for mobile and digital platforms.³⁰

San Jose-headquartered online payments and fintech company **PayPal** located its international headquarters office in Singapore in 2007 with a large staff there focused on software development.³¹ In 2016, the company also chose Singapore for the site of its first innovation lab to be launched outside of the US. That lab houses a PayPal Incubator, which ramped up in 2018 to nurture twice the number of startups it had supported in the previous two years.³²

Online payments company **Stripe**, headquartered in San Francisco, has been in Singapore since 2016. In 2018, Stripe opened its fourth global engineering hub in Singapore—a counterpart to hubs in San Francisco, Seattle, and Dublin.³³

■ Social Media, Consumer Technology/Goods, and Gaming

In 2018, **Facebook** moved from its previous Singapore location to Marina One in a new 260,000 square foot office that serves as its Asia-Pacific headquarters, houses its Singapore and regional teams consisting of about 1,000 people, and can accommodate up to 3,000 workstations. As Facebook ramps up its Asia operations, it also plans to develop a \$1 billion 170,000 square meter data center and, in collaboration with Singapore's Infocomm Media Development Authority, a data innovation startup program called Startup Station Singapore.³⁴

In 2013, social networking platform **Twitter**, headquartered in San Francisco, opened a service office in Singapore which quickly grew its staff to 80 people in less than two years.³⁵ In 2015, it designed a new 22,000 square foot space in Singapore's central business district to serve as its Asia-Pacific headquarters with double the staff size. In addition to supporting sales and marketing functions, the headquarters also features

a #RealTimeLab social media center where clients can see what's trending and can create and customize their own Twitter campaigns.³⁶

Singapore is home to the Asia-Pacific headquarters of San Francisco-based fitness tracking company **Fitbit**, which saw a 24% increase in its Asia-Pacific region sales between 2018 and 2019.³⁷

Singapore serves as **Airbnb's** Asia-Pacific regional headquarters. It first opened there in 2012 with 30 employees working out of a heritage shophouse. Asked about its presence, Head of Public Policy for Southeast Asia Mich Goh says, "Singapore provides Airbnb access to an innovative and diverse talent pool that is critical to advancing its mission of creating a world where anyone can belong anywhere. Emerging markets in Asia-Pacific are increasingly powering the growth of global tourism and we will continue to build our team in Singapore to support our growing community of hosts and guests across the region." The company now has more than 300 employees in Singapore across 15 different functions including marketing, finance, legal, and talent, supporting more than 5 million listings across the region. As the company's Southeast Asia headquarters, Singapore is also home to a cross-functional team focused on growing Airbnb's presence in the region; outside of Singapore a small but important team in Thailand focuses on building local supply and enabling more Thai communities to leverage Airbnb as a means to tap into the country's growing tourism industry.³⁸

Global gaming hardware company **Razer**, with dual headquarters in Singapore and San Francisco, announced in 2018 that it would move from its current Singapore headquarters location to a new 7-story 19,300 square meter office in the one-north business park by mid-2020.³⁹

Mars Inc., the confectionery, snacks, and pet health company, anchors its science and innovation activity in the Bay Area and uses Singapore as the regional hub for its businesses; other Singapore-based corporate units include Mars University, global mobility, and global procurement. Its Singapore office covers the Asia-Pacific region, the Middle East, Africa, and Latin America.⁴⁰

“Frontier growth in software and technology isn’t only happening in Silicon Valley. There’s a rapidly increasing dispersion of companies doing frontier work. Southeast Asia now has more internet users than the US. I think Singapore has an opportunity to be the next place where smart people congregate, which is why we’ve opened our latest R&D center there. We’re looking to design the company’s next generation of products there, not just for Singapore but for the world.”

—Patrick Collison, Co-Founder, Stripe

Beyond software and technology, the Bay Area’s footprint in Singapore includes design, engineering, and architecture.

- Global engineering firm **Arup**, with a large San Francisco presence, operates a full service office that is closely connected to Singapore’s design community. Major projects have included iconic developments such as Marina Bay Sands, the National Stadium, and the Singapore Flyer observation wheel.⁴¹
- Australian architectural firm **Woods Bagot** supports an active practice in Southeast Asia from its San Francisco office. Its presence in Southeast Asia started in the early 2000s with a commission in Jakarta and has since evolved into a regional

practice with active projects in the Philippines, Vietnam, Malaysia, and Singapore. Most developments are large mixed-use projects that combine commercial and retail, and in some cases hotel and residential components.

