

Charting ASEAN's Digital Future: Emerging Policy Challenges



Executive Summary

ASEAN is projected to become the world's 4th largest economy by 2030 and in these prospects, the digital economy has particular promise. Given favourable demographics and the accelerated adoption of mobile technology and internet services – spurred further by the pandemic – the region's digital potential is estimated over the next ten years to grow by as much as US\$1 trillion.

Policymakers have responded, with digital strategies and transformation programmes as national priorities. For the region as a whole, the ASEAN Digital Masterplan 2025 provides directions to guide the bloc's digital cooperation. Progress is discernible and interest from extra-regional players is also palpable.

Yet amid the excitement over ASEAN's potential, there are systemic concerns that, unless addressed, will hinder this digital growth:

- **Existing Rules Inadequate:** Existing rules for trade and investment struggle to meet the nature and acceleration of the digital economy. Regulatory cooperation and coordination about data policies has also not kept pace. This regulatory uncertainty creates commercial unpredictability; most notably for cross border data flows which is an essential area for online business transactions.
- **One System or Splinters:** For efficiency and stronger and sustained growth, the interoperability of digital systems across the region and the world is seen to be desirable. Yet this is under pressure from both the geopolitical tensions and diverse approaches and standards to rule-making at the national level. There is a real risk of the digital economy not being one system or even two, but splintered.
- **Geopolitical Tensions:** Political rivalries – especially Sino-American competition – encroach into the sector. Rather than being an open and global competition, there have been moves to limit supply chains, effectively blacklisting some companies. Notable too are protectionist stances in semiconductor production and the race to form digital trade rules in regional spheres of influence.
- **Sustainability:** There are also newer areas of concern, such as sustainability, that the digital economy will need to factor in, with new rules to be fit for this purpose. The digital gap is a major issue for the ASEAN region especially for SMEs that may not have the capacity to digitalise effectively. Inequality and the lack of inclusion are further concerns, as digital literacy and talent will be needed to propagate digital growth and help drive innovation in new areas of digitalisation such as Artificial Intelligence (AI). The digital-sustainability nexus – both for the planet and our peoples – will need to be considered. The digital economy does have a physical carbon footprint. Beyond mitigating the environmental impact of the digitalisation boom, technological innovation can be part of the solution in achieving sustainability goals.

The SIA in its special report on 'Charting ASEAN's Digital Future' looks at the emerging challenges for ASEAN that will likely affect business, and that will impact policymakers' on the lives of their citizens. We point to recommendations to help strengthen ASEAN's digital ecosystem.

Recommendations (In Brief)

The SIIA recommends that ASEAN's decision makers:

- 1 Build on multi-level governance¹ to address emerging digital policy challenges** such as the need for interoperability, capacity building, regulatory certainty, and sustainability. A convergence of national plans, regional plans and private sector programmes will help tackle digital policy concerns.
- 2 Provide more platforms for dialogue between the private sector and ASEAN policy makers and regulators** to map out operational pain points, identify areas for improved efficiencies, and allow for experiential sharing.
- 3 Recognise capacity building as a priority for ASEAN** with support needed for SMEs and to focus on digital upskilling in both business and government.
- 4 Encourage interoperability and secure open systems in ASEAN.** The region can remain open and inclusive to encourage healthy competition and innovation, in the face of geopolitical tensions and the threat of bifurcation. The ASEAN Digital Economy Framework Agreement by 2025 should be prioritised.
- 5 Harmonise standards on cross border data flows.** Countries in ASEAN should continue to harmonise data privacy standards. Businesses in the region can refer to existing regional tools such as the ASEAN Model Contractual Clauses for cross border data flows. A trusted data corridor among like-minded countries can also be established to ensure secure data sharing.
- 6 Socialise and provide clarity on ASEAN level initiatives to build digital trust.** Governments will need to educate enterprises on the fundamentals and benefits of incorporating digital trust. An awareness of existing data certification systems would make it easier for businesses to conduct online transactions across borders and enable the next stage of growth.
- 7 Regionalise sustainability commitments.** A sustainability strategy needs to accompany ASEAN's digital transformation. Collective efforts will be needed to prioritise clean energy infrastructure, enable corporate renewable energy investment, set ambitious carbon goals, and work with the private sector to achieve them.

This is a shortened summary of key recommendations identified by the SIIA to address the emerging policy challenges for ASEAN's digital future. An expanded version with more context is found in the last chapter of the full report.

¹ *Multi-level governance refers to how power is spread vertically between many levels of government and horizontally across regions such that non-state actors and NGOs can participate. For more info: <https://www.oecd.org/regional/multi-levelgovernance.htm>*

About this Report

This report aims to offer research and analysis on ASEAN's digital transformation by collaborating with relevant stakeholders and technology companies to gain insights on the future of the digital economy. Through a lens of economic recovery, geopolitics, ASEAN integration, and sustainability, the SIIA conducted a series of roundtables and interviews to garner insights from the private sector between November 2021 to April 2022, which feeds into this report. The participating organisations are listed in the appendix. The report launches at the ATxSG 2022, co-organised by Singapore's Infocomm Media Development Authority (IMDA) and InformaTech.

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Authorship and Acknowledgments

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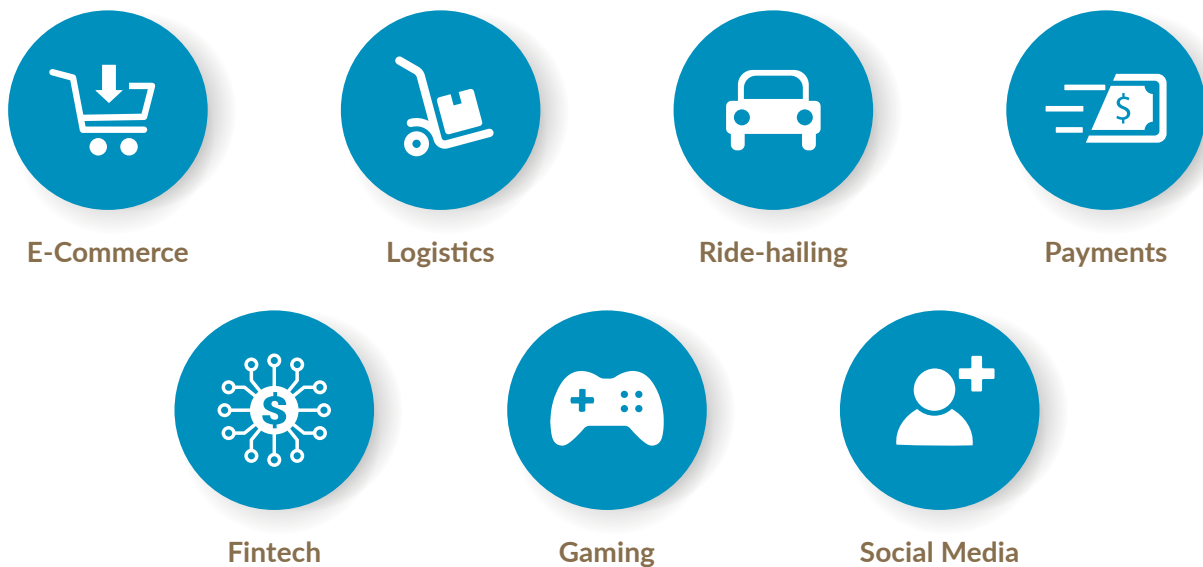
1. Introduction

“The road ahead is promising and exciting, but it will not be easy. We must recognise and seize the opportunities that digital transformation brings, while also managing the disruptions that it brings. To do that, we will need strong leadership and global cooperation. We must build on existing efforts to establish common frameworks and digital rules.”

Singapore Prime Minister Lee Hsien Loong at the APEC CEO Summit 2021
11 November 2021²

Southeast Asia's digital economy holds massive promise especially since the COVID-19 pandemic accelerated the trajectory of its growth. In the first year of the pandemic (2020), 60 million new users turned to digital services, with the region now recording an internet penetration rate of 75 per cent.³ ASEAN's digital economy is expected to add as much as US\$1 trillion to regional GDP over the next 10 years.⁴ The digital economy is framed in this report as a range of economic activities that are reliant on online information and services through the internet.⁵ Figure 1 shows a non-exhaustive snapshot of the digital economy.

Figure 1: ASEAN's digital economy



² PMO. (2021, November 12). PM Lee Hsien Loong at the APEC CEO summit 2021. Prime Minister's Office Singapore. Available: <https://www.pmo.gov.sg/Newsroom/PM-Lee-Hsien-Loong-at-the-APEC-CEO-Summit>

³ Google, Temasek, and Bain. (2022). e-Conomy SEA 2021. Available: https://services.google.com/fh/files/misc/e_economy_sea_2021_report.pdf

⁴ Ibid.

⁵ Deloitte Malta. (2021, April 19). What is Digital Economy? Deloitte. Available: <https://www2.deloitte.com/mt/en/pages/technology/articles/mt-what-is-digital-economy.html>

Even prior to the pandemic, ASEAN's digital potential was noteworthy with a large literate population, high smartphone penetration rate and increased investments into broadband infrastructure to support the "digital revolution". The COVID-19 pandemic, which hit the ASEAN region in the first quarter of 2020, accelerated the growth of the digital economy as most activities moved to the digital space. According to Google, Temasek and Bain's 2021 report, 40 million new users came online in ASEAN's six largest economies, recording 440 million internet users in 2021, as compared to 250 million in 2015.

This report will first touch on emerging trends of ASEAN's digital economy, followed by ASEAN's efforts to drive digital growth and a snapshot of key ASEAN countries' (Indonesia, Singapore, Thailand, Vietnam) digital economy and national plans. These countries were chosen because of their relative economic size in ASEAN and digital potential. Indonesia, Vietnam and Thailand's digital economy are projected to be the largest three in ASEAN by gross merchandise value by 2025.⁶ Subsequently, the report will analyse the policy risks and commercial concerns in digitalising ASEAN, digital inclusion and the digital-sustainability nexus. Lastly, the report will conclude with a list of recommendations and government interventions required that will help address the emerging policy risks ASEAN faces as the bloc digitalises.

