

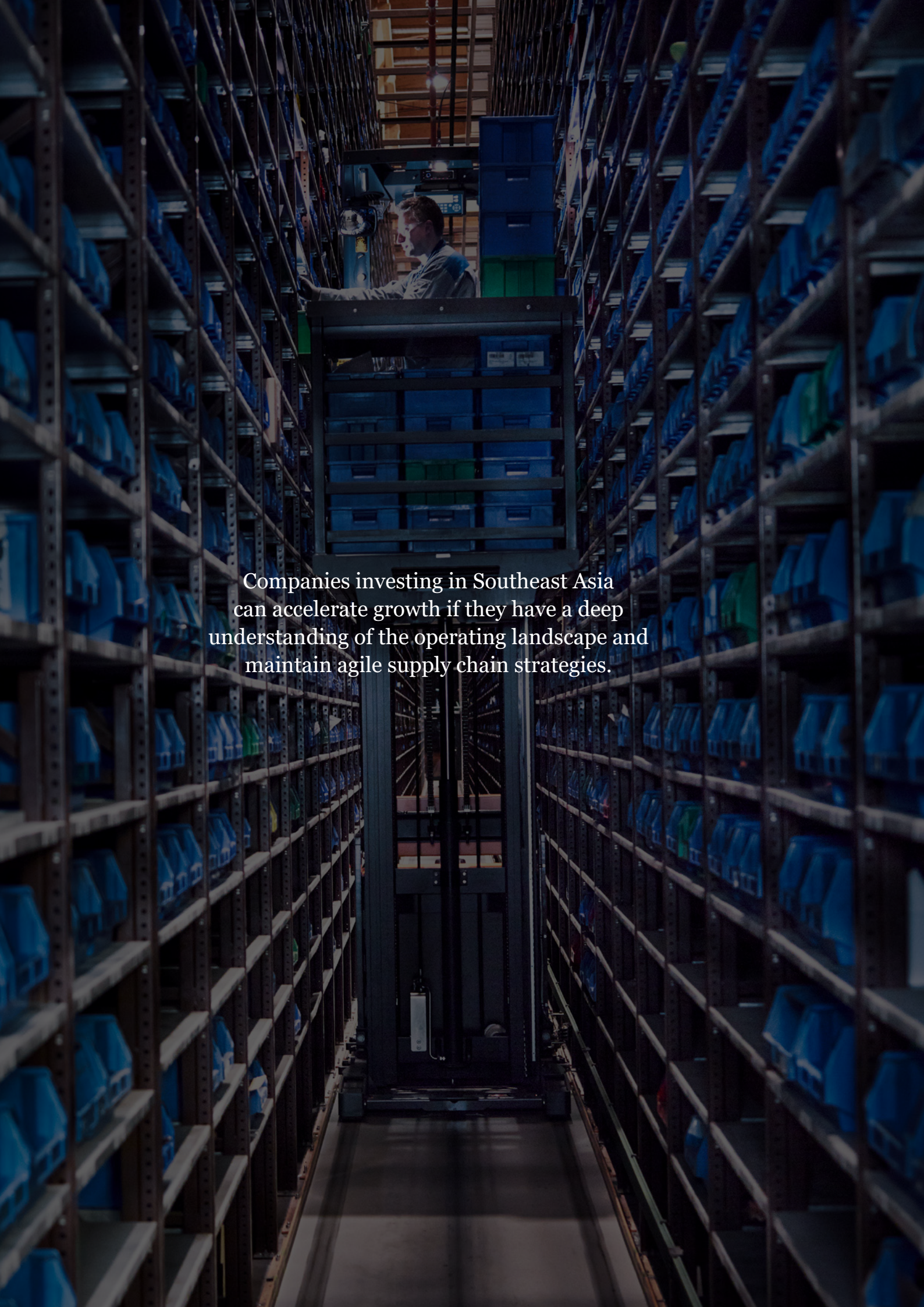
Reimagining manufacturing and supply chains

Investing in Southeast Asia



EY

Building a better
working world

A photograph of a warehouse interior. A worker is operating a scissor lift, reaching into a high shelf to retrieve or place a blue bin. The aisle is lined with tall metal shelving units filled with numerous blue plastic bins. The lighting is dim, creating a focused atmosphere on the worker and the lift. The perspective is looking down the length of the aisle, with the lift and worker in the center.

Companies investing in Southeast Asia
can accelerate growth if they have a deep
understanding of the operating landscape and
maintain agile supply chain strategies.

Contents

1

Executive summary

2

2

Overview of the business landscape

Southeast Asia (SEA) market environment and landscape 5

Why SEA: enablers for businesses and investments 7

Economic outlook post COVID-19 pandemic 9

3

Opportunities in SEA amid disruption and challenges

Top sectors in SEA 11

Key opportunities and mid-term outlook in SEA across sectors 12

4

Building the strategy

Supply chain reimagined 15

- How are industries being disrupted?
- What is the implication on traditional supply chains?
- How can these disruptions be addressed? The imperatives for a resilient supply chain in the future.

How can companies develop their strategy? 22

What are the potential pitfalls to be overcome and ways of building future strategies, new investments, capabilities, evolving supply chain models in the focused sectors? 24

5

Industry perspectives

Case studies 37

The Singapore+ Model 39

6

Key trends and developments

Regional Comprehensive Economic Partnership (RCEP) 41

Investments in infrastructure for improved supply chain and manufacturing 42

Emergence of new technologies 42

Development of sharing economy 42

Green and sustainable infrastructure investment 43

7

Annex

Snapshot of key SEA countries 45



1

Executive summary

Executive Summary

As the world is battling the COVID-19 pandemic, the vulnerabilities of traditional supply chains have been bared open, with certain critical industries being caught off-guard and now dealing with major and minor shock waves.

Southeast Asia (SEA) is home to over 656 million people and is a confluence of many emerging markets. Through a unique combination of demographics, natural resources and exciting market trends, the region provides both purpose and myriad opportunities to businesses to develop and expand their manufacturing and supply chain capabilities.

There are several enablers that make the region one of the fastest-growing regions in Asia-Pacific (APAC), and worthy of opportunity hunting even in the global landscape. Some of the enablers include growth of the consuming class and easy availability of a skilled workforce. Though the COVID-19 pandemic dealt a blow in 2020, the region is poised to make a sharp recovery in 2021. The region's evolving trade policies have helped to create a boost in several sectors of the manufacturing and service industry.

Based on an analysis of pre-pandemic export data, consumer goods and health care equipment sectors are areas of focus for this report. Other emerging sectors such as electronic manufacturing services (EMS) and agritech have also been explored.

As the world battles the COVID-19 pandemic, the vulnerabilities of traditional supply chains have been bared open, with certain critical industries being caught off-guard and now dealing with major and minor shock waves. Trade tensions between the US and China have driven entities to further rethink their supply chain strategies, providing an added impetus for SEA opportunities.

This report examines how entities in specified industries are impacted and can optimize their supply chain strategies. The consumer goods sector is currently under pressure to ensure maximum value derivation from the supply chain, while ensuring greater transparency in value chain activities. The health care industry, which was majorly impacted by the pandemic, is exploring alternate revenue channels through telemedicine and the use of technology for both production of medicines and equipment.

Through this report, industry perspectives were gathered from players in the focused sectors. These provide a context for the pain points these entities suffered, their rationale for selecting SEA as their region of preference or expansion, enablers that proved advantageous for entities operating in this region, and their future aspirations from the region.

Numerous initiatives such as the Southeast Asia Manufacturing Alliance (SMA) and Regional Comprehensive Economic Partnership (RCEP) connect companies with a network of trusted partners to navigate and grow in the diverse SEA region with confidence. In particular, the RCEP allows economic integration with about 30% of the world's population.

There are several trends and developments that promulgate SEA as a key region of focus in the future. Technological advancements and their rapid adoption, continuous improvement to provide state-of-the-art infrastructure facilities and development of a sharing-based economic model are some factors among many, which make SEA the desired region for expansion of manufacturing and supply chain capabilities.

An aerial photograph of a busy port at dusk. In the foreground, a large container ship is docked at a pier, with several yellow gantry cranes positioned over it. The piers are filled with stacks of colorful shipping containers in shades of blue, green, and red. Trucks are visible on the roads adjacent to the port. In the background, a wide river flows towards a city skyline with numerous illuminated skyscrapers under a cloudy, twilight sky. A large, bright yellow number '2' is superimposed over the center of the image.

2

Overview of the business landscape

Southeast Asia (SEA) market environment and landscape

SEA is situated at the confluence of major trade routes with US\$3.4t¹ of global trade passing through each year. The region borders China and India, two of the world's most populous economic powers, making SEA a focal point for cooperation and tensions, among both regional and global powers.

Amid rising trade and technology tensions between the US, China and other related trading partners, SEA nations have now surpassed the US as China's second-largest trade partner. Rising imports from China have also put downward pressure on prices in the region.

Despite these roadblocks, SEA is poised for growth in the upcoming years. With a combined GDP of over US\$3.2t² in 2019, it is currently the fifth-largest economy in the world. Home to 656 million² people, a young demographic and a growing middle class, SEA holds immense potential, seen in the region's real gross domestic product (GDP) growth over the years in figure 1.

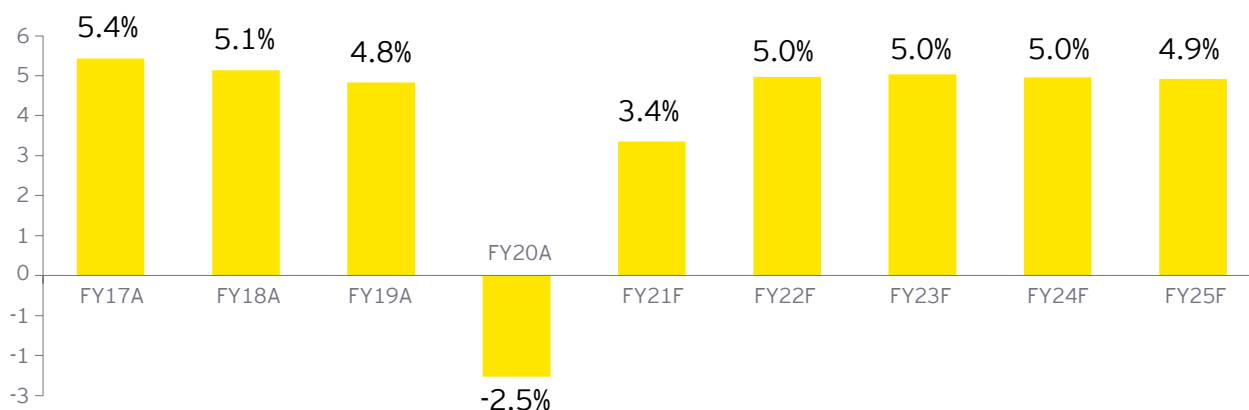
The region is the fastest growing economy in Asia after China, and the International Monetary Fund (IMF) expects growth to remain at 3-5% in 2021-25.

The ASEAN Economic Community (AEC), established in 2016, has been crucial to strengthening intra-ASEAN collaboration. It has created a single market and production base for the free flow of goods, services, investment, capital, and skilled labor within SEA.

Multiple free trade agreements (FTAs) of countries in SEA, along with its loosening tariffs, also attract increasing cross-border trade. For companies and investors in search of their next phase of growth, the AEC is an opportunity to integrate production processes and take advantage of each country's unique natural resources, structural capabilities and labor skills.

For instance, Singapore has emerged as a financial and legal powerhouse, offering easy access to investor capital. Furthermore, it is also considered an advanced manufacturing hub owing to cutting-edge technology capabilities and a highly skilled workforce. Indonesia, Malaysia and Myanmar are abundant in natural resources that fuel sectors such as oil and gas.

Figure 1: SEA real GDP growth % YoY³



The overall SEA region is also experiencing a meteoric rise in e-commerce penetration with online retail forecasted to reach US\$53b⁴ by 2023. The region's digital economy is projected to exceed US\$240b⁵ by 2025. The digital economy in Indonesia alone is estimated to reach US\$124b⁶ by 2025.

SEA is a geographically expansive and populous region, where each country has its own unique demographic, economic policies and market environment. Although increasingly viewed as an integrated regional bloc, SEA is by no means a homogenous entity. As several SEA states have their own production capabilities and unique business landscape, the region, as a whole, provides viable and sustainable opportunities for investors.

While SEA is emerging as a manufacturing and logistics hub due to its lower cost base, digitization of manufacturing processes is also at the core of its future strategy with the adoption of Industry 4.0 being the norm. To suit their customized requirements, it is imperative for investors to rethink and tweak their strategies to accommodate region-specific nuances in the operating landscape.

Indonesia's digital economy alone is estimated to reach

US\$124b

by 2025.

SEA online retail is forecasted to reach

US\$53b

by 2023.

The region's digital economy is projected to exceed

US\$240b

by 2025.

Why SEA: enablers for businesses and investments

1

Growth of consuming class

There has been strong demand from the SEA region across sectors, such as the energy sector that has grown by 80%⁷ since 2000. SEA's consumption is expected to more than double to nearly US\$4t⁸ by 2030, with Indonesia accounting for one-third of the total consumption.

SEA is also adding 140 million new consumers, representing 16% of the world's new consumer class with newfound spending power, by 2030. These new consumers are young. According to *ASEAN Key Figures 2020*, more than half (59.6%) of SEA's population was within productive working age in 2019, while 33.3% was classified as the youth population. By absolute numbers, Vietnam and Indonesia have the highest number of people in these demographic categories. This spells opportunities for companies to reach out to consumers in the region and cultivate loyalty.

2

Low cost and skilled workforce

SEA's key sectors such as advanced and precision manufacturing, medtech and consumer electronics require highly skilled labor with a specialized skill set. As Industry 4.0 technologies shape the future of these sectors, talent with skills in data mining, machine learning, and data transformation is being developed and generated.

The Net Enrolment Rate (NER) in secondary education for the region is over 75%, with Singapore leading at 99.3%. Four countries in the SEA region are ranked among the top 50 countries for the skill set of their graduate workforce. Regarding the ease of finding skilled labor, Singapore, Malaysia and the Philippines ranked 9th, 11th and 13th respectively across the globe.

SEA also has an abundance of lower-skilled workers, largely made up of intra-regional migrants. With a large labor force and a plethora of capabilities, ranging from assembly workers to highly skilled digital-ready professionals, there appears to be ample diverse talent to keep up with the increasing demand across SEA.

3

Ease of doing business coupled with an attractive tax environment

SEA governments have continued to take steps to improve the ease of doing business through reforming legal and trade frameworks in addition to investing in infrastructure, sophisticated manufacturing capabilities and talent.