While business development is driven through San Francisco, Singapore serves as the firm’s regional base of operations. After looking at several options, the call was made for Singapore due to its central location, transportation links, and quality of life for employees. Capitalizing on the reputation of the Bay Area for cutting-edge expertise and design, leadership on Southeast Asia projects is coming from the US and San Francisco in particular. Director Patrick Daly affirms that “The cachet of the Bay Area is a competitive benefit.” Major projects are currently underway in Vietnam and Indonesia. Regarding Singapore itself, Daly observes that “Singaporean developers like to use their own firms, so the market is harder to penetrate.” Much of its practice there is around the design of workplace interiors, another field where the Bay Area leads. The firm’s Asian clients include Chinese companies that are investing in the Bay Area and can move funds to the US more effectively through Singapore. Woods Bagot is now positioning itself to develop a “concierge” service to bring Southeast Asian funding to the Bay Area, much as it has done with China.⁴²

SPOTLIGHT

Eight Inc.

Eight Inc., a global design firm headquartered in San Francisco, operates 11 studios worldwide and a regional headquarters in Singapore. Building on extensive work for clients such as Apple, its Asia activity began in the early 2000s with a project for Citibank, which already had a regional headquarters in Singapore. When the logic of opening a local office of its own suggested itself, the Economic Development Board helped identify local talent and opened doors to other companies (recognizing that the commitment to a long-term presence would require more than one client). The firm’s CEO, Tim Kobe, now lives in Singapore and develops business in Asia, while its Chief

Innovation Officer is located in San Francisco. Starting with Singapore, Eight Inc.’s business subsequently grew in Asia as well as in India and Australia. Today, 90% of the firm’s regional clients are outside of Singapore, including in Southeast Asia (Indonesia and the Philippines) and in China. Wilhelm Oehl, Global Partner with Eight Inc. describes the Singapore office as “our strongest in Asia and the hub for the entire region.”*

Serving a diverse list of clients from retail to financial services, Eight Inc.’s Singapore team leverages Singapore’s status as a regional design center. Singapore’s design industry is still young and relatively small, but the government has produced a master plan for its development, led by a Design Council, to integrate design more deeply into its business systems.

* Interview with Wilhelm Oehl, Global Partner & CXO, Eight Inc.



Singapore's Marina Bay Sands resort towers and lotus-shaped ArtScience Museum engineered by Arup



Proposed Menara Taspen (Arthalo Square) office project designed by Woods Bagot, central business district of Jakarta

The region's growing startup community is also attracting the attention of Bay Area venture firms.

■ **Sequoia Capital** is active through its Bangalore-based India arm (whose CEO lives in Singapore). In 2018, it led a \$6.5 million Series A investment in Singapore's Hmlet to help the company expand its co-living rental business in Southeast Asia.⁴³ Explaining Sequoia's strategy, a recent senior executive says "Singapore and Southeast Asia have a growing middle class, high mobile penetration, and government that is focused. When compared to China or India, the case for the region is compelling." The firm's latest initiative is Surge, a startup program that combines an initial \$1–2 million in seed capital investment with global immersion sessions in China, India, and the US; mentorship; and business development support. An initiative of Sequoia India, Surge takes place twice a year and is open to companies that are based in or are building businesses targeting India and Southeast Asia. Each cohort includes 10–20 companies and runs for 16 weeks, capped by a week of exposure to investors, called UpSurge, in Singapore.⁴⁴

■ **Pegasus Tech Ventures**, a Silicon Valley-based global corporate venture firm, has a distinct strategy that, instead of inviting LPs to join a pooled fund, creates a separate fund for each LP. While primarily focused on the US and Japan, where most of its LPs are located, Pegasus also invests in Southeast Asia from a base in Jakarta. Pegasus is one of the largest investors in Tech in Asia (a Singapore-headquartered, Asia-focused online technology media company⁴⁵ similar to San Francisco-based TechCrunch), supports an accelerator in Jakarta, and to date has invested in more than 40 companies in Southeast Asia.⁴⁶

Bay Area accelerators are also becoming active in Singapore and other ASEAN countries.