⁶ Google, Temasek, and Bain. (2022). *e-Economy SEA 2021*. Available: https://services.google.com/fh/files/misc/e_economy_sea_2021_report.pdf

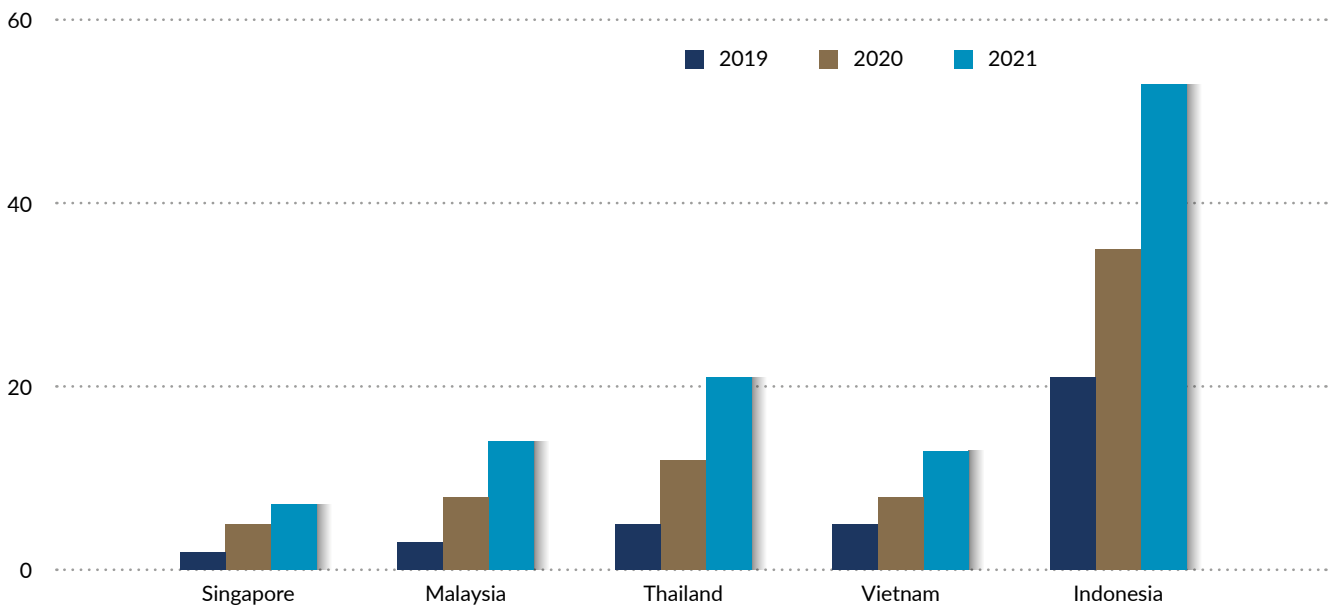


2. Emerging Trends in ASEAN's Digital Economy

2.1 Rapid Growth of E-commerce and Delivery Services

Consumers in ASEAN turned to e-commerce sites to satisfy most of their consumption as prolonged lockdowns resulted in the closure of most brick-and-mortar stores for an extended period. In key ASEAN markets, e-commerce spending saw a steep increase between 2019 and 2020, as indicated in figure 2. The e-commerce sector in ASEAN is projected by Google, Temasek and Bain, to exceed US\$100 billion by 2025.

Figure 2: Retail e-commerce market volume in key ASEAN markets (in US\$bn)



Source: Statista⁷

Many traditional sellers turned to e-commerce sites to list their products as prolonged mobility restrictions hit businesses' bottom lines. Governments and large e-commerce platforms also introduced incentives to encourage small businesses to sell their products online. For example, the government agency Enterprise Singapore introduced the Singapore E-commerce Programme in 2020. Under the initiative, SMEs were eligible for a one-time grant when they registered to sell with Amazon.⁸ In Indonesia, e-commerce marketplace Bukalapak is actively working with small retailers to list on their platform.⁹

Consumers in Southeast Asia also showed a willingness to purchase a wide range of goods and services online. Online shoppers purchased from an average of 8.1 categories of goods, ranging from groceries to clothing apparel to electronic goods, based on a Sync Southeast Asia report.¹⁰ The move towards consuming through e-commerce platforms appears to be a fundamental shift, with e-commerce sites continuing to grow in 2022 even as mobility restrictions ease. Testament to the optimism surrounding e-commerce, super apps such as Grab, Bukalapak and GoTo made their stock market debut in the past year.

⁷ Ganbold, S. (2021, December 7). SEA: E-commerce market volume by country 2019-2025. Statista. Available: <https://www.statista.com/statistics/647645/southeast-asia-ecommerce-market-size-country/>

⁸ Amazon. (2020, May 20). Amazon Singapore to help local retailers grow their businesses online. Amazon. Available: <https://press.aboutamazon.com/news-releases/news-release-details/amazon-help-local-retailers-grow-their-businesses-online>

⁹ Gilchrist, K. (2021, February 3). How 3 friends made a multibillion-dollar business of Indonesia's Street Stalls. CNBC. Available: <https://www.cnbc.com/2021/02/02/bukalapak-indonesias-multibillion-dollar-warung-e-commerce-business.html>

¹⁰ Facebook Business. (2021, August 31). Southeast Asia, The Home For Digital Transformation. Facebook. Available: <https://www.facebook.com/business/news/southeast-asia-the-home-for-digital-transformation#Point5>



With the rapid increase in demand for e-commerce goods, delivery partners saw a surge in demand for their services as well. For example, logistics provider Ninja Van's delivery shipments in Thailand recorded an increase of 300% in 2020.¹¹ Likewise, prolonged lockdown measures saw a rise in demand from consumers and more small businesses partnering with food delivery app providers. According to Momentum Works, the food delivery business in Southeast Asia saw a 183 per cent y-o-y increase in 2020, the first year of the pandemic, and slower growth of 30 per cent in 2021.¹²

2.2 Shift to Digital Payments

Alongside the growth in e-commerce, digital payments recorded a sharp uptake since the onset of the pandemic. Digital payments are expected to increase by threefold within ASEAN to US\$1.5 trillion by 2030 based on a report by HSBC.¹³ This growth is supported by the increase in e-wallet payment services in the last few years. According to fintech company Boku, mobile wallet growth is the fastest in the Southeast Asia region.¹⁴ The move by tech unicorns such as Grab (GrabPay), Sea (ShopeePay) and Gojek (GoPay) amongst others into the digital payments space has further driven the adoption of digital payments.¹⁵

The rapid growth in digital payment will require the necessary infrastructure to support digital payments across ASEAN. Singapore and Thailand have taken steps to harmonise payments systems through the real-time payment systems linkage of Singapore's PayNow and Thailand's Prompt Pay.¹⁶ The linkage enables funds to be transferred between both countries almost instantaneously without extra fees.

2.3 Growth in Data Centres

Data is touted to be the "fuel" of the digital economy as the rapid digitalisation has similarly led to the exponential growth of data. Data is expected to grow at a compound annual growth rate of 23 per cent and from 2020 to 2025, with the creation of an estimated 175 zettabytes of data.¹⁷ As more business activities move to the virtual realm and generate exponential amounts of data, there is an increased reliance on data centres as a key component to power the digital economy.

¹¹ Ninja Van. (2021, June 17). *Ninja Van Increases Shipments by 300% During 2020*. Ninja Van. Available: <https://media.ninjavan.co/ninja-van-increases-shipments-by-300-during-2020/>

¹² Valliappan, A. (2022, January 27). *Food Delivery in Southeast Asia Sustains 30% Growth in 2021*. TLD by MW. Available: <https://thelowdown.momentum.asia/food-delivery-in-southeast-asia-sustains-30-growth-in-2021/>

¹³ Choudhary, P. (2020, October 22). *ASEAN Payments go Digital*. HSBC. Available: <https://www.gbm.hsbc.com/insights/global-research/asean-payments-go-digital>


¹⁴ Lee, Y. (2021, July 8). *Southeast Asia Is World's Fastest-Growing Mobile Wallet Market*. Bloomberg. Available: <https://www.bloomberg.com/news/articles/2021-07-08/southeast-asia-is-world-s-fastest-growing-mobile-wallet-market>

¹⁵ Sri, D. (2021, July 8). *Southeast Asia is the Fastest-growing Mobile Wallet Market Globally, report says*. Tech in Asia. Available: <https://www.techinasia.com/southeast-asia-fastest-growing-mobile-wallet-market-globally-report>

¹⁶ MAS. (2021, April 29). *Singapore and Thailand Launch World's First Linkage of Real-time Payment Systems*. Monetary Authority of Singapore. Available: <https://www.mas.gov.sg/news/media-releases/2021/singapore-and-thailand-launch-worlds-first-linkage-of-real-time-payment-systems>

¹⁷ Needham, M. (2021, March 24). *Data Creation and Replication Will Grow at a Faster Rate than Installed Storage Capacity, According to the IDC Global DataSphere and StorageSphere Forecasts*. IDC. Available: <https://www.idc.com/getdoc.jsp?containerId=prUS47560321>

Table 1: Top markets for data centres in Asia Pacific (2022)

Top Markets for Data Centres in Asia Pacific (2022)	
1 Singapore	6 Osaka
2 Hong Kong	7 Mumbai
3 Sydney	8 Shanghai
4 Seoul	9 Melbourne 9 Beijing 
5 Tokyo	11 Jakarta

Source: Cushman & Wakefield ¹⁸

The Asia Pacific is slated to become the world’s largest data centre region in the next decade.¹⁹ In 2022, Singapore ranked as the top market in Asia Pacific according to Cushman & Wakefield, with Jakarta as another ASEAN city that also made the top market list.²⁰ Kuala Lumpur and Bangkok have also been identified as new markets to watch for data centres in Southeast Asia. Cushman & Wakefield also expects APAC’s compound annual growth (CAGR) to grow steadily at 12 per cent over the 2019 – 2024, with Southeast Asia growing similarly at a CAGR of over 13 per cent during the same period.²¹

While data centres are necessary for the growth of the digital economy, the impact it has on the environment is not insignificant. Data centres consume considerably energy, it is estimated that 40 per cent of energy is used to cool data centres and contribute to overall carbon emissions.²² More on the challenges resulting from the growth of data centres will be elaborated in section 6 of this report.

¹⁸ Poh, J. (2022, January 25). Singapore TOPS 2022 Asia Pacific Data Centre Market Ranking, places second globally: Singapore. Cushman & Wakefield. Available: <https://www.cushmanwakefield.com/en/singapore/news/2022/01/singapore-tops-2022-asia-pacific-data-centre-market-ranking-places-second-globally>

¹⁹ Poh, J. (2022, January 14). Asia Pacific set to become world’s largest data centre region over Next Decade: Singapore. Cushman & Wakefield. Available: <https://www.cushmanwakefield.com/en/singapore/news/2022/01/asia-pacific-set-to-become-worlds-largest-data-centre-region-over-next-decade>

²⁰ Poh, J. (2022, January 25). Singapore TOPS 2022 Asia Pacific Data Centre Market Ranking, places second globally: Singapore. Cushman & Wakefield. Available: <https://www.cushmanwakefield.com/en/singapore/news/2022/01/singapore-tops-2022-asia-pacific-data-centre-market-ranking-places-second-globally>

²¹ Bahari, S. (2021, March 17). Why Asia Pacific’s data centre demand is surging. iNews Asia. Available: <https://www.itnews.asia/news/why-asia-pacifics-data-centre-demand-is-surging-562226>

²² Wee, K. (2022, April 21). The curious case of green data centers. Data Centers Dynamics. Available: <https://www.datacenterdynamics.com/en/opinions/the-curious-case-of-green-data-centers>

2.4 Social and Sustainability Concerns

The growth in the digital economy across ASEAN is not uniform. An estimated 150 million adults (or 31 per cent of the adult population) in Southeast Asia do not have access to the internet in 2020, according to Roland Berger.²³ As the digital economy becomes synonymous with the entire economy, such disparity has long-running implications.