Incentives such as tax holidays, allowances, exemptions and super exemptions; customs and duties exemptions; and cash grants are available for companies looking to relocate their manufacturing or supply chain hubs to SEA. On the Global Ease of Doing Business Index 2019⁹, seven SEA countries featured in the top half, while three ranked in the top 25, with Singapore leading at rank 2. The average statutory corporate tax rate is 28.44% globally, 26.96% for G20¹⁰ and 27.40% for BRICS. The tax rate for the SEA region averages approximately 22.35%¹¹, with Singapore being the lowest at 17.0%.

The incentives available typically center around manufacturing, principal and trading activities; R&D and innovation; specific industries or location-bounded operations (e.g., special economic zones). A proactive and strategic approach to obtaining incentives can generate significant cost savings, generally a 5-30% return on investment, dependent on the project size, capital investment, geographic jurisdiction, perceived competitiveness and timing.

To further improve the digital infrastructure and facilitate cross-border digital trade, the ASEAN Coordinating Committee on Electronic Commerce (ACCEC) adopted the ASEAN Digital Integration Framework (DIF) in 2018.

The adoption of the ASEAN Smart Cities Network (ASCN) presents opportunities for investments across multiple sectors.

4

Abundant free trade agreements

Countries in SEA have continued to promote and enhance trade cooperation inter- and intra-region. A number of FTAs have been established over the past couple of years. These include the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) and Regional Comprehensive Economic Partnership (RCEP). FTAs can reduce overall costs to manufacture, improve operating margins and improve product lead times.

The attractiveness of SEA predates the US-China trade disputes. In 2010, Nike expanded its entire manufacturing operations in Vietnam. The region continues to further align itself as a major bloc for economic development and sustainable innovation. SEA enjoys the key advantage of significantly lower labor costs – an advantage that is outweighed by poor productivity. This, however, may be an outdated concern for some of SEA's budding high-tech sectors as they are dependent on a highly skilled workforce, and less so on a low-skilled one.

Apart from labor, the region's incentives for firms to set up high-tech manufacturing factories and numerous FTAs make SEA a viable manufacturing region. Collectively, ASEAN has six FTAs with its dialogue partners and its member states have a further 122¹² signed and in-effect agreements. Key SEA nations are an integral part of

the Regional Comprehensive Economic Partnership (RCEP) enabling preferential interaction between 30% of the world economy and connecting over a third of the global population. The RCEP is designed to positively impact multi-stage supply chain networks, making regional distribution more efficient through the easier operation of regional distribution centers (RDC) and additionally increasing competition for business hubs. When relocating manufacturing or supply hubs, utilization of FTAs can lower the total landed cost, improve margins, shorten lead times of import and export, and thus provide the requisite agility and resilience. A critical component when assessing the ability to qualify for preferential rates within the FTA is to carefully align the local supplier base evaluation to ensure regional value content thresholds can be met for FTA purposes.

According to the World Bank's Logistics Performance Index, nine SEA nations rank among the top 100. Notably, Vietnam, at the 39th spot¹³, offers a huge shipping advantage compared with other SEA countries and is a strong contender for export sectors such as apparel, textiles, footwear and bags, owing to the high workmanship of labor. Thailand, SEA's automobile manufacturing center, shows great potential despite political instability. Singapore is an attractive choice for entities looking for advanced manufacturing capabilities and that are at the higher end of the manufacturing value chain. SEA can also expect to see a record increase in investment and trade soon.

Economic outlook post COVID-19

Despite a contraction in the region's real GDP amid lockdown restrictions during the pandemic, SEA states were expected to collectively witness a sharp recovery in 2021 by 6%¹⁴, with the region's six largest economies growing by 6.3%. Malaysia was forecasted to be the fastest-growing economy in 2021 with real GDP growth of 7.8%¹⁴ and the Philippines was expected to grow at 7.4%.¹⁴ The region's growing trade and strong fiscal policies have helped the countries witness a boost in growth of the manufacturing and service sectors. Post-pandemic, real estate, fast-moving consumer goods (FMCG) and food logistics, and manufacturing industries will likely emerge transformed as a result of major shifts in supply-demand dynamics.

The integration of information and communication into health care will also drive sectoral reforms. Usage of health care apps shall transform the way hospitals and doctors store their records as well as collect and share patient data. Indonesia is predicted to have an internet economy close to US\$130b by 2025 from US\$40b in 2021.

There shall be major strides in new industries, such as agritech, medtech and edtech, and radical shifts in certain industries such as automotive and electronics manufacturing services. In this new era, SEA shall play a pivotal role in shaping the global supply chain landscape.



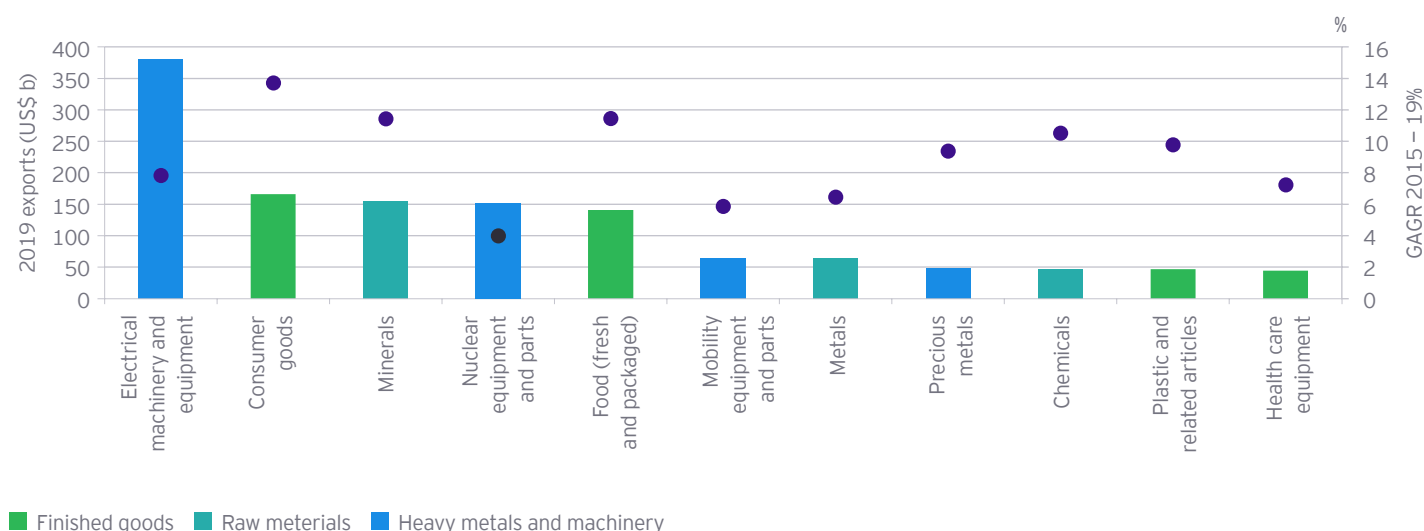
A photograph of a male worker in a grey and orange industrial uniform and safety glasses, focused on his work at a factory assembly line. He is wearing gloves and working on a series of dark, circular components. In the background, another worker is visible, also in a similar uniform. The scene is set in a well-lit industrial environment with various machinery and equipment. A large, bold yellow number '3' is superimposed over the center of the image, partially obscuring the worker's face and the components he is working on.

3

Opportunities in
SEA amid disruption
and challenges

Top sectors in SEA

Figure 2 : SEA sector-wise exports (2019)¹⁵ and CAGR (2015-2019)



The analysis of pre-pandemic metrics – notably the finished goods export in 2019 and the compound annual growth rate (CAGR) for 2015-2019 – has helped in the identification of key sectors as focus areas for this white paper. The top sectors identified are consumer goods and health care equipment. As seen in figure 2, the consumer goods sector has seen the second-largest volume of exports in the year 2019 and the largest CAGR in the period 2015-2019. Health care equipment has seen a considerable CAGR in 2015-2019 and has a complex and unique global supply chain.

In addition to these sectors and those highlighted in the graph above, certain emerging sectors have been identified, with a potential to become significant growth drivers for the region:

Electronic manufacturing services (EMS) – 7.3% of the world's consumer electronics come from SEA and 80% of the world's hard drives are made in this region. The top EMS manufacturing locations in SEA are Thailand, Malaysia and the Philippines. Some of the world's largest

chipmakers such as Texas Instruments and the world's largest producers of hard drives such as Hitachi have several bases in the Philippines. Malaysia has grown to become a major global manufacturing hub for several EMS companies, with a total investment of approximately US\$35b.

Agritech – The alternative protein industry, which consists of plant-based, cultivated, whole-food meat, seafood and dairy alternatives, is predicted to grow annually at 9.3%¹⁶ globally until 2026.¹⁷ The agritech industry in SEA is fueled by increasing interest and investments, not just by governments and state-owned institutions such as Temasek, Enterprise Singapore and Singapore's Economic Development Board (EDB), but also by large corporate and institutional investors such as Sequoia Capital.¹⁸ Rising consumer demand and a renewed focus on sustainability have led to promising growth of plant-based start-ups such as Karana and ShioK Meats among other plant-based ventures in the region.

Key opportunities and mid-term outlook in SEA across sectors

1

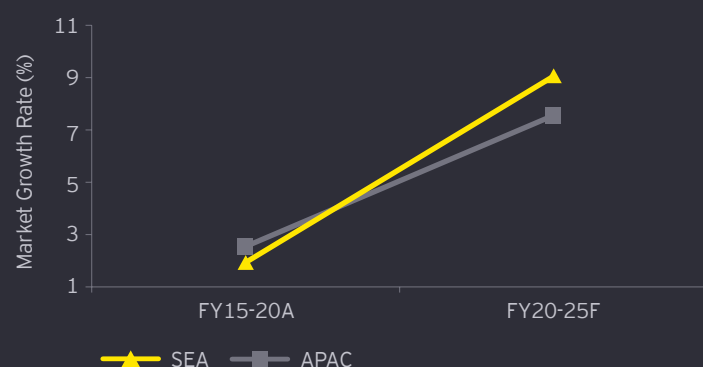
Consumer goods

Consumers are now trending toward convenient, personalized and sustainably-sourced products that can simplify everyday life. A rising section of consumers is ready to pay a premium for products due to rising purchasing power in the region. Super apps have emerged in SEA²⁰ and have altered how people engage within apps.

For the consumer goods sector that comprises home care, personal care and apparel, for the six biggest economies in SEA⁶, the market size for FY2015-20 grew historically at a CAGR of 1.9%¹⁹, and is forecasted to grow at 9.06% during FY2020-25¹⁹, while APAC is forecasted to grow at 7.6%¹⁹ as seen in figure 3. The market size in SEA for 2025 is estimated at over US\$107b.

The shift in consumer purchase patterns, support from government institutions and economic integration toward a digital infrastructure are improving the overall feasibility of SEA. Supply chain resilience and reliance on multiple sources of supply are giving rise to significant opportunities.

Figure 3: Market growth SEA vs. APAC¹⁹



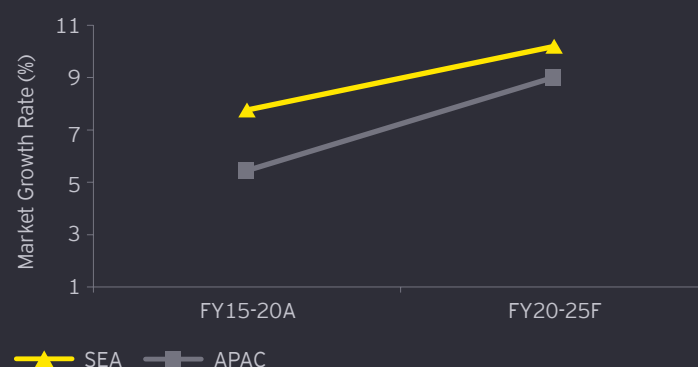
2

Health care equipment

Singapore is among the fastest-growing innovative production hubs of this sector. A favorable business environment, strong intellectual property (IP) laws, an expansive research network and grants provide conducive support for new opportunities. The region is enjoying strong growth in telehealth, digital therapeutics, diagnostics, remote patient monitoring and analytics.

The health care equipment market in SEA, which saw a CAGR of 7.8% in 2015-20, is forecast to see an increased CAGR of 10.2% in 2020-25. In contrast, APAC saw a CAGR of 5.5% in 2015-20, and is forecast to grow at 9.0% in 2020-25 (figure 4).

Figure 4: Market growth SEA vs. APAC²⁰



3

Electronic manufacturing services (EMS)

Globally, the EMS sector is forecasted to grow at a CAGR of 5% in 2020-26. Opportunities are opening up in SEA, as entities readjust from their current facilities in China and develop more resilient supply chain networks in the region. Notably, 6 of the world's top 10 EMS companies are present in Singapore. Under its Research, Innovation and Enterprise (RIE) 2020 plan, the Singapore Government plans to invest S\$3.3b²¹ in advanced manufacturing and engineering R&D.

4

Agritech

With an increasing focus on healthy food options and sustainability, the right target demographic and R&D capabilities, the agritech sector is growing at a rapid pace in SEA, with Singapore leading the way. Arguably, the biggest driver for innovation in agritech in SEA is that Singapore currently imports 90% of its food. The Singapore Government has allotted S\$30m²² in support of its "30 by 30" target, which aims to have 30% of Singapore's food produced locally by 2030. SEA received approximately US\$700m²³ of investments in 2020 in this sector, with a significant proportion going to Singapore.



A woman with long dark hair, wearing a teal patterned shirt and blue jeans, stands on the left, gesturing with her hands as she speaks. A man with a beard, wearing a blue button-down shirt and blue jeans, sits on the right, listening intently and holding a small object in his hand. They are in a modern office setting with a glass wall. Above them, several colorful sticky notes (purple, green, pink) with handwritten letters are attached to the glass. A large, bold yellow number '4' is overlaid in the center of the image. The background shows other office desks and a person working at a computer.

4

Building
the strategy

Supply chain reimagined

General observations and imperatives

SEA and the rest of the world continue to be impacted by COVID-19 and its variants, which also exposed the fragility and inherent inefficiencies of traditional supply chains. The pandemic has caught all industries off guard with ripple effects tearing through supply chains and impacting routine operations.

Dependence on a single source of supply enhances reliability, but hampers flexibility. The pandemic has forced companies to identify alternative, lower-risk local suppliers for diversification, as well as to be closer to the market. Proximity to consumers will result in faster time-to-market and lower logistics costs as well as provide companies higher flexibility to adapt to local demand.

Trade tensions between the US and China and the imposition of tariffs on Chinese goods are boosting opportunities for investments in SEA to circumvent any impending disruptions. The trade tension has not only caused global shocks with immediate and substantial consequences, but also indicates that the political landscape may face heightened uncertainty and formidable challenges in the decade ahead. SEA nations are now being increasingly seen as low-cost manufacturing hubs, not only for high-tech or high-value goods, but also for mainstream products.