■ **Plug and Play** has been in Singapore since 2011, initially as an investment office doing 3–4 investments per year, some in collaboration with Singapore's government. This was followed by a media-themed accelerator jointly developed with Singapore Press Holdings and Infocomm Investments, which completed more than 10 investments. Today, Singapore is Plug and Play's Asia-Pacific headquarters, with over 40 investments across Southeast Asia and 20

corporate partners. Plug and Play's regional programs are run in Singapore, Indonesia (Jakarta), and Thailand (Bangkok) and focus on financial services, Industry 4.0, mobility, food and agritech, and travel and hospitality, as well as smart cities. Plug and Play also has a representative office in the Philippines (Manila).⁴⁷

■ Since its 2010 founding, early-stage venture fund and seed accelerator **500 Startups** has been active in Southeast Asia, having invested in more than 180 companies (most notably Singapore-based Grab and Carousell).⁴⁸ The majority of those investments have been made through the 500 Durians family of funds, which debuted its first Southeast Asia fund, 500 Durians I, in June 2014. By 2016, 500 Startups had participated in more than 26% of all seed deals in the region, and it built on that momentum with the launch of the 500 Durians II fund set at \$50 million, doubling the size of 500 Durians I.⁴⁹ Beyond providing seed capital, 500 Startups supports startups through its accelerator and education programs, access to in-house experts and dedicated support, and partnerships with corporations and governments around the world.⁵⁰ In the fall of 2019, 500 Startups established a two-way partnership with Enterprise Singapore (ESG), the government's agency champion for enterprise development and growth. Under the partnership, the Global Launch program consists of workshops, bootcamps, networking opportunities, and strategic guidance run by 500 Startups that is designed to support Singapore-based startups in establishing a presence in San Francisco. In addition, a separate 16-week program run by 500 Startups is aimed at supporting global startups that want to establish a presence in Singapore. Through these programs, both 500 Startups and ESG seek to build a bridge between Silicon Valley and Southeast Asia and to leverage Singapore's vibrant startup ecosystem as a gateway for founders who want access to Southeast Asian markets.⁵¹

University Research Partnerships

Stanford University and UC Berkeley both have active research partnerships in Singapore.

■ CREATE partners with UC Berkeley to fund the Berkeley Education Alliance for Research in Singapore (**BEARS**), which serves as an international research hub connecting Berkeley researchers with Singaporean

counterparts. Launched in 2011 to develop research on energy-efficient commercial buildings in tropical climates, the project is developing new building codes with the goal of reducing energy consumption by a factor of 2X to 3X. Its research findings are currently being deployed in a government building that serves as the initial test bed.

To date, approximately 15 Berkeley faculty members have spent time in Singapore under the program's \$150 million Building Efficiency and Sustainability in the Tropics (**SinBerBEST**) program. A second program, the Singapore-Berkeley Research Initiative for Sustainable Energy (**SinBerRISE**) complements SinBerBEST.⁵² BEARS, which is programmatically linked to UC Berkeley's Center for Research in Energy Systems Transformation (CREST) at the College of Engineering,⁵³ also sponsors the Silicon Valley Entrepreneurship Bridge, a pilot program that sends the leaders of young Singapore companies to the Bay Area for training and orientation to Silicon Valley and takes emerging Bay Area companies to Singapore. Also supported by two Berkeley accelerators—Skydeck and the CITRIS Foundry—the exchange focuses on “deep technology” in fields such as biotech, AI, fintech, and robotics, where the barriers to success are primarily technological. UC Berkeley professor and BEARS Director Costas Spanos points to an advantage of being in Singapore: “It is a well-regulated place where government places high value on innovation, so novel ideas in Singapore can hit the market very fast.”⁵⁴

- Launched in 2010 as the Singapore-Stanford Bio-Design Programme (SSB) and renamed in 2018, **Singapore Biodesign** is a partnership between A*STAR, the Economic Development Board, and Stanford University. Modeled on Stanford University's Biodesign program, Singapore Biodesign aims to train and support the next generation of medtech innovators in Singapore and Southeast Asia. To date, more than 400 students and professionals have been trained through its Fellowship Programme (an intensive one-year team-based training scholarship) and an innovation class (a 14-week training program given once a year for engineering, medical, and MBA students). The program also organizes a Thought Leaders Series

and Workshops on the biodesign process. A local and regional partnership network helps participating companies develop innovation talent. The program's alumni have to date spun out 7 companies.⁵⁵

Corporations also have active research partnerships.