Even as the digital economy enables activities to move to the virtual realm, the rapid growth of the digital economy comes with a massive carbon footprint. The ICT sector is estimated to be responsible for an estimated 3-4 per cent of global greenhouse gas emissions. Increased consumption and packaging through e-commerce and food delivery services as well as the rapid growth of internet usage have significantly increased the digital economy's carbon footprint. More on the social and sustainability concerns will be elaborated in section 5 and 6 of this report.

²³ Low, J., Dujacquier, D., & Kaur, S. (2021). *Bridging the Digital Divide*. Roland Berger. Available: <https://www.rolandberger.com/en/Insights/Publications/Bridging-the-digital-divide.html>



3. ASEAN's Efforts to Drive the Digital Economy

At the ASEAN level, the importance of digitalisation was emphasised through the launch of the ASEAN Digital Masterplan (ADM) 2025 at the inaugural ASEAN Digital Ministers' Meeting held in January 2021. The ADM 2025 envisions ASEAN as “a leading digital community and economic bloc, powered by secure and transformative digital services, technologies and ecosystem.”²⁴ The masterplan highlights five sub-areas of focus: sustainable infrastructure, digital innovation, seamless logistics, regulatory excellence and people mobility.²⁵

Prior to the ADM 2025, other efforts have been taken by the bloc to improve cross-border trade rules and enhance digital connectivity. One key agreement in the area of e-commerce is the ASEAN Agreement on Electronic Commerce signed in 2019 and entered into force in 2021.²⁶ The agreement facilitates cross-border e-commerce transactions and increases transparency in e-commerce regulations within ASEAN.

Alongside the ADM 2025, digital ministers from ASEAN Member States (AMS) approved the ASEAN Data Management Framework (DMF) and ASEAN Model Contractual Clauses for Cross Border Data Flows (MCCs) in January 2021.²⁷ The DMF lays out a clear guide for corporations, especially SMEs, on how to establish a data management structure, which includes guidelines on data protection and risk assessment.²⁸ The MCCs are a template document with contractual terms and conditions which might include binding legal agreements for personal data transfers across borders between businesses.

The ADM 2025 and e-commerce agreements are good first steps to bring the region together and move forward on key issues. Yet there are many things that remain to be done, and are beyond the remit of ASEAN as a regional grouping. The ASEAN DMF and MCCs are “soft laws” which do not automatically guarantee compliance by different member states. Chief amongst these are the poor logistics infrastructure and differing policies on cross-border data flows between ASEAN countries – issues that are within the domain of the different governments of individual ASEAN member states. Other national level challenges exist too. The development of the e-commerce industry is impeded by the poor quality of roads, incomplete development, ports and low service capabilities. The differences between one ASEAN member state and another, and the challenge of coordinating a region-wide approach will be seen more clearly by looking at some of the key ASEAN economies.

In this regard, to move ahead to develop its digital future, ASEAN faces a multi-level challenge in governance. What ASEAN does as a group does matter but just as importantly or even more so will be the priorities, capabilities and implementation efforts at the national level. There will also be elements that depend on the private sector players moreover, and the degrees to which the sector will be inclusive of national champions and SMEs, or else dominated by larger and multinational corporate players from other countries. These differences interact and create significant challenges for the diverse AMS to reach agreement in detail and move forward together.

²⁴ ASEAN. (n.d.). ASEAN Digital Masterplan 2025. Association of Southeast Asian Nations. Available: <https://asean.org/wp-content/uploads/2021/08/ASEAN-Digital-Masterplan-2025.pdf>

²⁵ GICA. (2017, December 12). Master plan on ASEAN connectivity 2025. Global Infrastructure Connectivity Alliance. Available: <https://www.gica.global/resources/master-plan-asean-connectivity-2025>

²⁶ ASEAN. (n.d.). Work Plan on the Implementation of ASEAN Agreement on Electronic Commerce. Association of Southeast Asian Nations. Available: <https://asean.org/book/work-plan-on-the-implementation-of-asean-agreement-on-electronic-commerce/>

²⁷ Allen & Gledhill. (2021, February 25). Singapore-led initiatives on Data Management Framework, model contractual clauses for cross border data flows and information exchange mechanism approved at first ASEAN digital ministers' meeting. Allen & Gledhill. Available: <https://www.allenandgledhill.com/sg/publication/articles/17823/led-initiatives-on-data-management-framework-model-contractual-clauses-for-cross-border-data-flows-and-information-exchange-mechanism-approved-at-first-asean-digital-ministers-meeting>

²⁸ PDPC. (2021). ASEAN Data Management Framework and model contractual clauses on cross border data flows. Personal Data Protection Commission. Available: <https://www.pdpc.gov.sg/help-and-resources/2021/01/asean-data-management-framework-and-model-contractual-clauses-on-cross-border-data-flows>



Indonesia

Indonesia has the largest digital economy in ASEAN and is amongst one of the biggest online markets in the world.²⁹ The country's digital economy is expected to be valued at roughly US\$125 billion by 2025, the largest share in ASEAN.³⁰ Over 70 per cent of Indonesians have access to the internet as of July 2021, with internet penetration expected to further increase in the coming decade.³¹ Home-grown technology unicorns such as GoTo, OVO and Bukalapak have experienced rapid growth in the past two years, with other regional players such as Grab and Sea making further inroads in Southeast Asia's largest economy.

Recognising the importance of the digital economy to Indonesia's growth, the government unveiled Indonesia's digital roadmap 2021-2024 in August 2020.³² The roadmap highlights the government's priorities in investing heavily in digital infrastructure to support the launch of 5G services in 13 cities by 2024.³³ Furthermore, the Omnibus Law on Job Creation which was passed in 2020 amended 78 existing government regulations in a bid to streamline complicated business licensing requirements and encourage foreign investments.

While Indonesia's digital economy shows much potential, there are key risks surrounding its digital growth. Internet connectivity remains slow and limited, especially in rural areas in Indonesia. Furthermore, Indonesia has one of the most protectionist cross-border data flow restrictions amongst AMS.³⁴ Such protectionist policies coupled with lagging digital infrastructure could impede Indonesia's full digital economy potential.

²⁹ Nurhayati-Wolff, H. (2021, August 16). Number of internet users in Indonesia 2023. Statista. Available: <https://www.statista.com/statistics/254456/number-of-internet-users-in-indonesia>

³⁰ Google, Temasek, and Bain. (2022). e-Conomy SEA 2021. Available: https://services.google.com/fh/files/misc/e_economy_sea_2021_report.pdf

³¹ Nurhayati-Wolff, H. (2021, August 16). Number of internet users in Indonesia 2023. Statista. Available: <https://www.statista.com/statistics/254456/number-of-internet-users-in-indonesia>

³² ITA. (2021, September 12). Indonesia: Digital Economy Opportunities. International Trade Administration. Available: <https://www.trade.gov/market-intelligence/indonesia-digital-economy-opportunities>

³³ Balakrishnan, R. (2022, March 21). Partner content: From the pandemic to the Golden Era: The steady march of Indonesia's digital economy. DealStreetAsia. Available: <https://www.dealstreetasia.com/partner-content/ev-dci-2022-golden-era-indonesia/>

³⁴ UNDP. (2021). Enabling Cross-Border Data Flow: ASEAN and Beyond. United Nations Development Programme. Available: <https://www.undp.org/sites/g/files/zskgke326/files/2021-11/UNDP-Handbook-on-Smart-Urban-Innovations-V2.pdf>



Singapore

Singapore has a reputation for being one of the most connected countries and technologically advanced nations in the world.³⁵ According to the IMD World Digital Competitiveness Ranking, Singapore is ranked as the fifth most digitally competitive country globally and the top ASEAN country in 2021.³⁶ Singapore is also home to leading MNCs and technology companies, with 80 per cent of the top 100 technology giants having a presence in the city-state.

Singapore's foray into digitalisation began in the early 1980s through the National Computerisation Programme (1981) and the National IT Plan (1986).³⁷ Since then, the Smart Nation initiative (2014) has guided the government's thinking in relation to digital advancements. The Smart Nation initiative takes a "whole-of-nation approach" and envisions transforming Singapore into a country where technology is embedded into daily lives and offers opportunities to its people. The initiative has three main focuses: Digital Government, Digital Society and Digital Economy. The government has invested considerably into digital infrastructure, new technologies and provided digital training for businesses and citizens.³⁸

Singapore has taken a leading role in aligning digital standards and promoting interoperability through forging digital economy agreements (DEAs) with like-minded trading partners. The Digital Economy Partnership Agreement signed between Singapore, Chile, and New Zealand provides a starting framework to shape international norms in this burgeoning area.

³⁵ ITA. (2021, August 13). *Information and Telecommunications Technology*. International Trade Administration. Available: <https://www.trade.gov/country-commercial-guides/singapore-information-and-telecommunications-technology>

³⁶ IMD. (2021). *World Digital Competitiveness Rankings - IMD*. IMD Business School. Available: <https://www.imd.org/centers/world-competitiveness-center/rankings/world-digital-competitiveness/>

³⁷ Ng, C. K. (2019, August 8). *Digital Government, Smart Nation: Pursuing Singapore's Tech Imperative*. Civil Service College. Available: <https://www.csc.gov.sg/articles/digital-government-smart-nation-pursuing-singapore-s-tech-imperative>

³⁸ SNDGO. (2018). *Smart Nation: The Way Forward*. Smart Nation and Digital Government Office. Available: <https://www.smartnation.gov.sg/files/publications/smart-nation-strategy-nov2018.pdf>



Thailand

An early adopter of ICT, Thailand has invested considerably into ICT infrastructure, offering the fastest fixed internet connection globally and the second fastest mobile connectivity in Southeast Asia.³⁹ The importance of digitalisation was emphasised in the Thai government's Vision 4.0, which is an economic initiative "based on innovation, creativity, high-quality services, and new technology, employed for boosting the quality of life".⁴⁰ Thailand's Board of Investment projected that the digital economy will account for 25 per cent of the country's GDP by 2027, a steady increase from the 17 per cent in 2018.⁴¹

The Thai government has identified internet access as a basic infrastructure and has guaranteed to lower the costs of internet services, especially for lower-income and rural citizens.⁴² In 2017, the Thai government introduced the "Village Broadband Internet" (Net Pracharat) Scheme to provide broadband access to remote areas in Thailand. Under the initiative, fiber cable networks were installed in more than 24 thousand villages across Thailand.⁴³ Thailand is also at the forefront of 5G adoption in ASEAN, with commercial 5G services launched in 2020.⁴⁴

³⁹ Bangkok Post. (2021, July 2). Thailand's Digital Transformation Boosts Data Industry. Bangkok Post. Available: <https://www.bangkokpost.com/business/2142475/thailands-digital-transformation-boosts-data-industry>

⁴⁰ Aditya, A. (2020, July 10). Thailand 4.0 - A step towards Digital Future. StartUp in Thailand. Available: <https://startupinthailand.com/thailand-4-0-a-step-towards-digital-future/>

⁴¹ BOI Thailand. (n.d.). Digital, Creative, and Startup Ecosystem. Thailand Board of Investment. Available: https://www.boi.go.th/index.php?page=business_opportunities_detail&topic_id=117530

⁴² Ibid.