Many entities are already moving toward or planning to adopt a “China Plus One” strategy, a key opportunity for investments in SEA. There is a strong emphasis on reducing supply chain overheads in the long run, while developing a resilient supply chain, immune to both minor and major disruptions.

Industry 4.0 is transforming how entities optimize their manufacturing processes. Manufacturers in SEA are leveraging digital technologies such as advanced manufacturing methods, human-machine interaction, advanced analytics and intelligence to overcome relatively low productivity levels and further strengthen their position as “factories of the world”. The increase in investments by SEA governments in technology and digitization is a promising development.

Sector-specific observations and imperatives

Sector: Consumer goods (CG)

Consumer behavior had been evolving rapidly even before the pandemic struck. The current crisis has led to greater uncertainty and complexities for the consumer goods industry on many fronts, including accelerated shifts in consumer preferences, personalization, speed to delivery and convenience. Consumers who had been slow to adopt online shopping prior to the pandemic are now regular users. Other trends are also emerging. Short- and medium-term demand across product categories is expected to shift toward most consumer staples, including food and beverage products with an extended shelf life. Demand for home care and consumer health and hygiene products is also expected to continue to increase. However, discretionary spending will likely dip, with consumers becoming more value-conscious and focusing more on essential, competitively priced goods.

Consumer product supply chains face twin pressures – i.e., retailers are moving up the value chain and demanding greater traceability in the products they sell. The resulting complexity in distribution networks, coupled with supply and demand volatility, requires consumer companies to digitally transform their supply chains to build agility and resilience across their ecosystem (figure 5).

While geographic differences in affordability, health, sustainability, consumer impact and experience define our consumer segments, these issues concern all consumers globally (figure 6):

- ▶ **Affordability:** Globally, 58% plan to be more aware and cautious of their spending in the longer term.
- ▶ **Health:** 57% of consumers want to make healthier choices in their product purchases in the longer term.
- ▶ **Sustainability:** 49% will prioritize the environment and climate change in how they live and the products they buy.
- ▶ **Consumer impact:** 56% will be more likely to buy from companies that ensure what they do has a positive impact on society.
- ▶ **Experience:** 37% will be less inclined to get involved in experiences outside the home on account of health and safety concerns.

Sector: Health care equipment

The COVID-19 crisis and subsequent overwhelming of health care systems across the world have only highlighted the grim reality of conventional processes. The advent and mainstream adoption of digital technologies such as 5G and telemedicine are bound to disrupt the entire health care industry. This will also create new opportunities for transforming the current supply chain network of pharmaceuticals and health care equipment.

There is an emerging trend of value-driven care, centered around increasing focus on the patient's experience, reducing medical waste and lowering overall costs.

Chronic diseases, such as diabetes and cardiovascular disease caused by sedentary lifestyles, are becoming more prevalent in SEA. New solutions, which include the use of robotic surgery, 3D printing and implantable devices in addition to other innovations for prevention, have the potential to disrupt existing frameworks.

Figure 5: EY survey of global CEOs²⁵

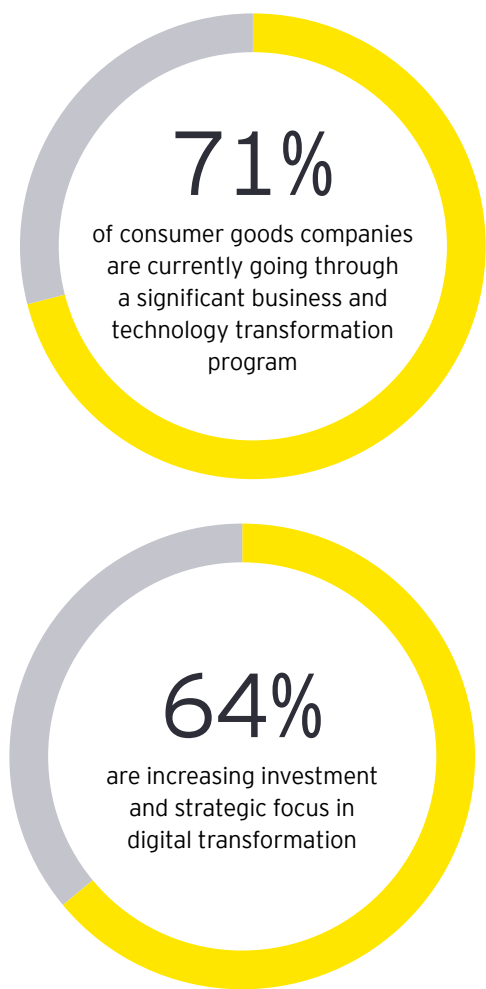
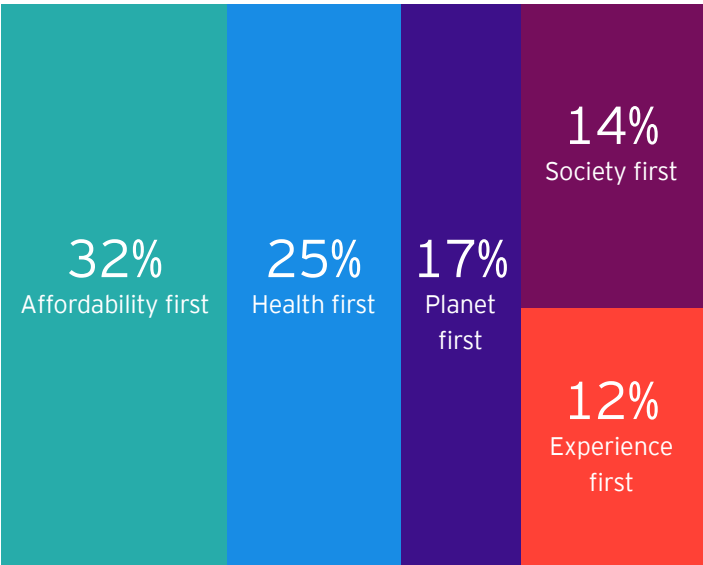


Figure 6: Distribution of future consumer priorities (global)²⁴



Medical equipment industries are facing pertinent obstacles in preparation for a new supply chain of tomorrow. The ubiquity of data creates new opportunities for life sciences companies to rethink innovation and create personalized health outcomes. Framing innovation in terms of outcomes and personalization means products are no longer the central driver of value. Platforms that connect, combine and share data will be a key enabler of this future value creation. Success requires adopting flexible business models that allow life sciences companies to develop data-driven improvements to health outcomes. Companies must also develop systems that align objectives and share value among stakeholders, with logistics strategically located within SEA to enable quick and efficient transportation of products.

Sector: Electronic manufacturing services (EMS)

Industry 4.0 technologies will drive the manufacturing facilities of the future, with seamless data flows across product life cycles, fully automated production systems running on significant data crunching and thorough analytics, enabling more efficient production processes.

The shortage of semiconductor chips in 2020 and 2021 showcased a direct consequence of supply chain disruptions as many car manufacturers were obligated to reduce output or even suspend production. This raised concerns about the concentration of vast chip manufacturing in relatively few countries, while providing an avenue to maximize efficiency and minimize disruptions.

As electric vehicle (EV) production grows, so will the global market for semiconductors, given that EV systems require more semiconductor content than internal combustion powertrains. According to the *EY Mobility Lens Forecaster*, EV sales across the US, Europe and China will surpass that of both internal combustion engine (ICE) and fully hybrid vehicles by 2033.

The rise in EVs is bound to disrupt the mineral and metal markets. Demand for lithium, cobalt, nickel, graphite and rare earth metals is likely to grow exponentially. Prices for these commodities are volatile and prone to geopolitical uncertainty. Reserves are highly concentrated. Over 50% of lithium reserves are found in Australia, Argentina and Chile. SEA's automotive industry is expected to enjoy continued growth in both regional supply chains, as well as a global exporter. The potential for high-value exports in EV components such as batteries will be an important driver in this expansion.

Sector: Agritech

The pandemic severely disrupted traditional and labor-intensive industries like agriculture, creating significant hurdles for food availability and accessibility. A growing world population, a rising middle class and a prolonged COVID-19 crisis pose challenges to food security and nutrition in developing countries and low-income households as some consumers reorient consumption patterns, e.g., from nutritious fruits toward staple foods.

Structural changes like shifting consumer trends and urbanization make consumers conscious about the environmental impact of supply chains, and consumers are therefore willing to adopt more sustainable alternatives and invest further in agritech.

Digital technologies like blockchain and AI can help the agritech industry derive ultimate value for consumers and create sustainable industry practices. It tackles the unsustainability of current animal protein consumption and production and acts as an alternative for countries that heavily rely on foreign food imports, such as Singapore.



What is the implication on traditional supply chains?

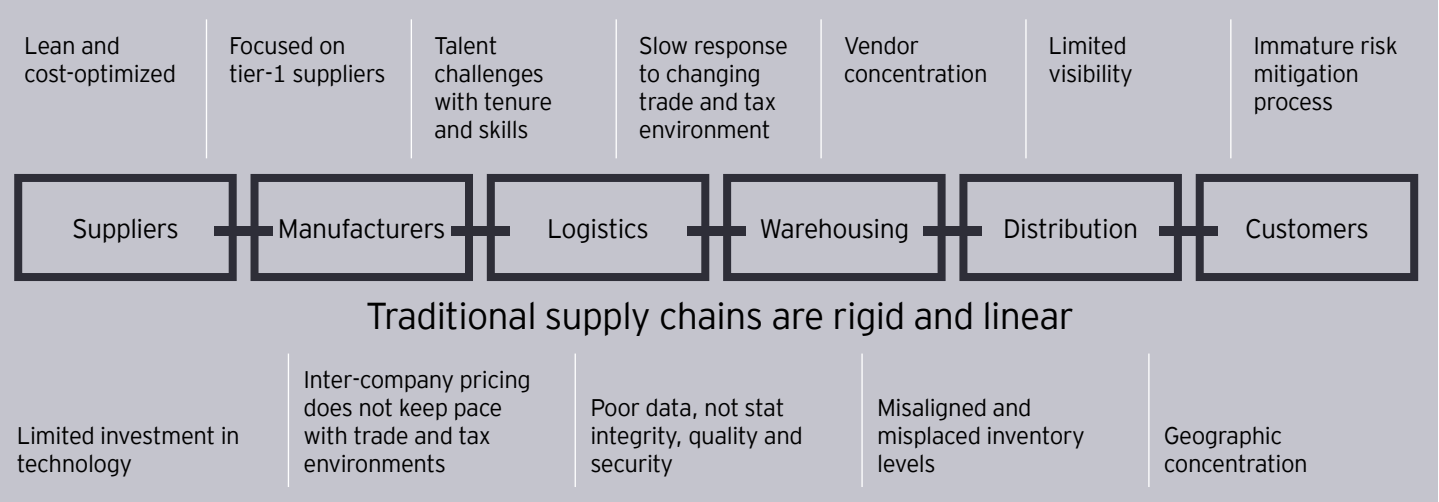
The just-in-time (JIT) methodology developed by the Japanese in the 1970s was designed to optimize the supply chain through a reduction of inventory and work-in-process (WIP). However, for many industries now with complex supply chains, there is significant pressure to achieve a cost advantage by sourcing materials and conducting value-addition activities across multiple geographies, making unfettered interconnectivity the primary key to success.

There are four major shifts expected to impact the traditional supply chain (figure 7) in general:

- **Acceleration of online retail penetration:**
With distancing measures and the pandemic transforming gradually into an endemic, online retail penetration will continue to accelerate. Estimates forecast online retail in SEA to reach US\$53b⁵ in 2023.
- **Shifting and expansion of new business models:**
There are new developments in how products and services are ultimately presented to and consumed by consumers. An example is the development of community platforms, which enable multichannel engagement directly with consumers through gamification and personalization. Nike has fully embraced its community platform through its “Consumer Direct Offense” strategy, enabling it to achieve a 38% digital growth in the second quarter of its financial year 2020.

- **Supply chains will become complex and agile:**
Pomelo Fashion, founded in 2013 and based in Thailand, is SEA’s leading omnichannel fashion platform. It recently launched PRISM, which is an end-to-end brand solutions platform utilizing demand forecasting services to enable smaller companies to achieve better economies of scale. PRISM’s demand forecasting service has an approximate 85% accuracy and uses proprietary machine learning. With information from Pomelo’s mobile app and physical stores in Thailand, predictive analytics analyzes data points of the products to predict their popularity. This helps companies, such as Pomelo, improve their merchandise planning and product development.
- **Supply chain optimization will become an important driver in decision-making:**
The strategy will shift from focusing only on traditional costs like logistics and warehousing to include the impact of lost sales, inventory holding and obsolescence costs.

Figure 7: The inadequacies of traditional supply chains²⁶



How can these factors be addressed?

The imperatives for a resilient supply chain in the future

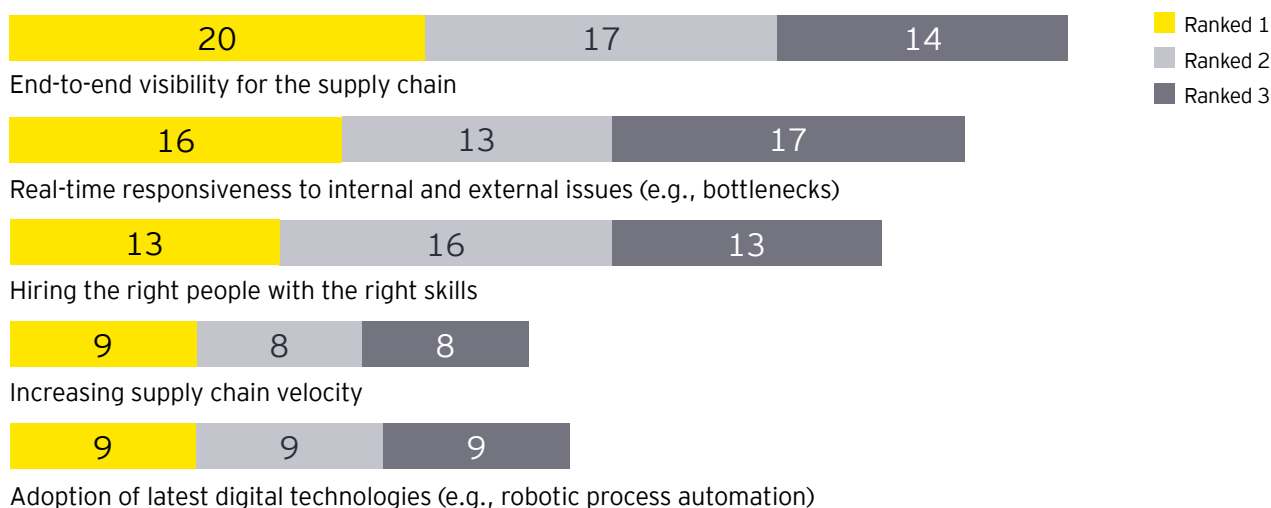
Companies and supply chains are facing multiplying pressures from the market. Requisites of a resilient supply chain include (Figure 8):

- ▶ **Need for speed:** Customers no longer expect their suppliers to simply react to their needs, but to anticipate them. With the pace of change, supply chains must be able to adapt quickly to match fast-changing customer preferences.
- ▶ **Evolving from linear to digitally networked supply chain:** Although most companies are evolving from a linear supply chain, only approximately 25% consider themselves digitally networked or autonomous. For companies seeking to transform their supply chain, it is critical to fully understand the path ahead and recognize where they are on the journey from linear to autonomous. Supply chains are moving to become a networked ecosystem where all the data is in the cloud, and any event can be seen and acted on by everyone simultaneously.
- ▶ **Supply chain investment priorities:** A key goal is to adopt and pilot emerging technologies with scale in mind – not as an afterthought, but as an integral part of the supply chain. Traditionally, supply chains were viewed by many as a cost center. However, going forward, decision-makers should see their supply chain as a way to effectively compete in the marketplace and steer strategy.
- ▶ **Overcoming talent shortage:** People are the backbone of an entity, and as industry transforms, so must the talent that drives it. Supply chain leaders need to drive the vision and rethink ways of working to attract and retain the right talent. The workforce must transform as the supply chain reinvents through retraining, recruiting and retention.