- With the support of Singapore's National Research Foundation (NRF), Applied Materials, Inc. and the National University of Singapore jointly launched the **Applied Materials-NUS Advanced Materials Corporate Lab** in October 2018. With SGD 70 million in funding, the lab is working to accelerate the discovery and commercialization of new materials for the manufacturing of next-generation semiconductors.⁵⁶
- Also supported with SGD 84 million in funding from the NRF and launched in October 2018, the **HP-NTU Digital Manufacturing Corporate Lab** partners HP Inc. and Nanyang Technological University to focus on R&D and development of the talent pool in digital manufacturing technologies, including advanced 3D printing, AI, machine learning, new materials, and cybersecurity.⁵⁷

Civic Connections

Bay Area non-profit organizations also have a presence in Singapore, similar to its use by corporations as a regional base. **The Asia Foundation** has been active in Singapore for most of its 65 years. Today, Singapore hosts a Senior Advisor and a Board of Advisors, and three members of its international Board of Trustees are based there. Recent Singapore programs include year-long professional placements of Luce Scholars, a Henry Luce Foundation program implemented by the Asia Foundation; a conference on Asian Views of America's Role in Asia, with recommendations for the incoming administration, that was organized before the 2016 US election; and more recently a conference on cybersecurity. In December 2018, The Asia Foundation hosted the 2018 Young Southeast Asian Leaders Initiative (YSEALI) Summit, in partnership with the US Embassy Singapore and US Department of State, and with participation from 150 emerging leaders from ASEAN and the United States, US companies, and partners. Innovation was a major theme, with visits to the Singapore labs and innovation centers of companies

including HP, Hewlett Packard Enterprise, Google, Twitter, P&G, and Verizon.

Going forward, through leadership development, training, and exchange programs, the Foundation plans to strengthen its focus on youth leadership, technology, small and medium enterprises, the future of work, and sustainable urban development—fields where Singapore is strong. The Asia Foundation looks to Singapore as one of the centers for regional programming. Reflecting this role, the Foundation's relationship with Singapore has evolved from one where Singapore was a beneficiary to one of partnership.⁵⁸

Singapore in the Bay Area

Reflecting the Bay Area's central role as a global technology and innovation hub, Singapore's government has established a significant footprint in the region. By leveraging its assets, the goal is to support entrepreneurial activity, attract investment, and more deeply connect the two innovation ecosystems.

Economic Development Board

With US offices in Redwood City, New York, Houston, Chicago, and Washington, DC (as well as in Asia, Europe, and Latin America), the Singapore Economic Development Board (EDB), a government agency under the Ministry of Trade and Industry, promotes and facilitates inbound investment to Singapore.⁵⁹

Enterprise Singapore

Though its California office is based in Los Angeles, Enterprise Singapore (ESG)—the Singapore government agency that champions enterprise development—is active in the Bay Area. Part of its role involves supporting Singapore's growth as a hub for startups, and together with the EDB it supports the Global Innovation Alliance initiative to strengthen linkages and partnerships with leading innovation hubs around the world. Its Startup SG initiative also offers a suite of programs to assist overseas startups that establish a base in Singapore, including mentoring, funding, infrastructure, and global connections. Accelerator partners in the Bay Area include 500 Startups (on the Global Launch program), AgFunder, and Imagine H2O.

BLOCK71 San Francisco

Located in San Francisco's South Park neighborhood in the heart of the city's South of Market technology district, BLOCK71 serves as a launchpad for National University of Singapore (NUS) and Singaporean startups in the United States and as a connector to Southeast Asia for Silicon Valley entrepreneurs and startups. Originally founded by NUS Enterprise, the entrepreneurial arm of NUS, and Singtel Innov8, with key support from Infocomm Investments Pte LTD (now SGInnovate, the investment arm of the Singapore government),⁶⁰ the facility provides co-working space for approximately 15–20 startups.