⁴³ Net Pracharat. (2018). The Village Broadband Internet Project (Net Pracharat). Available: https://netpracharat.com/Netpracharat_EN/one-page/

⁴⁴ Giles, M. (2022, February 4). 5G in Thailand: AIS Leads the Market. Ookla. Available: <https://www.ookla.com/articles/5g-in-thailand>



Vietnam

Vietnam is estimated to have one of the fastest-growing digital economies according to Google, Temasek and Bain & Co. Since the country introduced economic reforms in 1986 as part of the Doi Moi reforms, restrictions were removed for foreign investors which led to the rapid industrialisation of the economy. The Vietnamese government is targeting the digital economy to account for 20 per cent of GDP by 2025.⁴⁵ The National Digital Transformation Program introduced by the government in 2021 sets ambitious targets for the country. The targets include moving the majority of government services online, for 50 per cent of the country to have a digital banking account and for 70 per cent of consumer transactions to be done through digital means, all by 2025.⁴⁶

Many companies look to Vietnam to recruit software engineers and developers. In Coursera's Global Skills Index 2020,⁴⁷ Vietnam came in 22nd in the global ranking for technology domain. It was the highest ranked ASEAN country to exhibit competencies in the creation, maintenance, and scaling of computer systems and software. Vietnam's IT industry has been identified as one of its leading industries with more than 150 institutions training 50,000 IT personnel.⁴⁸ The presence of leading technology companies, especially from South Korea and Japan, will enhance this trend of digital skills development.

⁴⁵ VietnamPlus. (2022, January 19). Three scenarios to help digital economy make breakthrough by 2025. VietnamPlus. Available: <https://en.vietnamplus.vn/three-scenarios-to-help-digital-economy-make-breakthrough-by-2025/220950.vnp>

⁴⁶ Samuel, P. (2021, September 16). Vietnam's Digital Transformation Plan through 2025. Vietnam Briefing. Available: <https://www.vietnam-briefing.com/news/vietnams-digital-transformation-plan-through-2025.html/>

⁴⁷ Coursera. (2020). Global Skills Index. Available: <https://www.sertacdoganay.com/wp-content/uploads/Coursera-Global-Skills-Index-2020.pdf>

⁴⁸ TopDev. (2020). Viet Nam IT Nation. Available: https://topdev.vn/Eng_VietnamITNation2020_ByTopDev.pdf

4. Policy Risks and Commercial Concerns in Digitalising ASEAN

While no one doubts the great potential for the digital economy in ASEAN, there is a growing recognition of the ways that opportunities are created or else constrained by policy choices made by one or more ASEAN member states (AMS). The following section highlights the policy risks and commercial concerns as ASEAN digitalise that were highlighted by the roundtable participants and stakeholders interviewed by the SIIA.

4.1 Cross-border Data Flows

Across ASEAN, governments have recognised the importance of digital data governance, but the approach taken by each AMS has differed. Efforts to adopt the ASEAN cross-border data management framework are still at their nascent stages, and only a few countries have put in place systems to promote cross-border data movement in order to boost innovation and economic growth.⁴⁹ Another challenge is the lack of motivation from the broader business community to secure data standards. The APEC Cross-Border Privacy Rules (CBPR) system is a government-backed system for companies to certify compliance with internationally-recognised data privacy protections. Yet, there is a low take up rate⁵⁰ of this certification, with less than 100 organisations across APEC economies that have applied for the CBPR.

As governments begin to understand the value of data in the modern digital economy, some governments have introduced data protection requirements, with national security often cited as a reason for data localisation requirements.⁵¹ According to the Information Technology & Innovation Foundation (ITIF), globally the number of data localisation laws has doubled between 2017 and 2021, with 62 countries adopting some form of data localisation requirements.⁵² Within ASEAN, some countries have introduced onerous personal data localisation restrictions, which have a bearing on businesses engaged in cross-border digital trade. Such data localisation laws require organisations to store data within a country and restrict the transfer of data to other markets.⁵³ Table 2 is a snapshot of the approach taken to data management in key ASEAN markets.

⁴⁹ UNDP. (2021, February 11). *Enabling cross-border data flow: ASEAN and beyond*. United Nations Development Programme. Available: <https://www.undp.org/library/enabling-cross-border-data-flow-asean-and-beyond>

⁵⁰ CBPRs. (n.d.). *CBPR System Directory*. APEC Cross Border Privacy Rules System. Accessed May 11, 2022. Available: <http://cbprs.org/compliance-directory/cbpr-system/>

⁵¹ Dascoli, L., & Cory, N. (2021, July 19). *How Barriers to Cross-Border Data Flows Are Spreading Globally, What They Cost, and How to Address Them*. Information Technology and Innovation Foundation. Available: <https://itif.org/publications/2021/07/19/how-barriers-cross-border-data-flows-are-spreading-globally-what-they-cost>

⁵² *Ibid.*

⁵³ Chow, P., Sim, C., & Hubert, C. (2021, December 9). *Increasing Location of Data in Asia: Why this matters for Tech?* Herbert Smith Freehills. Available: <https://www.herbertsmithfreehills.com/latest-thinking/increasing-localisation-of-data-in-asia-why-this-matters-for-tech>



“... only a few countries have put in place systems to promote cross-border data movement in order to boost innovation and economic growth.”

Table 2: Cross-border data restrictions in key ASEAN markets

ASEAN Member State	Cross-border Data Transfer Rules
Indonesia	Indonesia has a range of laws on data protection that cover a wide range of industries. ⁵⁴ Government Regulation 82 (GR82) of 2012 requires “electronic systems operators for public service” to store data locally. An amendment to the regulation in 2019 under Government Regulation 71 (GR71) provides more clarity and allows some flexibility for private sector entities to transfer data overseas, in accordance with certain restrictions. ⁵⁵ The government is currently working on a Protection of Private Personal Data bill, which is expected to strengthen personal data protection. ⁵⁶
Singapore	No data localisation restrictions. The Personal Data Protection Act enables businesses to transfer personal data on the condition that the recipient entity provides a standard of protection to the personal data that is comparable to the protection under the PDPA. Singapore has introduced the Data Protection Trustmark (DPTM), which is a non-mandatory certification scheme for businesses to indicate that they have responsible data protection practices. ⁵⁷
Thailand	No data localisation restrictions. In 2019, the Thai government introduced the Personal Data Protection Act (PDPA), which will be enforceable from 1 June 2022. ⁵⁸ The PDPA is similar to the EU’s General Data Protection Regulation (GDPR).
Vietnam	Data localisation requirements are mandated by Vietnam’s Cybersecurity Law (2018). The law requires that “domestic or foreign cyberspace service providers carrying out activities of collecting, exploiting / using, analysing and processing data being personal information, data about service users’ relationships and data generated by service users in Vietnam must store such data in Vietnam”. ⁵⁹

Source: Authors’ compilation

4.1.1 Cross-border Data Security and Privacy

National security and protecting the privacy of citizens are often cited as justifications for introducing data localisation laws. Some countries may introduce data localisation restrictions in order to claim their sovereignty and might not see the economic merit in allowing the transfer of their data to data centres located in other countries. For example, Vietnam requires private companies operating in Vietnam to store their data on a local server.⁶⁰ Cambodia has proposed a contentious National Internet Gateway (NIG) which would allow the government to control internet traffic, even from abroad, in the country.⁶¹

⁵⁴ Cory, N. (2017). *Cross-Border Data Flows: Where Are the Barriers, and What Do They Cost?* Information Technology & Innovation Foundation. Available: <https://itif.org/publications/2017/05/01/cross-border-data-flows-where-are-barriers-and-what-do-they-cost>

⁵⁵ Google. (n.d.). *Indonesia Government Regulation No. 71 (GR 71)*. Google. Available: <https://cloud.google.com/security/compliance/indonesia-gr71>

⁵⁶ DLA Piper. (2021, December 17). *Law in Indonesia*. DLA Piper. Available: <https://www.dlapiperdataprotection.com/index.html?t=law&c=ID&c2=>

⁵⁷ IMDA. (n.d.). *Data Protection Trustmark Certification*. Infocomm Media Development Authority. Available: <https://www.imda.gov.sg/programme-listing/data-protection-trustmark-certification>

⁵⁸ DLA Piper. (2022, January 13). *Law in Thailand*. DLA Piper. Available: <https://www.dlapiperdataprotection.com/index.html?t=law&c=TH&c2=>

⁵⁹ DLA Piper. (2022, January 10). *Law in Vietnam*. DLA Piper. Available: <https://www.dlapiperdataprotection.com/index.html?t=law&c=VN&c2=>

⁶⁰ UNDP. (2021, February 11). *Enabling Cross-Border Data Flow: ASEAN and Beyond*. United Nations Development Programme. Available: <https://www.undp.org/publications/enabling-cross-border-data-flow-asean-and-beyond>

⁶¹ Strangio, S. (2022, February 16). *Cambodia puts controversial National Internet Gateway Plan on hold*. *The Diplomat*. Available: <https://thediplomat.com/2022/02/cambodia-puts-controversial-national-internet-gateway-plan-on-hold/>

There is also a misguided belief that such restrictive requirements allow the domestic technology sector to flourish. Studies have shown that data localisation restrictions have a detrimental impact on a country's growth.⁶² Businesses would have to incur higher costs of between 30 per cent to 60 per cent to meet data localisation restrictions, as compared to if they could transfer data across borders freely based on a study by Leviathan Security Group.⁶³ Hence, such data localisation restrictions might impact international investors and diminish the region's attractiveness as a market.