The unexpected disruption from the current pandemic provides an unprecedented opportunity for supply chains of the future to be redesigned with the new 3Rs:

- ▶ **Responsiveness:** Systems respond to inputs from the external environment. The supply chain system relies on inputs such as customer order volume, commodity prices and freight rates to act. Therefore, businesses should appreciate the value of obtaining real-time updates on these inputs by upgrading from legacy systems.
- ▶ **Reconfiguration:** Diversifying one's supply chain is not as simple as building additional plants in other jurisdictions. It involves revamping and redesigning functions in the system to be more "plug-and-play". For example, in the event of future pandemics and extreme events such as flooding, could certain business functions like procurement and finance continue their operations from other less affected locations? What are the necessary changes to enable that? These questions need to be answered.
- ▶ **Resilience:** Think bigger and be prepared to build resiliency from the ground up, starting with the organization structure, business processes and performance metrics to futureproof for the next disruptive event. There is no "one-size-fits-all" for what this looks like, as every business is different.

Figure 8: What ranks as the top supply chain success factor²⁷



As consumer goods executives strive to reframe their businesses for a post-pandemic era, they should be looking for opportunities to integrate digital capabilities that can generate significant financial value and prioritize the development of a transformational culture in their organizations. Development of smart factories, supply chain control towers, and supply chain intelligence platforms (SCIPs) can create end-to-end visibility through the collection of accurate cloud data to support real-time decisions for all ecosystem partners (figure 9). The improvement in infrastructure shall add an additional stimulus for development. The new Patimban port in Subang, Indonesia and investments will ease logistics bottlenecks for the developing industrial parks. Successful consumer goods organizations are transforming their culture from “Digital Also” to “Digital First” (figure 10).

For precision manufacturing sectors such as semiconductor, marine offshore and aerospace, adoption of innovative technological solutions in manufacturing operations is a must. Singapore’s business environment and talent availability are conducive to the development of such innovative manufacturing solutions.

The city-state provides a springboard to the SEA region; successful technologies and business models can logically be scaled up from there. Singapore, as a global logistics hub, could serve as an ideal solution for the Medtech industry.

The country is a host for multiple airfreight providers that have achieved IATA Centre of Excellence for Independent Validators Certification for Pharmaceutical Handling (IATA CEIV Pharma). This ensures excellence in pharmaceutical handling and establishes a consistent standard among industry partners.

The EY Food and Agriculture practice estimates the total alternative protein market size between US\$77-153b by 2030. Singapore’s science-forward regulatory approval process is frequently regarded as a leading indicator for broader approvals by other countries.

Figure 9: Supply chain of the future²⁸

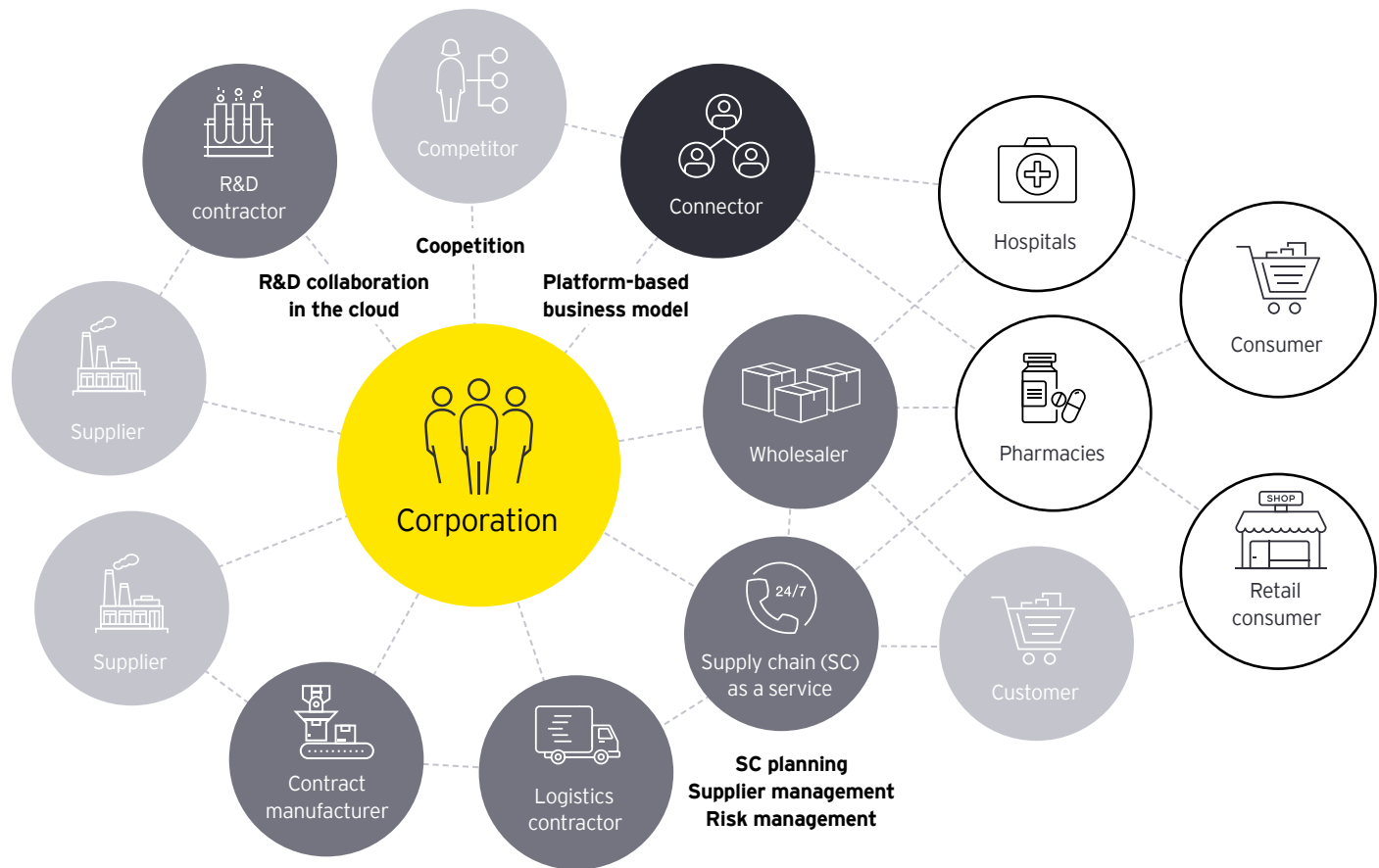
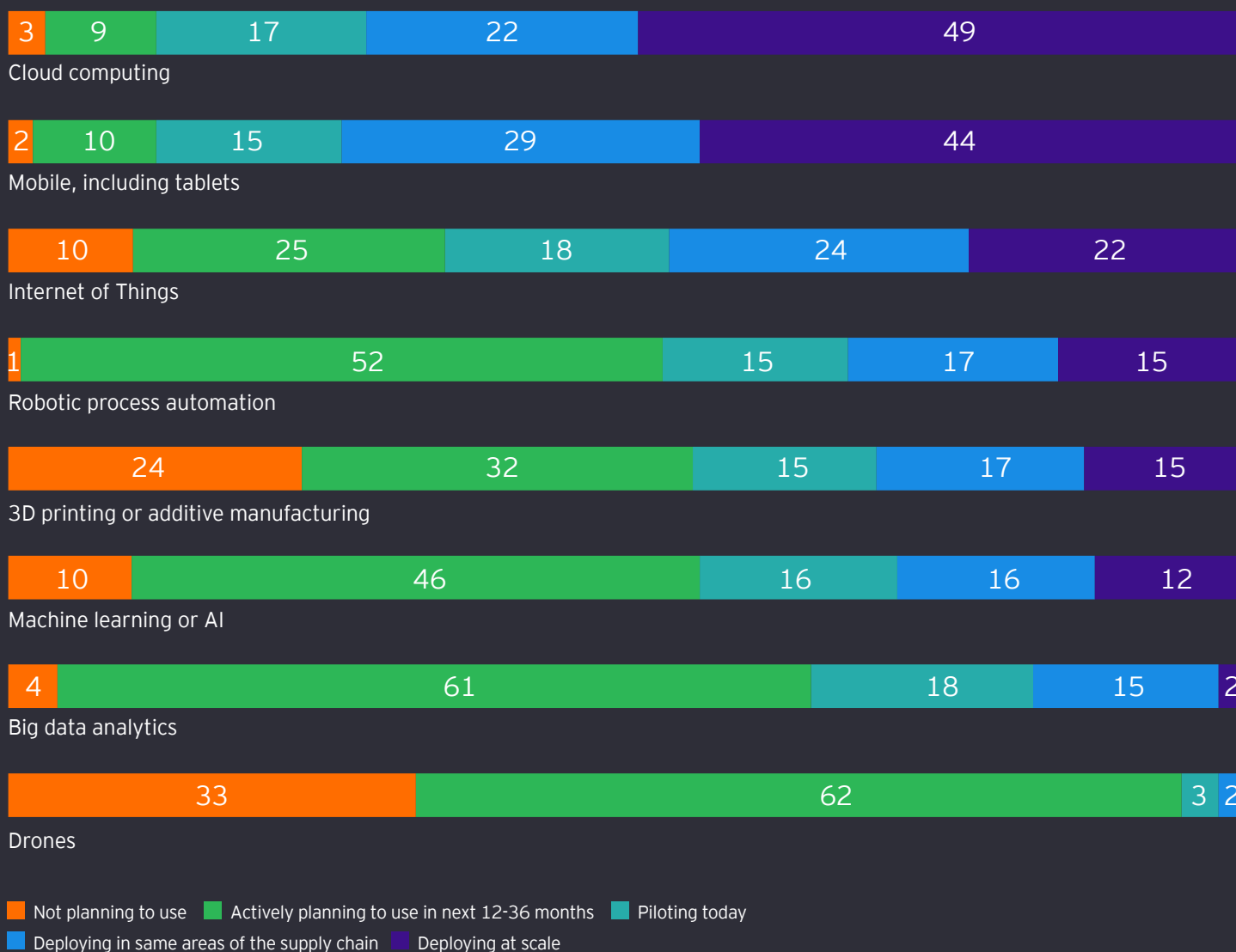


Figure 10: What supply chain tech is being planned to use²⁸



How can companies develop their strategy?

Multinational companies (MNCs) have traditionally leveraged economies of scale, standardization and centralization to drive efficiencies. However, this strategy is not always fit for purpose for a diverse SEA market. Language, culture, the geographic landscape, regulatory and tax regimes, economic maturity and a fragmented consumer base all challenge the replication of such global models in SEA.

Furthermore, companies are increasingly moving away from heavily centralized, co-located operating models to hybrid structures, which allow better management of regional differences and balance growth, cost and agility objectives. In addition, the pandemic has also challenged the notion that co-location is required, with virtual centralization likely more prevalent going forward.

While companies are rethinking their tailored regional supply chain strategies, there are eight critical factors that they must consider:

1 Customer collaboration and order fulfillment

Inventory, warehousing, logistics and last-mile delivery planning to meet consumer expectations for quick delivery and prompt return services

2 Regional trade and tax value chain optimization

An ideal positioning between jurisdictions to optimize the total cost-to-serve associated with procuring, manufacturing, importing, transporting, distributing and selling goods

3 Footprint, assets and investments

Right level of geographic decentralization attained to serve high-growth markets at compelling costs

4 Supply chain visibility, intelligence and traceability

A well integrated supply chain with minimum interruption and maximum collaboration

5 Product innovation

Right balance between product standardization and product tailoring to country-specific requirements and at what stage of the supply chain

6 Supply chain resiliency and sustainability at different stages

Reduced dependence on a narrow set of global vendors as well as increased reliance on local sourcing at competitive prices

7 Workforce restructuring and upskilling

A workforce that is not only technically competent, but also equipped with strategic thinking and problem-solving capabilities at different stages

8 Digital enablement

To bring to life the various principles of Industry 4.0 and provide a much-needed boost to manufacturing efficiency and flexibility, labor productivity and workplace safety

While considering the above factors, companies should adopt a step-by-step approach to shape their regional supply chain strategies. The strategy should be defined in sync with short-, medium- and long-term business goals and objectives; nuances of various business segments defined by geographies, products and channels; the current supply chain's robustness and potential gaps while scaling up the business and eventually take a segmented approach for different business segments to develop the supply chain strategy for SEA.

Companies can shape manufacturing and supply chain capabilities in SEA into a competitive advantage by investing in custom-fit models optimized for business needs. This strategic direction depends on where businesses are at across these three dimensions: asset ownership, consolidation and digitalization.

1 Level of asset ownership

Asset light

Companies can leverage shared ecosystem and platform services across the value chain (innovation, product testing, manufacturing and distribution) to achieve greater flexibility in operations. It is particularly beneficial in new market entries, new products, new business lines and disaggregated outreach to customers and provides better responsiveness to demand fluctuations, changes in technologies and unforeseen disruptions in the supply chain.

Asset heavy

Mature companies prefer to integrate vertically to the extent possible for better control, visibility and margins. However, the decision on asset ownership can differ across the value chain and investment can be over-indexed on critical and strategic parts only.

2 Level of consolidation

Hub and spoke model

Companies can utilize a central strategic location as a hub for distribution, from which all shipments to various destinations will be made. Singapore proves to be an ideal transshipment hub location given its excellent location, strong maritime and air connections (Tuas Mega Port and Changi Airport) and talent pool.

Additive manufacturing

Companies are slowly moving into utilizing additive manufacturing as it allows them to produce parts on demand and reduce inventory requirements by shifting them into virtual inventories.