Facilities include co-working and event space, while services focus on bridge support for residents to the Bay Area/Silicon Valley innovation ecosystems. Companies come on independent schedules and stay for varying periods of time, with more than 100 companies in residence supported over the course of the last 4 years.⁶¹

Successful NUS Enterprise and BLOCK71 graduates with Bay Area connections include Zopim, a Singapore-based startup producing live chat software, that was acquired by Zendesk; Patsnap, a Singapore-based data analytics research firm that was funded by Sequoia Capital; ViSenze, a Singapore-based deep machine learning company that was funded by WI Harper; tenCube, a Singapore-based software company acquired by McAfee; Lomotif, a Singapore-based music video editing app that is currently among the most popular on iPhone; Zinier, an intelligent field service automation company headquartered in San Mateo, with funders such as Accel and Founders Fund; and Spin, the San Francisco-based scooter sharing company, which was acquired by Ford in 2018 and competes with Lime and Bird.

Smart Nation

Smart Nation and Digital Government, a department of the Singapore Prime Minister's Office that aims to harness technology to help Singapore stay ahead as a global city, and through technology to improve the lives and livelihood of Singapore's residents, has had a Bay Area office since 2017.

A primary focus of the US office is facilitating global technology talent flows between Singapore and Silicon Valley. There are at least 1,200 Singaporean

tech professionals living in the Bay Area. If alumni of Singaporean universities, individuals who have worked in Singapore before, and Southeast Asians working in tech are considered, the number is an order of magnitude larger. Keeping them engaged in tech developments in Singapore and Southeast Asia is a key mission of the US office.

In March 2018, Smart Nation organized an inaugural Singapore Tech Forum in San Francisco, drawing 350 participants—primarily Singaporeans from startups and other tech companies in the Bay Area. A second Singapore Tech Forum was co-organized by Smart Nation and the Economic Development Board in April 2019, more than doubling the participation and creating a wait list of over 200. Smart Nation director Karen Tay explains, “Global tech professionals are in high demand. When we engage them, it is important to present the ecosystem. They aren’t going to move to Singapore or Southeast Asia for just one job. They want to know what other tech jobs and companies are there.”

To further that mission, Smart Nation’s US office has a partnership with the World Economic Forum’s Center for the 4th Industrial Revolution, in San Francisco’s Presidio, which focuses on issues at the intersection of technology and public policy. For example, Singapore’s AI Governance Framework is being tested with multiple Silicon Valley companies via the partnership. The partnership also looks at cross-border data flows. Initiatives of this kind help build contacts with technology companies and talent, and frame a thought leadership role for Singapore.⁶²

National University of Singapore

National University of Singapore Overseas College (Silicon Valley), which has operated in the Bay Area for fifteen years, is part of the NUS Overseas College Program (NOC) and provides NUS undergraduates with entrepreneurship curricula at partner universities and with internships at startups in technology and innovation centers around the world. Students who are still in school but haven’t yet graduated are placed in 12-month internships with emerging companies.

“The NOC programme instills in undergraduates a global entrepreneurial mindset—making entrepreneurship a viable, and even desirable, career

choice for Singaporeans,” says Professor Freddy Boey, Deputy President (Innovation & Enterprise) of NUS. During their internships, the students also take course modules for credit at Stanford: 75–100 participants, in two cohorts, typically come each year. “NOC programmes are also available to post-graduate students, and moving forward we expect to increase participation with research graduate students,” Professor Boey adds.⁶³

Early in the program’s development, students returning from San Francisco had nowhere to go so camped out at the NUS office. The search for a solution led to the creation of BLOCK71, which built on the flow of successful Bay Area program graduates.

“I attended NUS Overseas College in Silicon Valley together with my co-founders Marcus and Lucas. I got inspired by the use of technology to solve problems at scale. In Singapore, we tend to take fewer risks because of the stigma of failure, and as a result don’t set ourselves up for the moonshot goals that Silicon Valley startups do. After attending the program, my view of the world was changed and I was inspired to return to Singapore and start to build apps.”