4.1.2 Fragmented Data Protection Frameworks across ASEAN

As highlighted in table 2, individual AMS have their own data regulations which make it difficult for companies to navigate when operating or trading across borders. Even though ASEAN has a free trade area which means there are no tariffs, businesses are required to comply with the different sets of data protection laws in each market. Furthermore, it is often uncertain what type of data is required to be localised in countries with often unclear data localisation requirements. With the modern digital economy, the borders that govern nation-states are often "blurred" as technology companies operate across several countries. Most data stored by these technology companies are integrated and it is challenging for practitioners to classify data and meet data localisation requirements from a technical standpoint.

Data localisation mandates make it difficult for organisations to comply from a technical perspective and could inhibit companies' ability to render services. In particular, SMEs are disproportionately impacted by data localisation laws as they do not have the resources to navigate tedious restrictions. While the MCCs provide guidance for SMEs to operate and are a good starting point, more capacity building and awareness of such initiatives are needed to ensure a higher takeup rate. Some efforts have been made on this front with Singapore and Philippines Data Protection Commissions issuing guidance to businesses on the use of MCCs. At the point of writing, information about the take-up rate of the MCCs is not publicly available, hence it remains to be seen if SMEs have indeed benefited from it.

4.2 Patchy Infrastructure Development across ASEAN

Underpinning the growth of the digital economy is the infrastructure that supports this growth. Across ASEAN, critical infrastructure such as fibre optic connections and broadband networks continue to lag. Less developed and rural regions in ASEAN still face issues of patchy internet connection and low internet and mobile penetration. While some countries in ASEAN are investing heavily into 5G and even 6G technology, others are still reliant on 3G networks with intermittent connection. Table 3 compares the digital adoption across all ten ASEAN countries. Certain segments of the ASEAN population remain unconnected to the internet, with only half of the population in Laos and Myanmar having access to the internet. The poor infrastructure in less developed and rural areas limits the potential of digital technology adoption and usage, creating a digital divide within ASEAN.

⁶² UNDP. (2021, February 11). *Enabling Cross-Border Data Flow: ASEAN and Beyond*. United Nations Development Programme. Available: <https://www.undp.org/publications/enabling-cross-border-data-flow-asean-and-beyond>

⁶³ Leviathan Security Group. (2015). *Quantifying the Cost of Forced Localization*. Leviathan Security Group. Available: <https://static1.squarespace.com/static/556340ece4b0869396f21099/t/559dad76e4b0899d97726a8b/1436396918881/Quantifying+the+Cost+of+Forced+Localization.pdf>

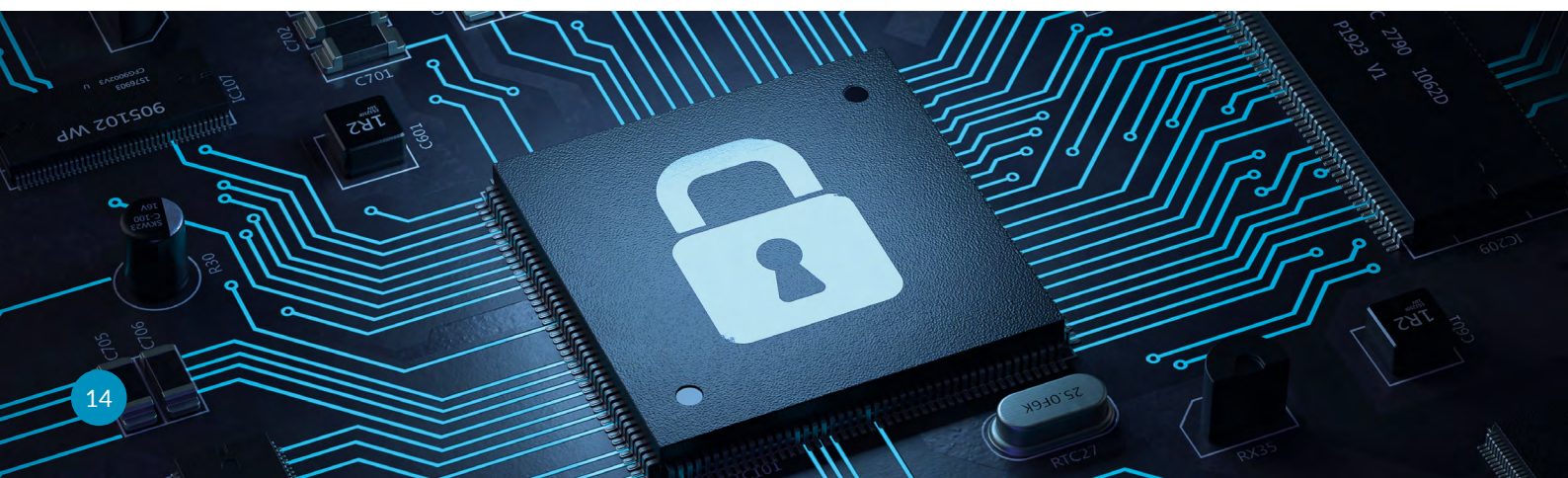


Table 3: Comparison of digital adoption in ASEAN countries

Country	Internet Penetration (January 2022) ⁶⁴	Fixed Median Broadband Internet Speed (March 2022) ⁶⁵	Mobile Population Penetration Rate (January 2022) ⁶⁶	Median Mobile Internet Speed (March 2022) ⁶⁷
Brunei	95.0%	36.96Mbps	129.0%	71.38Mbps
Cambodia	78.8%	19.33Mbps	129.3%	16.12Mbps
Indonesia	73.7%	21.23Mbps	133.3%	17.70Mbps
Laos	51.1%	28.32Mbps	79.6%	23.41Mbps
Malaysia	89.6%	84.61Mbps	127.7%	25.87Mbps
Myanmar	45.9%	16.86Mbps	133.6%	24.06Mbps
Philippines	68.0%	52.16Mbps	140.0%	19.38Mbps
Singapore	92%	197.97Mbps	145.5%	67.99Mbps
Thailand	77.8%	187.80Mbps	136.5%	33.49Mbps
Vietnam	73.2%	67.96Mbps	158.3%	33.90Mbps

Source: Data Reportal; SpeedTest and GSMA Intelligence

4.3 Geopolitical and Supply Chain Risks

What began as a US-China trade war in 2018 has over time manifested into a geopolitical contestation on many fronts, particularly in the technology space. The Sino-American tech-rivalry was made most evident when the US Commerce Department placed Chinese company, Huawei, on its 'Entity List'. This effectively barred Huawei from acquiring components or any technology from US companies without government approval. Tensions increased when Huawei's Chief Financial Officer, Meng Wanzhou, was held under house arrest in Canada on charges of fraud. Although she has since been released, the sanctions on Huawei still remain in place, restricting the Chinese tech giant from important access to technology which it needs to expand further.

This also led to a contentious debate on whether governments would allow the use of Huawei's 5G infrastructure, presenting it as a choice for ASEAN to pick between the two great powers.⁶⁸ Indeed, the threat of bifurcation of systems still remains and could become more costly for businesses and is an area to tread gingerly due to political sensitivities. It also coincides with China's ambitions to be more self-sufficient with its dual circulation strategy and Made in China 2025 policy. These policies aim to strengthen China's internal market and reduce the country's reliance on foreign imports.

⁶⁴ Kemp, S. (2022, January 26). Digital 2022: Global Overview Report. DataReportal. Available: <https://datareportal.com/reports/digital-2022-global-overview-report>

⁶⁵ Speedtest. (2022). Internet Speed around the world. Speedtest Global Index. Available: <https://www.speedtest.net/global-index>

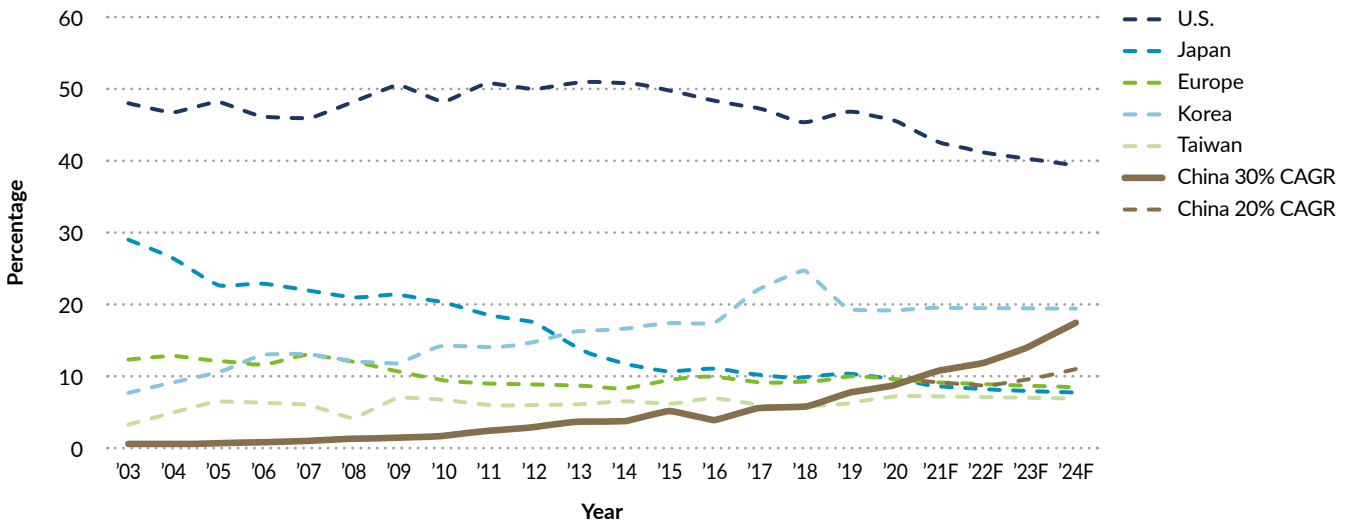
⁶⁶ GSMA Intelligence. (2021, November 12). GSMA Intelligence - Source Of Mobile Industry Insights. Available: https://www.gsmainelligence.com/?utm_source=DataReportal&utm_medium=article&utm_campaign=State_Internet_Connectivity

⁶⁷ Speedtest. (2022). Internet Speed around the world. Speedtest Global Index. Available: <https://www.speedtest.net/global-index>

⁶⁸ Tay, S., & Wau, J. (2020, March 6). ASEAN fights to stay neutral in the US-China contest. East Asia Forum. Available: <https://www.eastasiaforum.org/2019/12/03/asean-fights-to-stay-neutral-in-the-us-china-contest/#more-21999>

The COVID-19 pandemic further aggravated the tech war with the surge in demand for digital tools to enable continued communication and remain connected. Global supply chains were strained and this hit the semiconductor industry with increased demand for consumer electronics raising the need for more chips. However, this has led to more countries leaning towards industrial policies for semiconductor manufacturing.