3 Level of digitalization

Digital twin

Companies can leverage ecosystem providers to create a digital prototype of their physical supply chains to analyze data, sense problems and simulate decisions regarding demand forecasting, scenario testing, production planning, etc.

Blockchain

Companies are deploying shared databases to enhance product traceability, streamline processes and optimize costs by recording all transactions performed by various stakeholders across the value chain.

RFID

Companies are using tracking of individual stock-keeping units (SKU) using radio-frequency identification (RFID) tags for full visibility of the supply chain from manufacturing to warehouses to retail stores.

Cloud-based technology

Companies can consider utilizing software-as-a-service (SaaS) or platform-as-a-service (PaaS) for better procurement system and inventory management by an intelligent analysis of massive information across the supply chain network.

What are the potential pitfalls to be overcome as well as ways of building future strategies, new investments, capabilities and evolving supply chain models in these key sectors?

Sector: Consumer goods

Consumer goods is a mature industry with a global value chain. The sector is forecasted to grow at 9.06% between 2020 and 2025 to reach a market size of US\$107b in SEA by 2025. Disruptions due to changing consumer preferences and the need for rapid digitalization call for innovative supply chain solutions. Singapore, being a trading and logistics hub in the SEA region, is well positioned to coordinate and execute the development of more agile and resilient supply chains.

Pitfalls

1. Inability to meet rapidly changing consumers' consumption patterns, especially e-commerce

Consumer preferences are rapidly evolving. They demand greater convenience, personalization and "Amazonification". Consumers are now used to having products delivered to their doorsteps as a result of movement restrictions to prevent COVID-19 infections. According to EY *Future Consumer Index 2021*, 61% of consumers are visiting stores less frequently in Indonesia and 35% of consumers will have online as the primary channel for browsing across various subcategories of consumer goods. This has made e-commerce much more important than ever. Consumer goods companies realize the importance of online channels, but are still slow to capture this market segment due to a lack of agility required to repivot supply chains for e-commerce. Setting up the supply chain to support an online channel requires companies to set up smart warehouse operations, revamping transportation from traditional fleets for bulk orders to more agile last-mile delivery and return logistics. As a result, market shares in the online channel lag the offline channel for most companies, translating into foregone sales.

2. Lack of integrated and end-to-end communication

A seamless supply chain function requires continuous coordination with internal parties like procurement, manufacturing, logistics, marketing and finance functions and external parties like raw material suppliers, third-party manufacturers, logistics partners, and distribution partners.

The unavailability of real-time and accurate data across the supply chain and further lack of investment in data analysis prevent companies from efficiently forecasting consumer demand, and affect the supply chain's agility in the face of rapid changes. This lack of integration also prevents players from having insights into the inventory at various nodes of the supply chain and points-of-sale, leading to misaligned priorities, higher cost and increased wastage.

3. Geographic risk of concentrated manufacturing capabilities

A significant part of consumer goods manufacturing is still based in China. The high concentration of imports from any one country makes the supply chain susceptible to delays, heavy administration and shipping costs that can have ripple effects throughout the supply chain. For example, due to the US-China trade dispute, companies were forced to identify alternative markets for their products. Though exports to SEA have increased, opportunities to pivot to a new market may not always be available. Additionally, the pandemic has deepened the cracks in the supply chain due to China's dominant role as the movement of goods slowed drastically at the beginning of the pandemic, leading to empty distribution centers and warehouses and product shortages.



4. Increasing consumer awareness and inclination toward sustainability

The consumer demographic in the region is swiftly changing and Gen Z and millennials will account for 75% of the SEA consumers by 2030. This consumer segment is more digitally enabled and increasingly favors companies with sustainable and goal-oriented practices.

As the entire value chain becomes more transparent in today's age of information, it is not enough for companies to assume that their tier-1 suppliers are adhering to industry-accepted standards or simply rely on declarations by them. Leading fashion giants have been at the receiving end of a continued backlash for the social and environmental impact of their affordable fashion. Companies need to be confident that their entire supply chain, from the source of raw materials to the final product and distribution, is upholding sustainability standards and undertake a diligent review of all the stakeholders involved to ensure this.

According to the *EY Future Consumer Index 2021*, 73% of global consumers believe brands have a responsibility to make a positive change in the world and 80% of global consumers believe brands must be transparent about their environmental impacts in the production of their goods and services. An increasing number of companies in recent years have pledged to increase adherence to sustainability standards, which involves renegotiating contracts to work with suppliers whose practices are sustainable, including innovating packaging that produces minimum waste and reduces the environmental impact of transportation.

Besides sustainability considerations, consumers are also increasingly holding companies to higher ethical standards. Companies also need to ensure that other rightful practices, such as safe working conditions for laborers, no animal testing and fair payment for sourcing raw materials, are being upheld. Committing to such rightful and sustainable practices undoubtedly puts pressure on margins and companies need to rethink various parts of their supply chains to identify the best way forward to strike a balance between consumer expectations and profits.

Solutions

1. Increase geographic footprint

To reduce their reliance on any one country for sourcing of goods, companies should shift their focus to new and growing economies in the SEA region. Companies are strategizing to diversify their manufacturing footprint and move closer to end markets. Nearshoring and near sourcing give companies the flexibility to respond to consumer behavior faster. In the case of nearshoring, inventory can be transitioned and delivered faster as it is closer to the end customer. Similarly, companies can incorporate personalization by manufacturing products to order instead of building huge inventories. The Regional Comprehensive Economic Partnership (RCEP) can act as a great push for companies to diversify their manufacturing set-up in the region and benefit from the accelerated flow of finished goods, low import duties and increased regional collaboration. Combined with Singapore's expertise in trade supporting services such as finance and logistics, the RCEP can prove beneficial in making the regional supply chain more resilient and cost-effective.

Figure 11: Benefits of digital control tower in supply chains²⁹



2. Leverage data and digitalization

Integrating digital functions and leveraging data can make supply chain management efficient and agile. Companies are increasingly looking for an end-to-end solution, such as a digital control tower (figure 11), which integrates all requirements across the supply chain and provides real-time insights across warehouse management, fleet management, intelligent capacity forecasting, decision-making and reporting, intelligent tracking and returns management.

In addition to the digital control tower, companies can also invest in technological developments such as the following:

- ▶ AI to develop robust demand-forecasting models, which can promote efficient inventory management, improve working capital utilization and drive down logistics costs
- ▶ Smart automation, including predictive maintenance and lesser human touch during manufacturing to accelerate operations and reduce error rates
- ▶ RFID to make product tracking more efficient and help in reducing in-store merchandising manipulation

Singapore, being the regional hub for R&D, Internet of Things (IoT) and digitalization, can assist consumer goods players in developing such capabilities. Singapore's Alliance for Action on Supply Chain Digitalization is one such platform that companies can leverage where it pilots common data infrastructure to make supply chains more efficient by developing solutions to strengthen trade finance and help container flow-node decongestion.

3. Optimize value by segmented supply chain

Each geography, product segment and customer demographic has varying requirements and contributions to the contribution-margins and growth. It is critical to implement targeted supply chain strategies to optimize value for the customer. Companies can do that by deploying a segmented sales and operations planning methodology through the following strategies:

- ▶ Demand forecasting: Unique forecasting algorithms for different channels, products or regions based on the significance of inputs like sensitivity to promotions, pricing and causal factors

- ▶ **Supply planning:** Prioritization of strategic stock-keeping unit (SKU) for manufacturing; differentiated on time in full (OTIF) for channels or regions based on customer requirements
- ▶ **Inventory planning:** Separate inventory norms based on demand-supply variability and velocity of products to maintain a healthy inventory across the nodes

4. Leverage partnerships and outsourcing

- ▶ **To provide faster delivery:** Companies should enhance last-mile delivery by either outsourcing to or partnering with service providers such as Ninja Van, Lazada Express, etc. Companies can also explore partnering with tech providers to implement innovative distribution concepts.
- ▶ **To capture the online channel:** Consumer goods companies are choosing one of the two prevalent business models: e-agent and e-distributor (figure 12), based on factors such as channel control, inventory risk, ease of execution, revenue and margins. In the e-agent model, ownership of the products and risks lies with the company and commercial terms include a variable commission with a fixed fee. On the contrary, in the e-distributor option, the company simply sells the product to the distributor.

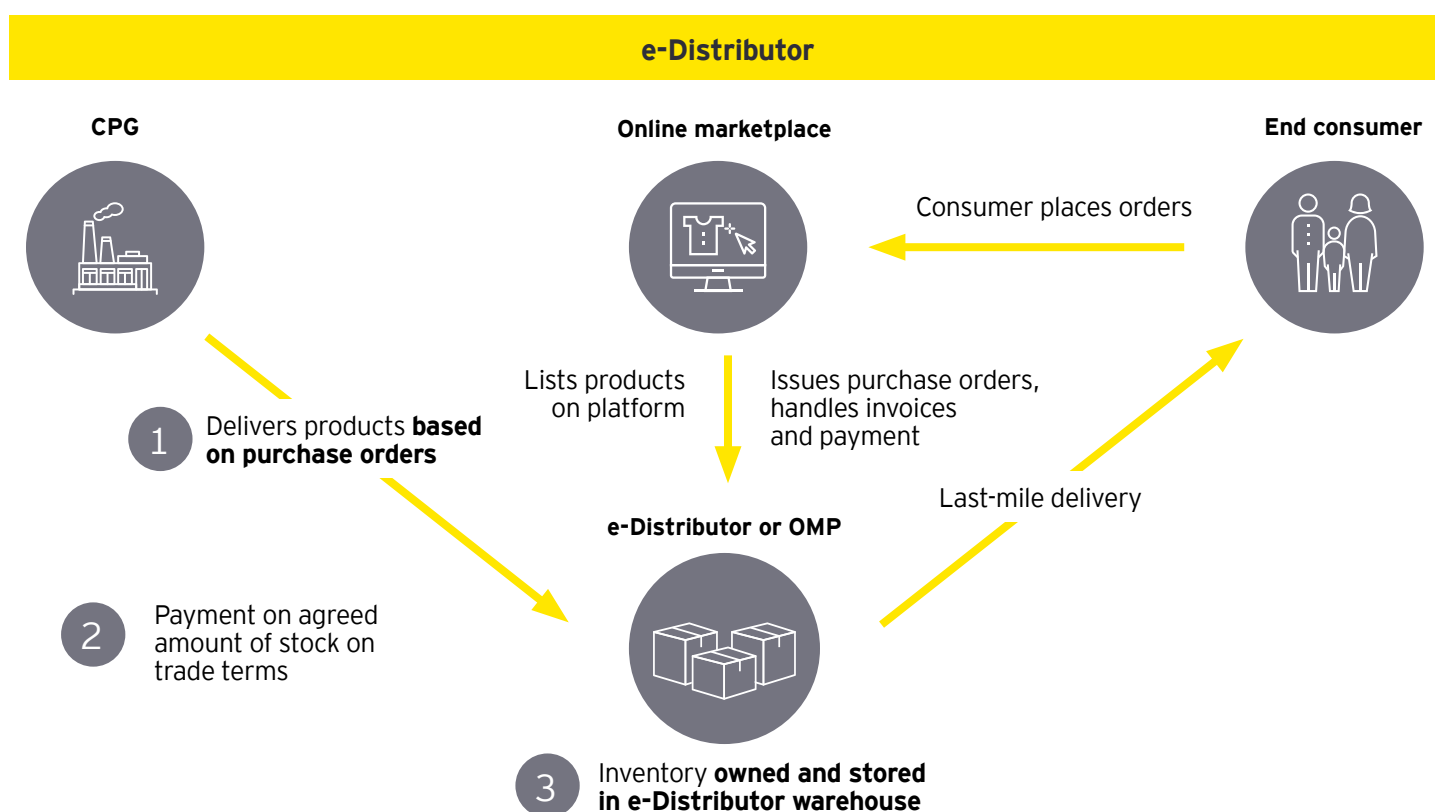
- ▶ **To provide personalization:** By outsourcing certain layers of the supply chain to specialized service providers, companies can cater to consumers' demand for personalized products. For instance, apparel companies can provide a raw stock of clothes to their partners, which specialize in customizing clothing pieces such as dyeing in different colors or adding initials to the garment.

5. Develop direct-to-consumer e-commerce

The direct-to-consumer (DTC) approach simplifies the supply chain by cutting out middlemen and ensures product ownership till the last mile. Companies can also fulfill bulk orders via this channel as the volume purchased helps in offsetting shipping costs.

The DTC segment in SEA is still picking up with companies such as Pomelo in Thailand and Secretlab in Singapore being early movers. Companies can explore various options to further drive down warehousing and logistics costs under this model. For example, small companies can leverage existing platforms such as Shopify or their brick-and-mortar stores under the click-and-collect logistics model. For example, Decathlon allows customers to place orders on its website and collect goods from their stores. As an alternative to collecting from physical stores, companies can partner with convenience stores such as 7-Eleven in Singapore or Big C in Thailand that can serve as the collection point.

Figure 12: e-Distributor model details³⁰



Sector: Health care equipment



Compared with the global market for health care equipment, which was valued at US\$456.7b in 2020, the SEA market corresponds to only 2.2% of the total market share and hence, is not a focus geography for multinational manufacturers. There is a gap between global manufacturing and regional distribution, which is further deepened by regulatory nuances in SEA countries. Companies can leverage Singapore's capabilities in the coming years as they increase their focus on the regional health tech sector, which is expected to see an increase in demand due to technological advancement and population growth.

Pitfalls

1. Inefficiency in supply chain due to the agency model

Health tech manufacturing has not picked up momentum in SEA. Most of the regional players are located outside SEA in countries like India and China, with Singapore being the only exception. Most players operate in the SEA region via the agency model, wherein an international manufacturer sells the right to market and distribute the product to an agent such as DKSH and Transmedic in each country. The agency is responsible for obtaining market authorization to be able to sell the products and undertakes all complementary functions such as marketing, distribution and logistics.

However, this model poses two key challenges:

- **Lack of agility in supply chain:** The lack of seamless coordination between the global manufacturing centers and the regional agents decreases the agility of the supply chain to respond to both demand and supply variations. The key reason is the limited involvement of the agencies in inventory management processes. In addition, the over-reliance on regional agencies poses cash collection challenges for multinationals.
- **Inaccurate demand sensing:** Demand forecasting for the sector is heavily reliant on historical data. The agency model poses challenges for companies to access real-time and accurate sales data. This makes it increasingly difficult for companies to plan their output, resulting in a demand-supply mismatch.

2. Third-party risk

Reliance on third parties for critical components makes the supply chain susceptible to disruptions. With the inclusion of third parties in the supply chain, companies get exposed to various risks like regulatory compliance, quality assurance, misappropriation of the company's IP and breach or termination of the manufacturing agreement at an inconvenient time for the company. In addition, backward integration prevalent in the industry and acquisitions of key suppliers by competitors have made the supply chains fragile, especially if the company operates under single supplier contracts.