—Siu Rui Quek, Co-Founder & CEO, Carousell⁶⁴

GIC and Temasek

Singapore’s sovereign wealth funds GIC (Government Investment Corporation) and Temasek both operate in San Francisco.

GIC’s presence dates to 1987, when San Francisco became its first office outside of Singapore. Being in the Bay Area has helped GIC develop relationships with venture capital firms and emerging technologies and companies. When it first arrived, the venture capital industry was a cottage industry in its first stage of development. GIC’s early investment included participation as a limited partner with Sequoia Capital in the Series A funding of Cisco. Since then, relationships with venture funds have continued to undergird its activity, with investment in all stages of a portfolio company’s development, from startup through IPO. To expand its reach further, in March 2018 GIC and the EDB co-organized the inaugural Bridge Forum, a

high-level conference where 40 Asia-Pacific real estate firms and 30 real estate tech companies from Silicon Valley participated, focused on technology-based disruption and opportunities in the real estate sector. A second Bridge Forum was held in San Francisco in April 2019, with a primary focus on fintech.⁶⁵

Temasek came to San Francisco in 2015, adding the Bay Area to its network of overseas offices in Brazil, Mexico, London, and New York. Seventeen people currently staff the San Francisco office. While Temasek invests in a broad range of companies across the US, connection to the Bay Area's innovation system was a unique draw. Temasek's investments are driven by return on investment, and the companies they invest in don't need a connection to Singapore. But a growing number of Temasek's portfolio companies choose to go there. Recent Bay Area investments include Airbnb, Denali, DoorDash, Guardant, Impossible Foods, Pivot Bio, Verily, and Wish. Guardant, a Redwood City company that produces diagnostic blood tests for cancer and received funding in 2015, established its Asia-Pacific headquarters in Singapore in 2018. The \$800 million investment in Verily was designed to facilitate commercial introduction of Verily's health solutions into Asian markets.⁶⁶

Corporate Connections

Singapore's **Venture Group**, a global provider of technology solutions, products and services, operates across Southeast Asia, Northeast Asia, Europe and the Americas, including Silicon Valley. Its core business is contract manufacturing for the electronics sector, but services also include R&D, engineering, and design with a particular focus on AI, digital and network technology, defense communications, and medical and life sciences. Founded in 1984, the company came to the Valley in 1997 in order to be closer to its customers. Activity started with product prototyping and small-scale manufacturing, after which manufacturing would shift to Asia as production volumes grew. More recently, however, production in the Bay Area has been growing as "made in USA" requirements incentivize local production. Increasingly, today's pattern is one where early or lower-end manufacturing may be done in Asia, but final product assembly and integration is done here. Venture's main production site in the region is a

100,000 square foot facility in Newark where 200 people are employed in the prototyping and manufacturing of electronic systems. In 2018, the company purchased a new 180,000 square foot facility in Milpitas to serve as a center of excellence for R&D and customer collaboration. Venture's production in Southeast Asia includes three facilities in Singapore but is concentrated in Malaysia where ten facilities operate, clustered in the electronics center of Penang and adjacent to Singapore in Johor Bahru.⁶⁷ This allows the company to leverage Singapore's technology capacity with Malaysia's high-quality but lower-cost workforce.

Singaporean startups are also finding success in the region.

One example is San Francisco-based AI company **KeyReply**, which was founded by three Singaporeans in 2014 and moved to San Francisco in 2015. According to co-founder Spencer Yang, "Being based here helps us catch on to trends faster—we know more people on the ground who are involved in this space and understand the local sentiment. I think it helps that clients know we are based in Silicon Valley, because they know we are out there and are a thought leader in the space." Key Reply's chatbot solution is now being used by Singapore's government to connect with residents via social media.⁶⁸

Another Singaporean startup, music video editing app producer **Lomotif**, found connections in the Bay Area that helped the company grow. Co-founder Paul Yang recalls having missed a flight home and spending the extra day at Block71, where SGInnovate director Victor Tan introduced him to a founding member of Stanford's StartX incubator. Yang describes his subsequent acceptance at StartX as a turning point for his company, which now has eight million users: "There is serendipity at work in Silicon Valley....From not having enough connections, our network just exploded. Our mentors ranged from founders of top-notch companies to general partners of venture capital firms. I still meet some of them regularly and they are generous in offering input."⁶⁹

Chin Su Yuen, co-founder of on-demand tech talent platform **MomoCentral**, splits her time between San Francisco and Singapore. Her observation is that "People in Singapore are quick to critique, whereas in

Silicon Valley, people may ask questions out of curiosity to understand how an idea works but they won't put it down. They'll encourage you to pursue it, to see how it succeeds or fails."⁷⁰

While companies whose businesses are primarily focused on Southeast Asia may find less value in Silicon Valley and can rely on a supportive community at home, for those with global ambitions, the Bay Area offers an important platform for expansion.