Figure 3: Global semiconductor market share



Source: Semiconductor Industry Association⁶⁹

In February 2022, the EU announced the European Chips Act to “address semiconductor shortages and strengthen Europe’s technological leadership”. It hopes to increase production capacity from 10 per cent to 20 per cent of the global market by 2030.⁷⁰ In June 2021, the White House released a 250-page report⁷¹ on supply chain resilience and the need to revitalise American manufacturing. The report identifies China for using aggressive measures to advance domestic competitiveness and recommends that Congress support investments to advance local manufacturing of leading edge semiconductors. The CHIPS Act (Creating Helpful Incentives to Produce Semiconductors) will provide US\$52 billion in subsidies for semiconductor chips manufacturing.⁷²

The semiconductor race is most evident in East Asia. In 2019, South Korea, Taiwan, Japan and China made up almost 80 per cent of global fabrication capacity.⁷³ Overall the trend is towards more protectionist policies in the production of semiconductors, and this is likely to continue as the digital economy grows. Many of the big players in this industry are seen as allies of the US. This further poses a risk for ‘two worlds’ of technology with China’s own standards and technologies competing against that of the US and its allies. In the worst-case scenario, there may be no interoperability, resulting in a loss in cross-border innovation and investments. According to Deutsche Bank, this could cost the global technology industry US\$3.5 trillion over the next five years.⁷⁴ For ASEAN, it would incur unnecessary costs when the region ought to focus more on developing its infrastructure.

⁶⁹ Semiconductor Industry Association. (2022, January 10). China’s Share of Global Chip Sales Now Surpasses Taiwan’s, Closing in on Europe’s and Japan’s. Semiconductor Industry Association. Available: <https://www.semiconductors.org/chinas-share-of-global-chip-sales-now-surpasses-taiwan-closing-in-on-europe-and-japan/>

⁷⁰ European Commission. (2022, April 1). European Chips Act. European Commission. Available: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-chips-act_en

⁷¹ The White House. (2021). Building resilient supply chains, revitalizing American manufacturing, and fostering broad-based growth. The White House Washington. Available: <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>

⁷² Shepardson, D. (2022, March 29). U.S. Senate approves \$52 BLN chips bill in bid to reach compromise. Reuters. Available: <https://www.reuters.com/world/us/us-senate-approves-52-bln-chips-bill-bid-reach-compromise-2022-03-28/>

⁷³ Congressional Research Service. (2022, January 13). Semiconductors, CHIPS for America, and Appropriations in the U.S. Innovation and Competition Act (S. 1260). Congressional Research Service. Available: <https://crsreports.congress.gov/product/pdf/IF/IF12016>

⁷⁴ American Military University Edge. (2020, November 25). Don’t underestimate the rise in US-china tech tensions. American Military University Edge. Available: <https://inhomelandsecurity.com/dont-underestimate-the-rise-in-us-china-tech-tensions/>

Table 4: Semiconductor policies

Country	Semiconductor Related Policies
 China	Made in China 2025 plan outlined in 2015. To manufacture 40% of local demand by 2020 and 70% by 2025.
 Japan	Ministry of Economy, Trade and Industry (METI) released a strategy for semiconductors and the digital industry in June 2021. To increase annual revenue of Japanese companies from USD 38 bn in 2020 to USD 112 bn by 2030.
 South Korea	'K-semiconductor strategy' announced in May 2021. New rules give large chip companies tax breaks and tax credit for facility investment and R&D.
 Taiwan	Ministry of Science and Technology creates the Angstrom Semiconductor Initiative in 2021. To achieve USD 170 bn production value and break 1 nm technology node by 2030.
 US	CHIPS Act (Creating Helpful Incentives to Produce Semiconductors) to provide US\$52 billion in subsidies for semiconductor chips manufacturing.
 EU	European Chips Act unveiled in February 2022. Aims to cover 20% of international production by 2030 in value.

Source: BCG, Institut Montaigne⁷⁵

The US-China tech war is also becoming more prominent in a battle over ideology and setting rules for the digital age. Regulatory frameworks need to keep up with the rapid pace of digitalisation. The formation of Digital Economy Agreements⁷⁶ (DEAs) are becoming increasingly important, not only to support online business transactions, but to begin to form the base for future trade rules that will inevitably involve digital aspects. Singapore has these types of partnerships with Chile, New Zealand, Australia, UK and South Korea. With like-minded countries, these DEAs agree on key elements including cross-border data flows, paperless trade, interoperable systems of payments and consumer protection. They can also help address the rise of cyber threats that are increasingly intertwined with digitalised trade.

“In a digital world with porous boundaries, we have to recognise that economic prosperity happens when there’s a belief amongst us that the world is not zero sum. Singapore engages with ASEAN and other like-minded partners to build a rules-based digital collective founded on neutral, interoperable and standards-based systems.”

**Janil Puthuchery, Senior Minister of State for Communications and Information Singapore
at the SIIA’s 13th ASEAN and Asia Forum
September 2021⁷⁷**

⁷⁵ Duchâtel, M. (2022, March). *Semiconductors in Europe: the return of industrial policy*. Institut Montaigne. Available: <https://www.institutmontaigne.org/ressources/pdfs/publications/europe-new-geopolitics-technology-1.pdf>

⁷⁶ MTI. (n.d.). *Digital Economy Agreements*. Ministry of Trade and Industry Singapore. Available: <https://www.mti.gov.sg/Improving-Trade/Digital-Economy-Agreements>

⁷⁷ SIIA. (2021, November 10). *13th ASEAN and Asia Forum (AAF) – seeking recovery amid covid-19: Regional strategies and a Digital Future Conference highlights*. Singapore Institute of International Affairs. Available: <http://www.siiainline.org/13th-asean-and-asia-forum-aaf-seeking-recovery-amid-covid-19-regional-strategies-and-a-digital-future-conference-highlights/>

For ASEAN, the geopolitical tensions provide an added impetus to move towards an ASEAN Digital Economy Framework Agreement (DEFA) 2025. The Bandar Seri Begawan Roadmap⁷⁸ (BSBR) officially endorsed in October 2021 will aim to accelerate economic recovery and digital economy integration in ASEAN. The push towards a region-wide ASEAN digital economy will support digital transformations to enable the smooth flow of goods, services and data. Discussions will surround establishing trade rules and facilitating interoperability between countries to create a seamless digital trade ecosystem.

More recent trade agreements such as RCEP and CPTPP have provisions for digital economy services such as paperless trading, data protection and electronic authentication. In November 2021, China officially filed an application to join the Digital Economy Partnership Agreement (with Singapore, Chile, New Zealand). Going forward, the digital elements of trade will become more salient and the involvement of great powers may result in a bigger role in rules-setting and shape the strength of relationships in regions like ASEAN. Meantime there is talk of a digital trade deal by the Biden administration to cover Indo-Pacific economies as part of an “Indo-Pacific economic framework”.⁷⁹ Harmonising standards on digital elements such as data use will be an area of contestation.

“Stepping up cooperation in digitalisation is a key contributor to an environment of peace, stability, cooperation, and development among countries and peoples across the world.”

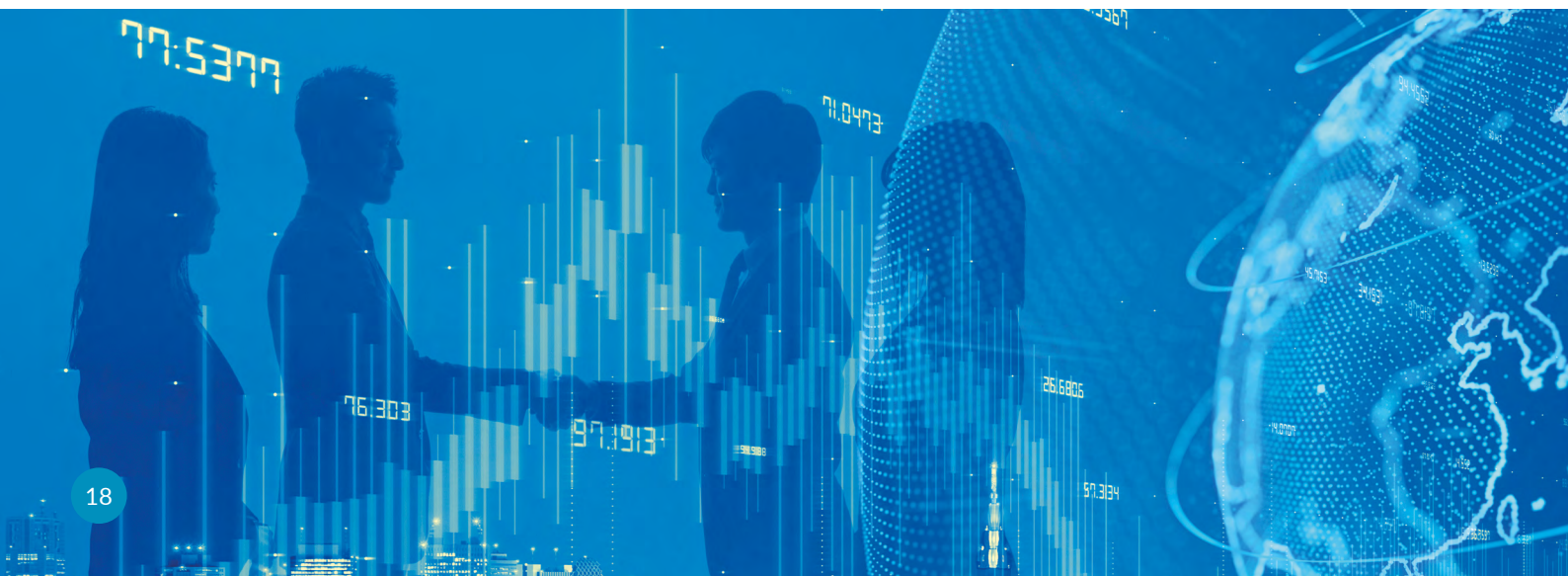
Vietnam Prime Minister Pham Minh Chinh
February 2021⁸⁰

As more agreements are forged to improve connectivity and interoperability, the position from ASEAN remains largely unchanged. The region does not want to be forced to choose between great powers in such a way where using a digital operating system from a certain country leads to accusations of picking a side. Furthermore, even with more digital considerations in trade agreements, ASEAN still needs to focus on supporting its SMEs and building up infrastructure. The benefits of digital trade provisions are yet to be seen for SMEs that may not be aware of the tools and mechanisms that can aid them in reaching out to a wider market online. More investments will be needed, not only in building up infrastructure but also in capacity building. In these areas, ASEAN’s dialogue partners can have a significant role to play.