3. Different regulatory requirements across the region

The differing regulatory frameworks for medical tech devices in SEA result in varied times to market for different countries and add to further complexities in the supply chain. Foreign manufacturers are subject to additional regulations such as the mandatory appointment of a local authorized representative in Malaysia to register devices or a local partner for sales and distribution in Vietnam. Indonesia restricts foreign ownerships in medical devices companies at 49%. While countries like Singapore, Indonesia and Malaysia have integrated the ASEAN Medical Device Directive in their local laws, other countries like Thailand and the Philippines are still in the process of transitioning.³¹

The local SEA markets still represent a fraction of the demand for health tech equipment companies and such regulatory complexities could act as further deterrents to establishing local manufacturing and distribution capabilities. Such regulatory nuances force companies to rely on their local distributors for market authorization and quality assurance, contributing to additional lead times to market.

Solutions

1. Consider alternatives to the agency model

Manufacturers can consider operating under a direct to market model, wherein they do not engage an agency, but instead set up local teams for sales, marketing and distribution depending on the demand in a country. Setting up local entities in a country can also help shorten the time to market due to favorable regulations.

Engaging with major customers through partnerships or investments in joint research could help bring companies closer to customers and that will help avoid dependency on the agency for demand creation. Companies can adopt a vendor-managed inventory system where the manufacturer is responsible for optimizing the inventory held by the distributor. This can give companies more visibility on consumer demand and lead to more accurate demand sensing.

2. Diversify supplier and geographic risk

The pandemic has highlighted the importance of reducing the third-party and geographic risk in the supply chains to ensure continuous manufacturing of health tech equipment. Companies should undertake a diligent review of the supply chain to identify what portion of the

business is tied to a particular component and supplier, to analyze the risk profile of third parties. Companies should also consider entering contracts with different suppliers across geographies to diversify the sourcing of components. If multi-supplier contracts for components are restricted under exclusivity clauses, strategic partnerships with manufacturing suppliers should be established. Companies should enter into long-term, stable and predictable contracts with explicit clauses that ensure supply after the acquisition of the supplier by a competitor. This will allow companies time to renegotiate contracts with new suppliers without disrupting production.

3. Enable real-time data and end-to-end visibility

Better collaboration with the distributors and investing in technologies can provide companies with real-time and accurate sales data. End-to-end visibility is important, especially in the agency model, to integrate the two separate entities and make the supply chain seamless. Real-time data can also be fed into artificial intelligence-based models, which can make demand forecasting more accurate. Tracking real-time data can also help in flagging early indicators of risk, disruptions and potential opportunities and give the companies enough time to respond.

4. Establish a regional hub for secure commercial operations

Singapore has established itself as a vantage point for companies to lead their commercial operations for the SEA region given its ease of doing business, availability of skilled talent, vibrant local health tech and innovation ecosystem, strong IP protection laws and logistics capabilities. Singapore's proven logistics capabilities can benefit manufacturers to set up robust distribution channels across the region. Typically, an end-product comprises various components that are shipped from different parts of the world. Singapore can serve as the assembly base for such devices given its position as the trading hub in the region. Companies can also leverage Singapore's manufacturing ecosystem, which hosts 6 of the world's top 10 EMS companies – which are active across the value chain, in medical imaging and diagnostic equipment as well as analytical instruments – to shorten the supply chain and bring it closer to the end customers of the region. Singapore also has well-established regulatory frameworks such as the National Telemedicine Guidelines, which set clear guidelines on AI and data governance, medical devices, and telemedicine.

Sector: Electronic manufacturing services (EMS)



Sub-sector: Precision equipment

In current times, the precision equipment industry plays an increasingly pivotal role due to the pressure to develop products that fare well in a highly competitive and technologically advanced market. The final products from the sector serve as critical inputs for other important industries such as telecom, electronics and medical. Most countries in SEA are still developing capabilities to cater to the high-value sub-sector of the industry as manufacturing capabilities in the region still lag those of the developed nations. Singapore is an exception among the SEA countries and already has a well-established ecosystem of precision equipment stakeholders, given its skilled talent pool, world-class R&D capabilities and strong government focus. Other SEA countries can benefit from Singapore's expertise in the sector as they aspire to move up the precision equipment value chain.

Pitfalls

1. High risk of disruption due to concentrated centers of manufacturing

The regional manufacturing sector for precision equipment and electronic components is concentrated with fewer major centers for component manufacturing. The electronic revenue of the region is concentrated in mainland China, which accounts for 23%, and Taiwan, Japan and South Korea collectively contributed 74%, while markets such as Malaysia, the Philippines, Thailand and Vietnam in SEA make up only 1% of the total revenue. This makes the supply chain slow in adapting to sudden shocks such as restrictions due to COVID-19 and impacts the bottom line due to an increase in shipping cost.³²

Although companies are taking actions to shift their supply chains into SEA, the momentum remains slow.

2. High inventory turnover due to shorter product life cycle

The rate of technological advancement has been higher than ever before and continues to grow rapidly. This has made product life cycles shorter and inventory harder to forecast and manage. The value for goods like smartphones, tablets and laptops depreciates very quickly, falling 1%-2% each week.³³ The average life-span of electronics has decreased drastically over the last few decades and that ranges from 1.5 years for wearables to 13 years for flat-screen appliances today.

This complicates obsolescence planning and requires firms to invest in end-of-life (EOL) forecasting, aftermarket parts, refurbishing, remarketing, recycling, and EOL extension models through repair and maintenance.³⁴ In the case of product failure, the inventory and cost of discarding it impact the bottom line and procurement of new products becomes challenging if manufacturing is centralized.

3. Commoditization and product complexity

To include cost-competitive components and manufacture products that include the latest advancements in technologies, almost all portions of the design and supply chain have become commoditized and are being outsourced. This ensures each component comes from a specialized manufacturer and the final product is of the highest quality. For example, an iPhone designed in California needs components procured from 43 countries to be finally assembled and make its way to the retail stores.³⁵ This has significantly increased the number of stakeholders in an already complex supply chain.

With the high number of components outsourced, the shortage of even the smallest components can make the entire supply chain come to a standstill. The supply patterns for each component need to match the demand patterns of the final product. As a result, it requires a strong feedback loop to coordinate the supply and demand across various stakeholders. For example, the current shortage of semiconductors in the market is having a ripple effect in the electronics industry. The supply of electronics is falling short of the demand due to the shortage of components that rely on semiconductors. Although semiconductor foundries in Taiwan and Vietnam are manufacturing at full capacity³⁶, the shortage continues to persist due to high demand and supply chain disruptions. Wistron, a global EMS player, also flagged that its hard drives and dynamic random-access memory (DRAM) supply will remain low due to the shortage of semiconductors and their consequent high prices.³⁷

In addition to potential supply shortages, the high number of suppliers involved in the supply chain increases quality and reputation risks. This is due to increasing cases of counterfeits because of low visibility into tier-2 and tier-3 suppliers and difficulty in identifying counterfeited or subpar equipment. The semiconductor counterfeit market was worth US\$75b, which was approximately 18% of the US\$419b market (2019).^{38,39} Companies need to invest substantial resources in quality assessment

and review and audit suppliers periodically to ensure that the suppliers' standards are in line with the company's requirements.

4. Over-reliance on just-in-time logistics

Most companies rely on just-in-time or lean manufacturing to reduce cost, optimize inventory and leverage offshore outsourcing. This model has worked well for decades, but the pandemic has shed light on the inflexibility of the model in the face of external disruption. For example, the popular STM32 family of microprocessor units, which underpins many modern electronic device designs, became almost impossible to buy.⁴⁰ The reliance of the manufacturing of these electronic devices on lean manufacturing had essentially halted the supply chains. As the pandemic progresses, the supply chain for such critical components remains tight due to the lean manufacturing models in place, which are highly contingent on the smooth movement of goods globally.

Solutions

1. Diversify geographical and supplier risk

SEA markets have presented themselves as a strong alternative to mainland China for companies to set up their manufacturing centers. For example, Pegatron, a Taiwanese assembler for Apple, Microsoft and Sony, invested US\$19m to build its first plant at the Nam Dinh Vu Industrial Park in Hai Phong City in March 2020 and plans to build its second and third plants at a cost of US\$481m and US\$500m respectively in addition to moving its R&D center from mainland China to Vietnam.⁴¹

Further, the shift of manufacturing centers to countries in SEA will be well supported by Singapore's pre-existing distribution capabilities as it used to be a major source of both electronics components and final products for the region but has since ceded market share to China.⁴² In addition, the flow of goods will be facilitated by the ASEAN Free Trade Area as well as the Regional Comprehensive Economic Partnership (RCEP).

Countries in the RCEP, namely Thailand, Malaysia, the Philippines and Vietnam, are still focused on low- to mid-value segments of the supply chain. As these countries move to high value-added products, they can also benefit from Singapore's role in the segment as a hub for the regional headquarters, R&D centers or highly complex and niche technologies required in the final manufacturing.

Globalization of supply chain and outsourcing components have some well-established pros and the cons can be dealt with by engaging a range of suppliers across components and geographies to prevent disruptions. Companies have already started exploring options as they had to procure components from different sources when production in China came to a sudden halt in the initial days of the pandemic. Companies should continue to build on these diverse supplier sources to establish more resilient supply chains.

2. Allow adaptable design in the supply chain

Supply chain complexity can be reduced by creating products that do not rely on a single component for critical functionality. Identifying a range of equivalent components from different suppliers can reduce the reliance on any one component or source. For example, a typical printing circuit board (PCB) comprises various components such as resistors, transistors, the capacitor, inductors, transformers, diodes and sensors. Companies should invest in research and design modification to include variants or swappable substitutes of a single critical component, such as the resistor in the case of a PCB, to prevent the lack of availability of critical components from being a bottleneck in the supply of the finished equipment.

3. Explore digitalization

The seamless implementation of most improvements in the supply chain rests on digitalization. There are a few key solutions that companies are investing in:

- ▶ Product lifecycle management (PLM) solutions to establish better coordination with suppliers and provide consumer data internally to all departments, including the supply chain, with a digitalized PLM helping to get the product to the market faster
- ▶ Application lifecycle management to better integrate the software and hardware components of the business
- ▶ Component management with computer vision cameras and blockchain records to trace components and identify subpar or fake components
- ▶ Additive manufacturing to print or fabricate parts in case of supply disruptions

Singapore has a strong ecosystem within the precision equipment industry that helps companies procure critical components and leverage the expertise of the other players. The country has been ahead of the curve in investing in high-tech digital solutions for the supply chain. The established EMS ecosystem can provide firms with the digital capabilities for transformation. Singapore's Precision Equipment Industry Transformation Map (2016) and Research, Innovation and Enterprise (2020) are government initiatives that will leverage digital technologies to develop capabilities in advanced robotics, additive manufacturing, advanced materials, sensors, lasers and optics, advanced manufacturing and engineering R&D.

4. Consider just-in-case vs. just-in-time

With the evident cracks in the just-in-time model, reverting to the just-in-case (JIC) model for critical components, like resistors in PCBs or precision parts based on custom specifications, is the obvious solution. JIC stands the test of uncertain external factors and uncertainty is expected to be the theme of the post-pandemic economic environment, at least in the short term. Companies are proactively reconfiguring their production and supply processes in the event of a supply shock. Companies should strive for a balance between the JIC and JIT models by maintaining inventory levels for components that do not have a diverse source or are critical to keeping the supply chain running even in the face of disruptions.

Sector: Agritech



Sub-sector: Foodtech

Foodtech is a nascent industry, especially in SEA, and has only just begun to gain traction. Its enablers and challenges are different from the traditional food industry, as the former is in its growth stage while the latter is a mature and well-established industry. Plant-based protein and dairy products are in the early-stages of commercialization whereas lab-based protein products still face early-stage R&D and consumer adoption challenges. The strengths required for a well-established foodtech industry are spread across countries in SEA such as agrarian capabilities in Myanmar and Cambodia; and R&D, innovation and a conducive manufacturing ecosystem in Singapore. Singapore is well-placed to helm the development of the regional industry.

Pitfalls

1. Import-dominated market leading to costly supply chain

Western countries have been leading the foodtech industry. North America dominated the alternative protein market in 2020 with a market share of 36%. The foodtech market in SEA has just begun to gain traction and is still in the very early stages. Product penetration of plant-based meat substitutes is less than 1% in major SEA economies like Indonesia and Malaysia. As a result, most of the recent innovations in food products such as plant-based meat and dairy are imported into the region from more developed markets like North America and Europe, contributing to a higher lead time in product procurement, high shipping and logistics cost, and a low remaining shelf life. In addition, supply chain practices to keep the products fresh longer and allow them to last the transportation distance make the current supply chain model costly.

2. Underdeveloped supply chain of an early-stage sector

There are many factors that are slowing the momentum of the development of a well-established supply chain for the industry. These include the following:

- ▶ Producers of raw materials, alternative proteins and aquaculture are low in scale with low tech-enablement, which makes the sourcing of raw materials fragmented.
- ▶ The lack of regional infrastructure or localized R&D required to manufacture plant-based protein and dairy prevents players from leveraging the substantial supply of raw materials such as rice and mung bean available in Asia.
- ▶ Manufacturers currently have less incentive to invest in establishing dedicated supply chains for the sector as they are unclear about the profit margins and growth of the sector. This makes it even harder to establish partnerships in the sector.
- ▶ Due to a lack of industry awareness, there is no well-established marketplace where suppliers and buyers can locate one another. There are very few visible players at each level of the supply chain and interaction between them is not streamlined, resulting in high supply volatility.

3. Varied regulatory standards hinder high-scale production

The regulatory framework surrounding foods differs among the various SEA countries. For example, Thailand does not allow the cultivation of any genetically modified products, while Vietnam does not allow their import. In addition, different markets also have different safety standards to adhere to. The heterogeneous regulatory nature of the region makes it difficult for firms to set up extensive and centralized capabilities. In the absence of a standard regulatory framework, companies will have to invest substantial funds and resources to uniquely cater to each market, weakening the economic case for the development of foodtech in the region. The presence of a standardized regulatory landscape will make it feasible for players to benefit from economies of scale in the regional market.

4. Lack of skilled talent to assist in the high-tech supply chain

Foodtech companies are struggling to find the right talent to integrate into the industry as the skill set required by employees in this subsector is different from the traditional food sector. The industry requires integration of subjects like tissue engineering, synthetic biology and plant physiology with food science. Currently, there is a lack of such niche educational resources required to train people. This also adds to the delay in setting up R&D, manufacturing and supply chain capabilities in the region.