Expanding Air Links

Business growth in both directions is mirrored by growing air traffic between Singapore and San Francisco. **Singapore Airlines**, which has served San Francisco for forty years, until recently had two daily flights, one through Hong Kong and another through Incheon. In October 2016, the daily flight through Incheon was replaced by non-stop service. The addition of another 3x weekly non-stop flight in November 2018 again expanded the airline's service to a total of 17x weekly flights between Singapore and San Francisco. Tim Lee, Vice President Western USA notes, "The new flights had been performing well since the launch, which is evidence of the Bay Area's strong economy."⁷¹ United Airlines also provides non-stop service.

Other ASEAN Countries Engage

Other Southeast Asian countries are also dropping technology, investment, and innovation anchors in the Bay Area. Besides Singapore, ASEAN governments are present through the **Consulates General of Indonesia, Vietnam, and the Philippines**, which in addition to consular functions actively promote trade, investment, and entrepreneurial exchanges. Various privately-supported and professional networking organizations also support business and startup activity with Vietnamese, Filipino, and Indonesian ties.

The Bay Area is home to one of the largest concentrations of Vietnamese immigrants in the United States, and San Jose is home to more residents of Vietnamese descent (107,000) than any city outside Vietnam.⁷² Ties with Vietnam have a unique history in San Francisco. The city sent a delegation to Vietnam in March 1994, one month after the US trade embargo was lifted, and in May received the first official delegation

from Ho Chi Minh City to the United States. September 1994 saw the first trade and investment show in the US since 1975, held at Fort Mason. In November 1994, San Francisco Mayor Frank Jordan became the first mayor of a major US city to visit Vietnam since 1975. And in April 1995, Ho Chi Minh City and San Francisco became the first cities from Vietnam and the US to establish sister city relations. The **San Francisco–Ho Chi Minh Sister City Committee** has sustained the relationship ever since through business and cultural programs and an annual delegation to Vietnam to showcase San Francisco firms and products at events such as the Vietnam Food Show. Diplomatic relations between Vietnam and the United States were normalized in July 1995, and in October 1997 a consulate general opened in San Francisco—Vietnam's first in the United States. Today, Vietnam Airlines' North American sales and marketing office is located in San Francisco, and trade groups come and go on a regular basis, as do ministers and senior government officials.⁷³ Business activity is also supported by the Vietnamese American Business Association.

The Philippines is another special case. The US is home to the world's largest population of residents of Filipino ancestry outside of the Philippines,⁷⁴ with the Bay Area having the second largest metropolitan Filipino population (163,000),⁷⁵ producing deep family, cultural, and business connections. Entrepreneurs are a growing focus. In October 2019, the Philippines launched **Spark 447** in downtown San Francisco.⁷⁶ A 10,000 square foot co-working space located in the consular building, its focus is on startups led by Filipinos and Filipino Americans, providing space to network, engage with mentors, and connect with potential partners in the Philippines.

Privately-supported **Cognito Labs**, also launched in 2019, is a virtual, pre-seed incubator that supports AI and data-enabled Philippine startups, connecting them with the network and resources of the Philippine diaspora in Silicon Valley. To accelerate their growth, its 16-week program assists entrepreneurs with product, marketing, and sales strategies, and connections to resources and partners through phone consultations with mentors and professionals in the Bay Area and Manila. Cognito's first cohort of startups was enrolled in August 2019.⁷⁷ Another Philippine tech-oriented initiative is **FASTER (Filipino Americans in STEAM)**,

which works to build professional networks in the Bay Area and the Philippines, increase the visibility of Filipino Americans in tech, and help young Filipino Americans build tech careers. Support is provided through industry mentors and FASTERCON, an annual conference hosted at UC Berkeley.⁷⁸