⁷⁸ ASEAN. (2021). *The Bandar Seri Begawan Roadmap: An ASEAN Digital Transformation Agenda to Accelerate ASEAN's Economic Recovery and Digital Economy Integration*. Association of Southeast Asian Nations. Available: https://asean.org/wp-content/uploads/2021/10/Bandar-Seri-Begawan-Roadmap-on-ASEAN-Digital-Transformation-Agenda_Endorsed.pdf

⁷⁹ The White House. (2022). *Indo-Pacific Strategy of the United States*. The White House Washington. Available: <https://www.whitehouse.gov/wp-content/uploads/2022/02/U.S.-Indo-Pacific-Strategy.pdf>

⁸⁰ VietnamPlus. (2021, September 3). *Remarks by Prime Minister Pham Minh Chinh at 2021 Global Trade in Services Summit*. VietnamPlus. Available: <https://en.vietnamplus.vn/remarks-by-prime-minister-pham-minh-chinh-at-2021-global-trade-in-services-summit/207405.vnp>



5. Digital Inclusion

As the digital economy becomes synonymous with the modern-day economy, digital inclusion has become all the more pertinent. Digital inclusion refers to the process where everyone in society is able to contribute and benefit from the use of digital technology.⁸¹ As illustrated in section 4.2, the lagging infrastructure development across ASEAN contributes to the widening digital gap. According to the EIU's Inclusive Internet Index,⁸² Singapore is ranked 12th while Laos is ranked 88th out of the 120 countries assessed.⁸³ Within individual AMS, the gap between urban and rural areas continues to widen as rural communities have limited access to digital services. For example within Malaysia, broadband internet speeds in urban areas such as Selangor and Kuala Lumpur are amongst the highest in ASEAN, while rural areas in Sabah face intermittent connectivity.⁸⁴ The necessity of digital inclusion was further highlighted during the pandemic when governments and businesses had to increase their reliance on digital tools to update the public on safe management measures and ensure business continuity.

5.1 Digitalising MSMEs

Micro, small and medium-sized (MSMEs) businesses make up around 88 per cent to 99 per cent of ASEAN's economy.⁸⁵ Prior to the pandemic, digitalisation was not a priority for many SMEs, given the high cost involved in adopting digital technology in terms of both hardware and software and in meeting the digital skills gap (highlighted in the next section). The pandemic necessitated SMEs' digital transformation. MSMEs had to "leapfrog" to adopt digital tools to keep their businesses running during extended periods of lockdown. According to the ASEAN SME Transformation Study 2020, 60 per cent of SMEs in ASEAN surveyed said they were prioritising digitalising to "secure their long-term competitiveness".⁸⁶

"We hope the development of digital economy can also promote our MSMEs products and provide contributions to inclusive, equitable, and equitable economic growth."

Indonesian President Joko Widodo
March 2022⁸⁷

However, challenges remain for MSMEs in ASEAN. Many SMEs found it increasingly challenging to cope with the changing customer demands during the pandemic. Small business owners may tend to have the perception that digitalisation is merely the uploading of written documents online. However, the process of digitalisation requires companies to relook at their business models resulting in an overall business transformation, and not just merely changing certain processes and business practices. Hence it is important to distinguish between adopting digital tools and ensuring a company digitalise by integrating digital tools as part of their business operations.

⁸¹ Kaur, S., Low, J., & Dujacquier, D. (2021, February 7). Bridging the digital divide. Roland Berger. Available: <https://www.rolandberger.com/en/Insights/Publications/Bridging-the-digital-divide.html>

⁸² The Inclusive Internet Index tracks the availability, affordability, relevance and readiness of a country's internet services.

⁸³ The Economist Intelligence Unit. (n.d.). The Inclusive Internet Index: Singapore. The Economist. Available: <https://theinclusiveinternet.eiu.com/explore/countries/SG/performance/indicators/overall>

⁸⁴ Yusof, A. (2020, September 9). Putrajaya to look into Internet connectivity in rural areas, says science minister after Sabah student took exam on a tree. CNA. Available: <https://www.channelnewsasia.com/asia/malaysia-vevenoah-sabah-exam-tree-internet-connectivity-khairi-695006>

⁸⁵ ASEAN. (n.d.). Development of Micro, Small, and Medium Enterprises in ASEAN (MSME). Association of Southeast Asian Nations. Accessed May 4, 2022. Available: <https://asean.org/our-communities/economic-community/resilient-and-inclusive-asean/>

⁸⁶ UOB Business Banking. (2020, September 16). ASEAN SME Transformation Study 2020: UOB Asean insights. United Overseas Bank. Available: <https://www.uobgroup.com/asean-insights/markets/asean-sme-transformation-study-2020.page?path=data%2Fai%2F22>

⁸⁷ Office of Assistant to Deputy Cabinet Secretary for State Documents & Translation. (2022, March 1). President Jokowi: Indonesia has promising potential for digital economy. Cabinet Secretariat of the Republic of Indonesia. Available: <https://setkab.go.id/en/president-jokowi-indonesia-has-promising-potential-for-digital-economy/>

5.2 Digital Literacy and Demand for Digital Talent

The digital talent gap is often cited as the main challenge for companies to digitalise. Large technology unicorns such as Grab and Sea offer competitive remunerations and can attract top talents from the universities, SMEs and traditional industries struggle to hire employees with relevant skills required for their digital transformation. Emerging areas of the digital economy such as fintech, big data, AI and crypto require specialised technical skills. Data scientists, engineers, cybersecurity specialists and full-stack developers are amongst the top roles in demand in Singapore based on the Robert Walters Salary Survey 2022.⁸⁸

Beyond just technical skills, the digitalisation process requires a complete business transformation. While Institutes of Higher Learning (IHLs) have traditionally been the beacon of knowledge and have provided the necessary training and certifications required for the economy, the rapid digital acceleration has meant that IHLs are behind the curve. Across ASEAN, IHLs have taken a reactionary approach to designing curriculum, which by and large do not incorporate the technical know-hows required for companies' digital transformation. A survey by the Malaysian Global Innovation and Creativity Centre (MAGIC) found that 9 out of 10 new graduates do not have the necessary skills required for the workforce.⁸⁹ Furthermore, the digital workforce no longer has the luxury of waiting for prospective employees to complete a 3 to 4 years university education.

Ensuring MSMEs have access to digital technology tools is a key priority under ASEAN's MPC 2025.⁹⁰ The Go Digital ASEAN initiative, by the ASEAN Coordinating Committee on Micro, Small and Medium Enterprises (ACCMSME) and The Asia Foundation, with support from Google, provides digital literacy training in rural and underserved communities.⁹¹ These initiatives provide toolkits for MSMEs to move their business operations online, especially during the pandemic, which could determine a business' survival.⁹²

The private sector, too, has a role to play. Large tech companies such as Huawei and Google offer training programmes in various ASEAN countries. The Huawei ASEAN Academy works with local stakeholders and has trained over 23 thousand workers from Malaysia, Indonesia, Thailand and Cambodia. Grab and Microsoft announced a training programme in 2020 to equip delivery riders and tertiary students with digital skills. Such apprenticeship programmes and training opportunities could serve as a template for developing talent required for a digital workforce.

⁸⁸ Heng, J. (2021, December 6). Tech talent most in demand as Singapore hiring picks up in 2022: Surveys. *The Straits Times*. Available: <https://www.straitstimes.com/singapore/jobs/tech-talent-most-in-demand-as-singapore-hiring-picks-up-in-2022-surveys>

⁸⁹ Malaysiakini. (2021, August 13). A growing mismatch: Overcoming the skilled Digital Talent Crunch. *Malaysiakini*. Available: <https://www.malaysiakini.com/announcement/587036>

⁹⁰ ASEAN. (n.d.). Digital Innovation. Association of Southeast Asian Nations. Available: <https://connectivity.asean.org/strategic-area/digital-innovation/>

⁹¹ ASEAN. (2020). ASEAN and The Asia Foundation, with support from Google.org collaborate to equip 200,000 micro and small enterprises with digital skills and tools amidst the COVID-19 crisis. Association of Southeast Asian Nations. Available: <https://asean.org/asean-and-the-asia-foundation-with-support-from-google-org-collaborate-to-equip-200000-micro-and-small-enterprises-with-digital-skills-and-tools-amidst-the-covid-19-crisis-2/>

⁹² Lim, J. H. (2022, April 20). ASEAN SME Academy: Inspiring and uplifting ASEAN MSMEs during crisis. *Tempo.co*. Available: <https://en.tempco.co/read/1584135/asean-sme-academy-inspiring-and-uplifting-asean-msmes-during-crisis>

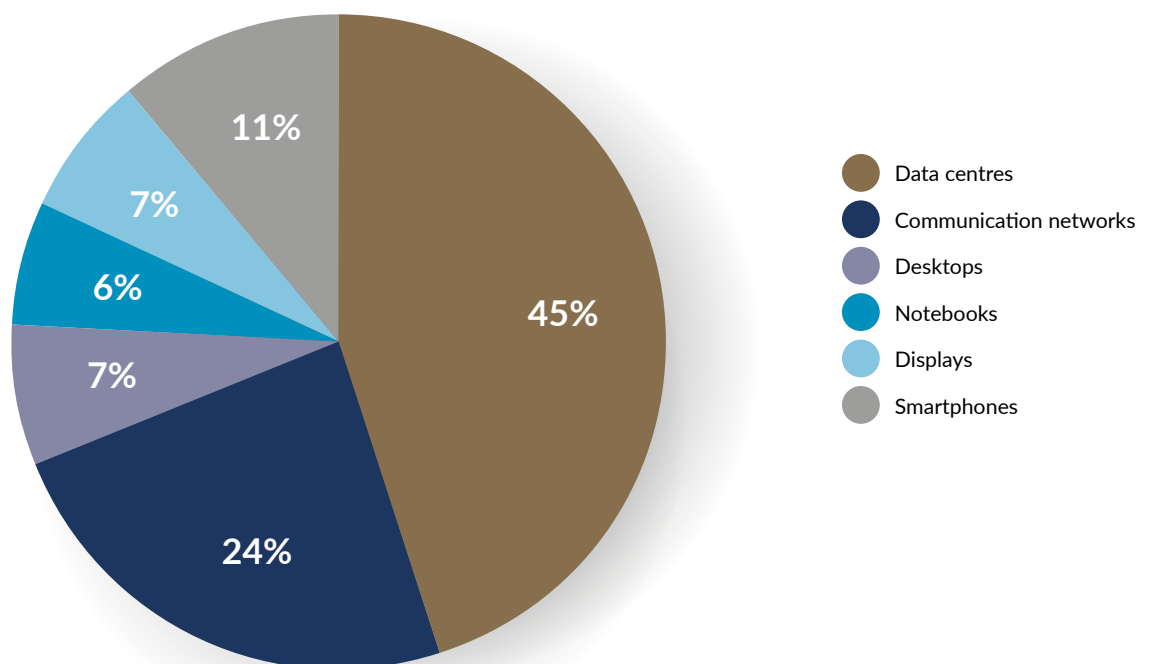


6. The Digital-sustainability Nexus

The rapid pace of digitalisation is not the only major trend affecting ASEAN's future. Another, cross-cutting issue is the drive towards sustainability where governments and businesses are incorporating more environmentally considerate policies and practices. The nexus between digitalisation and sustainability will garner more attention in coming years and necessarily so as both trends are major value-driving driving forces for societal changes. Further, the COVID-19 pandemic has put a spotlight on both trends as the increased reliance on technology and digital services is accompanied by a greater physical carbon footprint.