Solutions

1. Leverage Singapore as the regional hub for the development of the foodtech industry

Companies should look toward Singapore for establishing their regional presence in the foodtech sector as the country is well-positioned to be at the center of the region's foodtech revolution. It already has a conducive ecosystem in place that it plans to develop even further for companies to leverage and cater to the high-growth potential Asian market for the following reasons:

- ▶ It was ranked second worldwide in the ease of doing business (2020).⁴³
- ▶ It has strong intellectual property protection laws.
- ▶ A vibrant ecosystem of more than 850 food manufacturers can help new players in rapid R&D and product testing and offers collaborative manufacturing capabilities.
- ▶ There are well-established capabilities in cold storage logistics.
- ▶ It is an established trading hub with distribution networks for SEA that can facilitate import of raw materials and the export of finished goods in the region.
- ▶ Strong interest from investors in the sector makes it easy for start-ups to secure funding. Next Gen Foods, a start-up offering plant-based chicken called TiNDLE, set up its Asian headquarters in Singapore. It recently bagged US\$10m in seed funding from investors, including Temasek, K3 Ventures and EDB New Ventures, which is the arm set up to catalyze corporate venturing in Singapore.

- ▶ It has a strong government focus on the sector, including initiatives such as FoodInnovate, a multi-agency initiative to grow the manufacturing industry through innovation as well as help companies create and commercialize products faster and sell to a larger market.
- ▶ It has a higher availability of a skilled talent pool.

Together, all these factors make Singapore the ideal hub for companies to launch their regional operations, and players are beginning to recognize that. Thai Union, a Thai seafood player, has set up its SEA regional operations in Singapore dedicated to foodtech ventures. Singapore will support the industry at its current growth stage, working together with regional players to develop the foodtech sectors in other SEA countries.

2. Develop R&D capabilities within the region that are collaborative in nature

The success of the regional foodtech industry is dependent on developing products that meet the region's regulatory standards and consumer tastes. An increased focus on R&D and product innovation can accelerate the momentum of industry development. Singapore's well-established R&D capabilities, high investment in product innovations and ample supply of skilled professionals make it well-prepared to become an ideal location as the R&D hub for foodtech in the region.

There is also a US\$107m⁴⁴ investment in the Singapore Food Story R&D Programme by Singapore Food Agency and A*STAR to support the development and use of productive and innovative technologies for agriculture and aquaculture. The Singapore Government's efforts to boost the foodtech sectors are paying off as companies like Perfect Day have set up their R&D base in Singapore owing to the well-established ecosystem that they can tap into. In a first-of-its-kind partnership, two Swiss companies, Buhler and Givaudan, have teamed up to launch an APAC protein innovation center to develop plant-based food that caters to the Asian palate in Singapore.

3. Tap into regulatory incentives and collaboration

SEA countries should work together to standardize regulations on food safety, the adoption of biotechnology in agriculture and the use of pesticides. Such standardization can help the trading bloc compete aggressively with established markets such as North America and Australia. Singapore becoming the first country globally to approve cultured meat is a step in the right direction. The country is well-positioned to initiate the development of regional standards and share best practices in this sector. This will lay the foundation for SEA countries to work together and adopt these standards.

4. Explore training programs to create a skilled talent pool

Setting up an efficient supply chain is only part of the solution. Training employees to run the supply chain efficiently is what makes the solution robust and sustainable. Governments should provide support to national educational institutions for developing courses based on relevant subjects such as plant physiology and tissue engineering to bridge the gap between the talent required and its supply. Leading universities in Singapore such as the National University of Singapore and research institutions like A*STAR can develop such training programs and share the learning framework with other institutions in SEA or work to collaborate with them to nurture a skilled talent pool in the region. As companies continue to develop their supply chain practices, employee training should proceed in tandem.

A high-angle, wide shot of a modern automotive manufacturing plant. The scene is filled with multiple levels of assembly lines. In the foreground and middle ground, several silver car chassis are positioned on a yellow conveyor system. Numerous red robotic arms, likely KUKA or similar industrial brands, are visible, some mounted on overhead cranes and others on the production line itself. The background shows more complex machinery, structural steel beams, and safety railings, creating a sense of a large-scale, automated industrial environment. The lighting is bright and even, typical of a factory setting.

5

Industry
perspectives

Case studies

Sector: Consumer goods

This is a global consumer products company operating out of APAC with competencies in brand building, supply chain excellence, productivity and go-to-market strategy.

Like most of the world, its primary challenges originated from the disruptions caused by the COVID-19 pandemic. Lockdowns in key manufacturing regions, as well as ocean freight capacity and cost challenges, have made it imperative to focus on building supply chain resilience. It aims to do so by enabling constructive disruptions in automation technologies and utilizing digital twin capabilities to go from descriptive to predictive and cognitive analytics.

They have chosen SEA and Singapore specifically for some key contributing factors. The geographical advantage of Singapore plays a big role in supply chain operations and logistics. The availability of talent, retention and growth across the region makes it a crucial determining factor in the company's growth. Furthermore, the attractive business environment with the support of local governments makes the region a key node for the company's supply chain as well as R&D.

Sector: Health care equipment

This is a global medical devices manufacturer with key competencies in reliability, innovation, collaboration and social responsibility. It has a complex and fragmented APAC supply chain planning network with teams situated across various markets such as Japan, South Korea, New Zealand and Singapore for SEA.

Its current supply chain is fragmented with decentralized teams, a lack of standardized processes, a lack of end-to-end visibility and data integration, inconsistent service levels and excessive inventory and write-off costs.

To manage its supply chain challenges, talent shortages, business cost pressures and evolving customer demand, it is embarking on a transformation journey to get to best-in-class supply chain planning to drive innovation, support business growth and exceed customer expectations.

It has chosen SEA to embark on this journey. It has also chosen Singapore as its APAC regional headquarters as it is a key transportation hub with an integrated and efficient freight and distribution network. Furthermore, with its political stability and government support such as tax incentives and sponsored grants (e.g., those provided by EDB Singapore), SEA proved to be an attractive region to grow its business. SEA also provides a significant talent pool with respect to skills as well as language considerations.

Sector: Automotive OEM

In 2021, a leading auto parts manufacturer collaborated with EY teams to build a centralized, APAC-wide supply chain control tower with Singapore as the hub. Through the partnership, the entity envisioned to digitalize its supply chain processes.

This enabled informed decision-making, a robust review through dashboards and reports, as well as monitoring of supply chain functional KPIs (like planning, sourcing and production) seamlessly without the need for any manual data crunching.

The system enabled the entity's drive toward efficiency, visibility of information and automation. The increase in data visibility allowed for a deeper level of data analytics as well as better benchmarking and assessment of countermeasures' effectiveness.

The entity continues to foresee SEA's significant contribution in gaining deeper visibility in emerging countries, building supply chain resilience and a lean yet effective supply chain network. SEA provided the entity with a favorable mix of attractive locations and policies, a unique blend of low costs and specialty skills, and relatively free access to both regional and global markets.

Sector: Foodtech

A cutting-edge foodtech company operating out of APAC and EMEA is renowned for its plant-based food products that are cholesterol-free, with less saturated fat and the same amount of protein compared with conventional alternatives. They are manufactured sustainably, free of slaughter, deforestation and zoonotic disease.

Like various organizations around the world, it faces challenges that originated from the current pandemic. It is unable to meet the rising demands in manufacturing due to a lack of production facilities, high labor cost and heightened worker safety due to the contagious nature of COVID-19. The pandemic has also taken a toll on logistics with rising international shipping rates and shipment delays. Furthermore, rising R&D costs created barriers to scaling up production and improving existing technology.

The company believes that SEA will be the next frontier for growth with the maturation of the millennials and Gen Z, it believes that the pace of adoption of emerging consumer trends will accelerate. Furthermore, SEA provides a business-friendly environment with political stability, a diverse talent pool as well as supportive government policies. SEA is also strategically located to facilitate market entry and expansion as it is positioned at the center of a vibrant APAC region, thereby giving it a market advantage for expansion into locations such as India, mainland China, Taiwan, Japan and South Korea. With the onset of the COVID-19 pandemic, there has been accelerated digitalization and tech innovation movements where many foodtech companies have seen tremendous growth and interest from consumers in SEA.

The Singapore+ Model

Gateway for manufacturing in SEA

Southeast Asia Manufacturing Alliance (SMA)

Businesses can diversify their supply chains in SEA with the SMA, which gives access to different production locations across the region: Indonesia, Malaysia, Singapore and Vietnam.

An initiative by the EDB, Enterprise Singapore (ESG), and private sector partners, the SMA connects companies with a network of trusted partners to navigate and grow in the diverse SEA region with confidence.

Businesses can combine the synergistic advantages of dual locations in SEA with the “SG + 1” twinning model, tapping into Singapore as a globally connected business hub for innovation and corporate activities with cost-competitive manufacturing locations a short flight away. With the SMA, manufacturers can build more resilient and efficient supply chains by leveraging the complementary advantages of Singapore and the region.



A smiling woman with long dark hair, wearing a white blouse, stands in a clothing store. She is looking upwards and to the right. In the background, there are racks of various colored shirts hanging on hangers. The scene is brightly lit, and the overall atmosphere is positive and professional.

6

Key trends and
developments

Regional Comprehensive Economic Partnership (RCEP)

The RCEP now introduces a new FTA for trade flows for China-Japan and Japan-South Korea. In addition to all the positive parties who are in, it is also important to see who in the region is not (yet) in, like major economies or business hubs such as India or Greater China. While the tariff reductions may not be the most aggressive, with a long runway of 20 years to fully achieve the reductions, the RCEP still sends a very positive message about economic integration that covers 30% of the world economy.

Many factors drive the requirements for the optimal design of supply chains and operating models in Asia, including the need for resilience and agility. Long-term trends like the rise of production costs in mainland China and the demographic promise of the SEA markets have merged with the recent trade disputes to drive the center of gravity of supply chain networks westward in Asia. At the same time, mainland China offers very strong integrated clusters in many industries like consumer electronics and automotive and is itself a must-win market from a size and growth perspective.

Where and how can the RCEP impact supply chain design?

Facilitating multi-stage and network supply chains:

The RCEP provides clarity and certainty regarding qualification by standardizing origin criteria and allowing cumulative origin, i.e., where different parts and components are added in different countries.

- ▶ **Make regional distribution easier:** Operating regional distribution centers (RDC) can be cumbersome if different goods have different origins for different FTAs. Under the RCEP, this would be much easier to handle.
- ▶ **Position mainland China as a North Asia hub alternative:** Mainland China could be an interesting location for subregional manufacturing and trading hubs as one can combine the benefits from high-tech incentive regimes or free trade zones with the new RCEP trade facilities.
- ▶ **Influence competition for business hubs:** Over the past few years, Hong Kong has steadily lost ground as a trading hub location to competitors like Singapore. Singapore's RCEP member status may give the country an edge over Hong Kong, even as the city builds on its position as the gateway to mainland China.

Therefore, with the possibility of more nations joining the RCEP, it would strengthen the case for locating so-called value-based services and digital services hubs in countries that are RCEP members. When designing the supply chain for the future, several aspects need to be considered. The RCEP provides several positive factors that will increase competitiveness for a key region.

Investments in infrastructure for improved supply chain and manufacturing

As Singapore sets out to reinvent the maritime industry, it is making bold investments in port infrastructure and terminal development. The new Tuas port, located in the southwestern corner of Singapore, will ramp up the country's cargo capacity by 15m TEUs (20-foot equivalent units), consolidate 5 individual container terminals, and create new jobs. It will use state-of-the-art technology such as automated drones and big-data analytics to carry out operations and boost productivity of the tight labor market.

Other states in SEA have embarked on similar journeys. Vietnam has developed a seaport master plan for 2021-30 with the aims of enhancing infrastructure connectivity, reducing logistics costs and promoting marine economic development.

In Malaysia, the Industry4WRD National Policy on Industry 4.0 was launched to increase adoption of digital technologies in the manufacturing and related services sectors. The Government has allocated MYR210m to focus on labor productivity growth, manufacturing contribution to the economy, innovation capacity and creation of highly skilled jobs in this sector.

Emergence of new technologies

In SEA, Singapore is the leader in adoption of emerging technologies such as IoT, AI and blockchain in manufacturing, warehousing and logistics. Apart from a flurry of private companies and start-ups cropping up in the republic, the Government is injecting large sums of money into the development of these technologies.

Blockchain-enabled bill of lading: The Singapore Government's TradeTrust project is built on blockchain-enabled bill of lading to strengthen Singapore's position as a global maritime hub. Initiatives led by IBM and PIL have been successful in this area. Electronic documentation in conjunction with blockchain can lower bureaucratic costs, help reduce fraud and cut processing times. Additionally, saving time reduces the cost of trade finance.

Automated warehousing and picking: Singapore's precision engineering firm, PBA group, has been using the patent-pending Golden Retriever Automated Robot, which automates inventory storage and replenishment and transports items within production, warehouse, fulfillment, and distribution centers.

SESTO Robotics, a Singapore-based start-up, is significantly improving efficiency and productivity in labor-intensive industries such as semiconductor manufacturing. The robots enable the movement of materials between workstations and bulky items to warehouses.

Development of sharing economy

With Singapore and the Philippines passing legislation targeted toward peer-to-peer platforms acting as enablers, SEA's sharing economy is on the rise. Consumers are hoovering up goods and services in nearly every area imaginable – from point-to-point transport and bicycles to accommodation and co-working spaces – typically at a low cost.

The three most common sharing economy models in SEA have seen continued growth in these areas:

- ▶ Car and bicycle sharing as well as ride-hailing with companies such as Grab and Gojek dominating the sector
- ▶ Sharing of home and workspaces making inroads
- ▶ Peer-to-peer rental such as Singapore-based Rent Tycoons, an online marketplace for all rentals, and Malaysia-based start-up Moovby, which deals with car rentals

Integration of a "sharing first" model into supply chains creates flexibility and agility. For example, businesses might participate in co-managed collaboration – sharing people or physical assets, planning technology and data or reporting. This could mean greater convenience and highly involved stakeholders due to the nature of "sharing first". Specifically, a company could pair up with a third-party delivery service to achieve same-day delivery or find new and innovative ways to deal with unsold inventory such as renting it out to other businesses.

Green and sustainable infrastructure investment

SEA is often categorized as a relatively slow-progressing region in the renewables space. However, the region has witnessed promising recent developments in the area of sustainability. Vietnam, the Philippines, Malaysia and Thailand are expected to spearhead the clean energy movement over the next two years. For instance, Vietnam recorded a boost in solar power development in 2019-20 alone.

SEA regional leaders re-emphasized the region's commitment to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement (November 2019), envisioning a 21.9% reduction in energy intensity compared with 2005 levels. The leaders also issued the call to developed nations to establish carbon-cutting efforts in a joint statement.

Refreshed road maps are the need of the hour if SEA is finally going to spur private sector investment for its green and sustainable infrastructure needs. In Singapore, the Government is issuing green bonds on select public infrastructure projects with approximately S\$19b of public sector projects being identified for this as part of the Singapore Green Plan 2030 (figure 13). These projects include Tuas Nexus, Singapore's first integrated water and solid waste treatment facility in Tuas, which will be ready from 2025.