Incorporated in 1991, the **Indonesian Professionals Association (IPA)** provides networking and support for Indonesian professionals in the Bay Area and promotes business links between the US and Indonesia. Most members are bilingual, hold advanced degrees from US or other international academic institutions, and work for financial institutions, tech manufacturers, IT vendors, engineering firms, or startups.⁷⁹

Though lacking a consulate, Malaysia is also active. The **Malaysian Industrial Development Authority (MIDA)** has been in the Bay Area since 2000. Initially, the purpose of its office in San Jose was to support its many clients—particularly semiconductor companies—that are based in the region. While that focus was on the semiconductor supply chain, it has grown since then to include sectors such as medical devices and aerospace. This connects to MIDA's larger strategy: recognizing that there will always be lower cost competitors, much of its focus is to push Malaysia higher up the value chain.⁸⁰

Khazanah Nasional Bhd., Malaysia's sovereign wealth fund, started 25 years ago as a holding company for government-linked assets, and it later shifted toward private equity-style investment. Unlike other sovereign funds, it does not receive annual allocations, and its growth is driven by recycling capital and growing its investments. Headquartered in Kuala Lumpur, its geographical footprint covers Europe, MENA, India, China, Southeast Asia, and the Americas.

The fund is highly diversified in its focus, including both public and private companies and an array of sectors such as telecommunications, energy, infrastructure,

financial services, healthcare and technology. It invests directly as well as through funds. An early investment in Alibaba pointed the fund toward a deeper involvement in technology. Like other sovereign funds, Khazanah's primary goals are financial—return on investment—but there are social goals as well. The latter led to the creation of a sister entity, Hazanah, which focuses on research and social impact, including education, relief efforts, heritage, environmental, and supporting social impact projects. One noteworthy project has been ThinkCity, which helped secure UNESCO World Heritage Site status for Penang. Concerned that the city could become overdeveloped and lose its character, ThinkCity awarded grants to restore historic buildings but also included long-term leases in order to allow long-term tenants to remain. Similar initiatives are underway in Malacca and Johor Bharu. A related ThinkCity focus is on cities as hubs of innovation and public-private methods to catalyze creativity.

Khazanah's San Francisco office opened in 2013 to tap into the region's innovation ecosystem. Seeing the Bay Area as an essential hub, it focuses on investment but also acts as a sensor and connector linking Malaysia and Silicon Valley. Its investment strategy for the region focuses primarily on enterprise software, data analytics, and AI; taking portfolio companies to Malaysia is not an expressed goal, but Khazanah provides introductions and other assistance when there is an interest. The sensor role involves engaging with other investors, technologists, and universities to identify technology trends. The connector role involves advice, support, and introductions for Malaysian entrepreneurs coming to Silicon Valley and Valley entrepreneurs going to Malaysia. With approximately \$37 billion in assets, the fund invests primarily in Asia but is expanding its focus. With a team of twelve in San Francisco, including six investment professionals, recent Bay Area investments include Velocloud, which was acquired by VMware.⁸¹



Conclusion

Singapore and ASEAN: Building New Synergies

Economic growth in Singapore and the ASEAN region is offering new opportunities for Bay Area and California companies and organizations to expand or diversify their presence in Asia. Of 18 high-growth “outperformers” identified in a September 2018 McKinsey Global Institute study of high-growth emerging economies, four long-term outperformers—Singapore, Thailand, Indonesia, and Malaysia—are ASEAN member countries.¹ Underlying this performance are pro-growth policies, fueled by strong competitive dynamics. Young populations, rising middle classes, increased

technological capacity, and an explosion of internet and mobile activity are driving the process. Singapore in particular offers a business environment characterized by open markets, transparency, and the rule of law.

These developments are producing new synergies with the Bay Area based on investment, R&D, innovation, and entrepreneurial activity. These opportunities, led by Singapore as a unique regional platform, will continue to expand as Southeast Asia grows in strategic and economic importance.

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CHAPTER 1

Capitalizing on Growth and Development in Southeast Asia

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Singapore's Economy: Planning, Execution, and Open Markets

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Conclusion

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