Figure 13: Singapore Green Plan 2030⁴⁵

Encouraging use of electric vehicles (EV)

60,000

charging points to be deployed at public car parks, private premises by 2030

S\$30m

to be set aside over next five years for related initiatives

- ▶ Cost differential between EVs, and petrol and diesel vehicles to be narrowed
- ▶ Additional registration fee floor to be lowered from S\$5,000 to S\$0 for EVs from Jan 2022 to Dec 2023
- ▶ Road tax to be adjusted so that mass-market electric cars pay road tax comparable to conventional cars

Food resilience

S\$60m

Agri-food Cluster Transformation Fund to continue supporting technology adoption in the sector

Green financing

Green bonds

to be issued on select public infrastructure projects

S\$19b

of public sector green projects identified as a start

A person's hands are shown writing in a spiral-bound notebook with a pencil. The person is wearing a white wristband. In the background, a laptop screen displays a bar chart with several bars of increasing height. The scene is set on a wooden desk with some papers and a pen nearby.

6

Annex

Snapshot of key SEA countries

	2020 GDP at current prices ⁴⁶	Top export sector ⁴⁷	Labor force (2020) ⁴⁸	Monthly wage of manufacturing worker ⁴⁹	FTAs (Signed and in effect) ⁵⁰
Malaysia	US\$338.3b	Electric equipment and parts, minerals	15.9m	US\$414	16
Philippines	US\$362.2b	Electric equipment and parts	43.7m	US\$236	9
Singapore	US\$340.0b	Electric equipment and parts	3.5m	US\$1,924	25
Thailand	US\$501.9b	Electric equipment and parts, mobility	38.5m	US\$446	14
Vietnam	US\$340.8b	Electric equipment and parts, consumer goods	56.5m	US\$236	13
Indonesia	US\$1,059.6b	Mineral fuels, consumer goods	134.6m	US\$348	12
Cambodia	US\$26.0b	Consumer goods	9.2m	US\$196	7
Lao PDR	US\$19.1b	Minerals	3.8m	US\$180	9
Myanmar	US\$81.3b	Mineral fuels	23.9m	US\$159	7
Brunei Darussalam	US\$12.0b	Mineral fuels	0.2m	N/A	10

References

The set of information sources referenced in this guide were derived from online resources of EY teams and various local and international publications, research papers, statistical bulletins and online sources.

- 1 "ASEAN Matters for America / America Matters for ASEAN", East West Center, https://www.eastwestcenter.org/system/tdf/private/2019_asean_matters_for_america.pdf?file=1&type=node&id=37230
- 2 "ASEAN Key Figures 2020", ASEANstats, https://www.aseanstats.org/wp-content/uploads/2020/11/ASEAN_Key_Figures_2020.pdf, accessed 2 September 2021.
- 3 "World Economic Outlook Database", IMF, <https://www.imf.org/en/Publications/WEO/weo-database/2021/April/download-entire-database>, accessed 2 September 2021.
- 4 "Southeast Asia's online retail market to reach \$53b in 2023", KrASIA, <https://kr-asia.com/southeast-asias-online-retail-market-to-reach-53b-in-2023>, accessed 29 October 2021.
- 5 "ASEAN Matters for America / America Matters for ASEAN", East West Center, https://www.eastwestcenter.org/system/tdf/private/2019_asean_matters_for_america.pdf?file=1&type=node&id=37230.
- 6 "Digital policy in Indonesia: the missing public sector link", WEF, <https://www.weforum.org/agenda/2021/03/digital-policy-in-indonesia-the-missing-public-sector-link/>, accessed 2 September 2021.
- 7 "Between demand and energy security", ENI, <https://www.eni.com/en-IT/global-energy-scenarios/asia-demand-energy-security.html>, accessed 29 October 2021.
- 8 "Future of Consumption in Fast-Growth Consumer Markets: ASEAN 2030", Bain, <https://www.bain.com/insights/future-of-consumption-in-fast-growing-markets-asean-2030/>, accessed 29 October 2021.
- 9 "Ease of doing business rank (1=most business-friendly regulations) - Singapore", The World Bank, <https://data.worldbank.org/indicator/IC.BUS.EASE.XQ?locations=SG>, accessed 20 September 2021.
- 10 "Corporate Tax Statistics", Compare your country, <https://www.compareyourcountry.org/corporate-tax-statistics>, accessed 2 September 2021.
- 11 "Statutory Corporate Income Tax Rates", OECD, https://stats.oecd.org/Index.aspx?DataSetCode=CTS_CIT, accessed 29 October 2021.
- 12 "Free Trade Agreements", ARIC, <https://aric.adb.org/fta-country>, accessed 29 October 2021.
- 13 "Global Rankings 2018", World Bank, <https://lpi.worldbank.org/international/global>, accessed 20 September 2021.
- 14 "Navigating the Pandemic: A Multispeed Recovery in Asia", IMF, <https://www.imf.org/en/Publications/REO/APAC/Issues/2020/10/21/regional-economic-outlook-apd>, accessed 12 September 2021.
- 15 EY Analysis based on "Trade in Goods (IMTS), Annually, HS 2-digit up to 8-Digit (AHTN), in US\$," 2015-2019, <https://data.aseanstats.org/trade-annually>, accessed 12 September 2021
- 16 "Green Queen Releases First-Ever Asia Alternative Protein Report", Green Queen, <https://www.greenqueen.com.hk/breaking-green-queen-media-releases-first-ever-asia-alternative-protein-industry-report/>, accessed 20 September 2021.
- 17 "Mainstream hurdles: APAC plant-based firms highlight cost, labels and health concerns as the biggest challenges", Food Navigator Asia, <https://www.foodnavigator-asia.com/Article/2020/11/20/Mainstream-hurdles-APAC-plant-based-firms-highlight-cost-labels-and-health-concerns-as-the-biggest-challenges>, accessed 20 September 2021.
- 18 "Top Food-tech startups in Vietnam", Investocracy News, <https://www.invc.news/top-food-tech-startup-in-vietnam>, accessed 20 September 2021.

- 19 The Dataset was published in Euromonitor (Sectors Snacks, Apparel, Home Care, Beauty and Personal Care) (Region : APAC), <https://www.euromonitor.com/insights/asia-pacific>, accessed 20 September 2021.
- 20 Medical Equipment Global Market Briefing 2021: Covid 19 Impact And Recovery by The Business Research Company
- 21 "Precision Engineering", EDB, <https://www.edb.gov.sg/en/our-industries/precision-engineering.html>, accessed 4 September 2021.
- 22 "How Singapore Aims to Secure its Food Supply With its '30 by 30 Plan'", earth.org, <https://earth.org/singapore-30-by-30-plan>, accessed 8 June 2020.
- 23 "The Future of Food: What makes Singapore an attractive destination for AgriFoodTech start-ups?", CMS Law-Now, <https://www.cms-lawnow.com/ealerts/2021/04/the-future-of-food-what-makes-singapore-an-attractive-destination-for-agrifoodtech-start-ups>, accessed 24 September 2021.
- 24 "The CEO Imperative: Accelerate to get ahead of the changing consumer", EY, https://www.ey.com/en_gl/consumer-products-retail/accelerate-to-get-ahead-of-the-changing-consumer, accessed 4 September 2021.
- 25 "Global Capital Confidence Barometer", EY, https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/ey-capital-confidence-barometer/pdfs/22/ey-22nd-global-capital-confidence-barometer-march-2020.pdf, accessed 24 September 2021.
- 26 "The EY/P&G supply chain alliance comes to market", EY, https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/home-index/ey-research-reprint-the-eyp-supply-chain-alliance-comes-to-market-2021.pdf, accessed 14 September 2021.
- 27 "How reinventing the supply chain can lead to an autonomous future", EY, https://www.ey.com/en_gl/consulting/how-reinventing-the-supply-chain-can-lead-to-an-autonomous-future, accessed 29 October 2021.
- 28 "How the future of work will change the digital supply chain", EY, https://www.ey.com/en_om/consulting/how-the-future-of-work-will-change-the-digital-supply-chain, accessed 14 September 2021.
- 29 EY-Parthenon Research, Singapore.
- 30 EY-Parthenon Research, Singapore.
- 31 "ASEAN Medical Device and Pharmaceutical Regulations", Pacific Bridge Medical, <https://www.pacificbridgemedical.com/regulation/asean-medical-device-pharmaceutical-regulations/>, accessed 14 September 2021.
- 32 "Electronic companies in the region still lag China: report", Business Times, <https://www.businesstimes.com.sg/asean-business/electronics-companies-in-the-region-still-lag-china-report>, accessed 14 September 2021.
- 33 "Apple Supply Chain - The Best Supply Chain in the World", Trade Gecko, <https://www.tradegecko.com/blog/supply-chain-management/apple-the-best-supply-chain-in-the-world>, accessed 4 September 2021.
- 34 "Creating New Markets in the Lifecycle of Connected Things", Equinix, <https://blog.equinix.com/blog/2019/02/11/creating-new-markets-in-the-lifecycle-of-connected-things/>, accessed 14 September 2021.
- 35 "Inside the iPhone: How Apple Sources From 43 Countries Nearly Seamlessly", Thomas Net, <https://www.thomasnet.com/insights/iphone-supply-chain/>, accessed 14 September 2021.
- 36 "Why there's a chip shortage that's hurting everything from the PlayStation 5 to the Chevy Malibu", CNBC, <https://www.cnbc.com/2021/02/10/whats-causing-the-chip-shortage-affecting-ps5-cars-and-more.html>, accessed 14 September 2021.
- 37 "Annual Reports", Wistron, <https://www.wistron.com/CMS/AnnualReport?pagelId=191>, accessed 23 September 2021.

References (cont'd)

- 38 "Dangers of Counterfeit Semi Chips", DesignNews, <https://www.designnews.com/cyber-security/dangers-counterfeit-semi-chips>, accessed 23 September 2021.
- 39 "Gartner Says Worldwide Semiconductor Revenue Declined 12% in 2019", Gartner, <https://www.gartner.com/en/newsroom/press-releases/2020-04-15-gartner-says-worldwide-semiconductor-revenue-declined-12-percent-in-2019#:~:text=Worldwide%20semiconductor%20revenue%20totaled%20%24419.1,memory%20market%20down%2032.7%25%202019.,> accessed 14 September 2021.
- 40 "The end of just-in-time for electronics manufacturing", ElectronicsOnline, <https://www.electronicsonline.net.au/content/business/article/the-end-of-just-in-time-for-electronics-manufacturing-277372036>, accessed 23 September 2021.
- 41 "Apple supplier Pegatron to expand Vietnam operations", VNExpress, <https://e.vnexpress.net/news/business/companies/apple-supplier-pegatron-to-expand-vietnam-operations-4291365.html>, accessed 16 September 2021.
- 42 "Asia's Electronics Supply Chains and Global Trade Corridors", MAS, https://www.mas.gov.sg/-/media/MAS/EPG/MR/2020/Apr/MRApr20_SF_A.pdf, accessed 16 September 2021.
- 43 "Doing Business 2020: Comparing Business Regulations in 190 Economies", World Bank, <https://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf>, accessed 29 October 2021.
- 44 "Balancing Innovation with Safety: Novel Food", Food for Thought, <https://www.sfa.gov.sg/food-for-thought/article/detail/balancing-innovation-with-safety-novel-food>, assessed 4 November 2021.
- 45 "Budget 2021: Some govt agencies to make early switch to chillers using refrigerants with low global warming potential", Straits Times, <https://www.straitstimes.com/singapore/budget-2021-some-govt-agencies-to-make-early-switch-to-chillers-using-refrigerants-with>, accessed 16 September 2021.
- 46 "World Economic Outlook Database", IMF, <https://www.imf.org/en/Publications/WEO/weo-database/2021/April>, accessed 27 August 2021.
- 47 "ASEAN Key Figures 2019", ASEANstats, https://www.aseanstats.org/wp-content/uploads/2019/11/ASEAN_Key_Figures_2019.pdf, accessed 27 August 2021.
- 48 "Labour force, total", World Bank, <https://data.worldbank.org/indicator/SL.TLF.TOTL.IN>, accessed 27 August 2021.
- 49 "2019 JETRO Survey on Business Conditions of Japanese Companies in Asia and Oceania", JETRO, https://www.jetro.go.jp/ext_images/en/reports/survey/pdf/rp_firms_asia_oceania2019.pdf, accessed 27 August 2021.
- 50 "Free Trade Agreements", ARIC, <https://aric.adb.org/fta>, accessed 27 August 2021.

Contact us



Atul Chandna

EY Asia-Pacific Supply Chain Leader and
EY Asean Consumer Consulting Leader
Partner, Consulting
Ernst & Young Advisory Pte. Ltd.
atul.chandna@sg.ey.com



Olivier Gergele

EY Asean Consumer Products &
Retail Leader
Partner, EY-Parthenon
Ernst & Young Solutions LLP
olivier.gergele@parthenon.ey.com



Shaurya Ahuja

Partner, EY-Parthenon
Consumer and Digital
Ernst & Young Solutions LLP
shaurya.ahuja@parthenon.ey.com



Nick Muhlemann

Partner, Operating Model Effectiveness,
International Tax and Transaction Services
Ernst & Young Solutions LLP
nick.muhlemann@sg.ey.com

Contributors

Ishita Dhamani

Associate Partner, Consulting
Ernst & Young Solutions LLP

Mani Garg

Director, EY-Parthenon
EY Corporate Advisors Pte. Ltd.

Liwan Ngian

Associate Director, Operating Model Effectiveness
EY Corporate Advisors Pte. Ltd.

Oskar Karlborg

Senior Consultant, Supply Chain, Consulting
Ernst & Young Advisory Pte. Ltd.

Dipto Bose

Consultant, Supply Chain, Consulting
Ernst & Young Advisory Pte. Ltd.

EY

Level 18 North Tower, One Raffles Quay, Singapore 048583
Direct: +65 6535 7777 Fax: +65 6532 7777

Follow us on social media: Facebook, LinkedIn, Twitter or
visit us on YouTube

EY | Building a better working world

EY exists to build a better working world, helping to create long-term value for clients, people and society and build trust in the capital markets.

Enabled by data and technology, diverse EY teams in over 150 countries provide trust through assurance and help clients grow, transform and operate.

Working across assurance, consulting, law, strategy, tax and transactions, EY teams ask better questions to find new answers for the complex issues facing our world today.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. Information about how EY collects and uses personal data and a description of the rights individuals have under data protection legislation are available via ey.com/privacy. EY member firms do not practice law where prohibited by local laws. For more information about our organization, please visit ey.com.

© 2022 EYGM Limited.
All Rights Reserved.

EYG no. 010286-21Gbl
ED None

This material has been prepared for general informational purposes only and is not intended to be relied upon as accounting, tax, legal or other professional advice. Please refer to your advisors for specific advice.

ey.com