Policy concerns are emerging regarding the environmental impact of accelerated growth of the digital economy. Digital growth necessitates the need for more data and data centres to store data that run on large amounts of electricity. Globally, data centres account for around 2 per cent of greenhouse gas emissions. This is predicted to reach 3.2 per cent in 2025 and jump to 14 per cent by 2040.⁹³ The ICT sector is responsible for an estimated 3-4 per cent of global greenhouse gas emissions.⁹⁴ At the same time, the ICT sector does offer services to replace physical goods, such as in the area of documentation. Digitalisation also helps to consolidate these sustainability issues that were already existent and provide solutions to track, trace and measure carbon emissions.

Figure 4: Relative contribution of various ICT products towards total sector footprint in 2020



Source: Global Electronics Council⁹⁵

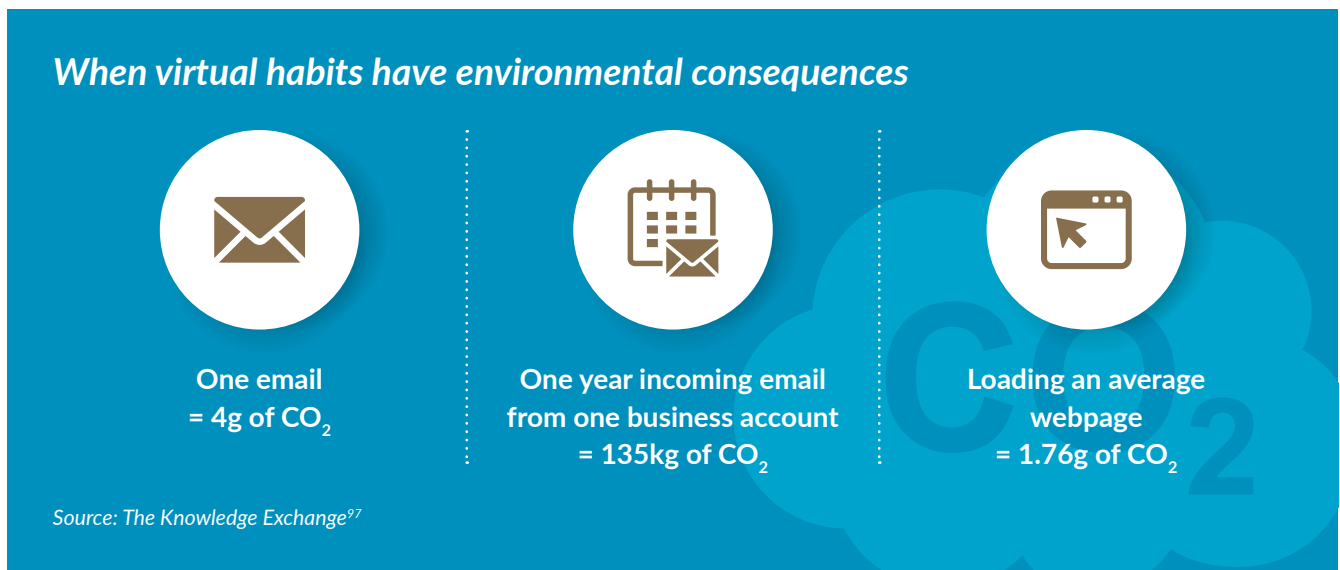
“Policy concerns are emerging regarding the environmental impact of accelerated growth of the digital economy.”

⁹³ Keeler, C. (2022, April 5). How is your data centre affecting your carbon footprint? Micro Data Center. Available: https://www.zelladc.com/insights/how-is-your-data-centre-affecting-your-carbon-footprint?hs_amp=true

⁹⁴ The Shift Project. (2020, September 12). “Climate crisis: The unsustainable use of online video”: Our new report on the environmental impact of ICT. The Shift Project. Available: <https://theshiftproject.org/en/article/unsustainable-use-online-video/>

⁹⁵ GEC. (2021, April 1). State of Sustainability Research: Climate Change Mitigation. Global Electronics Council. Available: https://globalelectronicscouncil.org/wp-content/uploads/GEC_Climate_Change_SOSR_DRAFT_For_Public_Comment_1APR2021.pdf

The pandemic also shaped consumer behaviour to increasingly go online to access services previously accessed in person. This not only meant the need for more digital equipment and increased connectivity, but the e-commerce sector boomed and resulted in increased deliveries of goods. The need to cope with pandemic restrictions and shop online predictably feeds into increased scope 3 emissions⁹⁶ such as increased packaging.



Many stakeholders have acknowledged the opportunities in the convergence between digitalisation and sustainability. Increased efficiencies brought about by digitalising supply chains can help save costs and processing for traders and exporters. The use of technology such as AI to monitor goods in local fulfilment centres and digital trade documentation can theoretically support sustainability efforts. There is improved efficiency through connectivity, data collection and monitoring for sustainability reporting standards, transparency and traceability along value chains, and innovation in developing renewable energy. More investment is being placed in innovative R&D that can help companies mitigate their carbon footprint. At the same time, behavioural changes can be a solution and large tech companies can play a role in nudging consumers toward more green behaviour.

6.1 Harmonising Standards and Cross-border Cooperation

One challenge in achieving climate aims is the lack of harmonised sustainability standards across countries in the ASEAN region, which complicates efforts to deploy climate solutions. For example, countries have different systems to calculate or measure carbon emissions – in some cases, metrics might vary across industries within the same country. Existing sustainability tools on the market, such as apps or dashboard platforms, are often calibrated with European or American emissions data in mind and need to be customised for use in Southeast Asian countries.

Cues can perhaps be taken from the financial and governance space where there has been some convergence in sustainability and ESG reporting criteria, with the internationalisation of GRI (Global Reporting Initiative) and other standards.⁹⁸ Notably, it is not just NGOs and environmental activists that have argued for the harmonisation and adoption of ESG reporting criteria, the push has also come from international bodies such as the World Economic Forum, the Task Force on Climate-Related Financial Disclosures (TCFD), and market regulators such as the Singapore Exchange (SGX).

⁹⁶ Scope 3 emissions are indirect emissions occurring in a company's value chain. This is in comparison to scope 1 that covers direct emissions (usually fuel combustion) and scope 2 that are indirect emissions focused on electricity purchased. The Carbon Trust. (2020, June 23). Briefing: What are scope 3 emissions? The Carbon Trust. Available: <https://www.carbontrust.com/resources/briefing-what-are-scope-3-emissions>

⁹⁷ Brunton, H. (2022, January 14). Digital Carbon Footprint: The Environmental Impact of Digital Transformation. The Knowledge Exchange Blog. Available: <https://theknowledgeexchangeblog.com/2022/01/17/digital-carbon-footprint-the-environmental-impact-of-digital-transformation/>

⁹⁸ Other existing standards include the Sustainability Accounting Standards Board (SASB), EU Generalised Scheme of Preferences (GSP)

Climate commitments in tech

- In 2019, Amazon co-founded The Climate Pledge—a commitment to be net-zero carbon by 2040. The initiative has over 300 signatories including, Maersk, SAP, Microsoft and Unilever.⁹⁹ The company wants to power all its operations with 100% renewable energy by 2025.¹⁰⁰
- Google aims to run on 24/7 carbon-free energy by 2030 to ensure electricity demand is met with clean energy everywhere, at all times.¹⁰¹
- Huawei has a 2025 target of reducing carbon emissions per unit of sales by 16% compared with 2019.¹⁰²
- SAP has announced intentions for its operations to be carbon neutral by the end of 2023.¹⁰³

An increasing number of businesses are adopting “net zero” or carbon neutrality targets. While the ideal way to achieve net zero commitments is via actual emissions reduction, the use of carbon credits for offsets is a useful interim measure for businesses. For example, the Singapore government has signalled that companies may use “high quality” international carbon credits to offset up to 5 per cent of their taxable emissions, starting from 2024. This will create a compliance market in Singapore, and may provide an impetus for companies to take up voluntary offsets as well.

While some companies, particularly MNCs, will be able to procure carbon credits on their own, exchanges like Climate Impact X (CIX) or AirCarbon will play a valuable role in helping many businesses engage with the offset market. However, there is not yet any firm national or international consensus regarding what constitutes a “high quality” carbon credit. In addition, regulatory instruments still need to be set up to ensure that corresponding adjustments are made when carbon credits are traded across state borders – so there is no double counting of emissions reductions towards Paris Agreement targets, a principle agreed on by governments at COP26 in Glasgow. On 21 March 2022, Singapore and Indonesia signed a Memorandum of Understanding Concerning Cooperation on Climate Change and Sustainability covering several areas, including bilateral collaboration on carbon trading with corresponding adjustments in mind.¹⁰⁴ In the long term, some form of harmonisation of carbon pricing policies across ASEAN or a joint emissions trading scheme (ETS) might be beneficial in helping to scale up carbon markets in the region. Besides Indonesia and Singapore, Thailand and Vietnam are also actively developing national ETS mechanisms.

⁹⁹ The Climate Pledge. (n.d.). 313 Signatories. The Climate Pledge. Available: <https://www.theclimatepledge.com/us/en/Signatories>

¹⁰⁰ Wellise, C. (2021, July 27). AWS Cloud Can Help Lower Carbon Footprints in Asia Pacific. Amazon. Available: <https://www.aboutamazon.com/news/aws/aws-cloud-can-help-lower-carbon-footprints-in-asia-pacific>

¹⁰¹ Google. (n.d.). 24/7 Carbon-Free Energy by 2030. Google. Available: <https://www.google.com/about/datacenters/cleanenergy/>

¹⁰² Huawei. (n.d.). Tech for a better planet. Huawei. Available: <https://www.huawei.com/minisite/tech-4-better-planet/en/index.html>

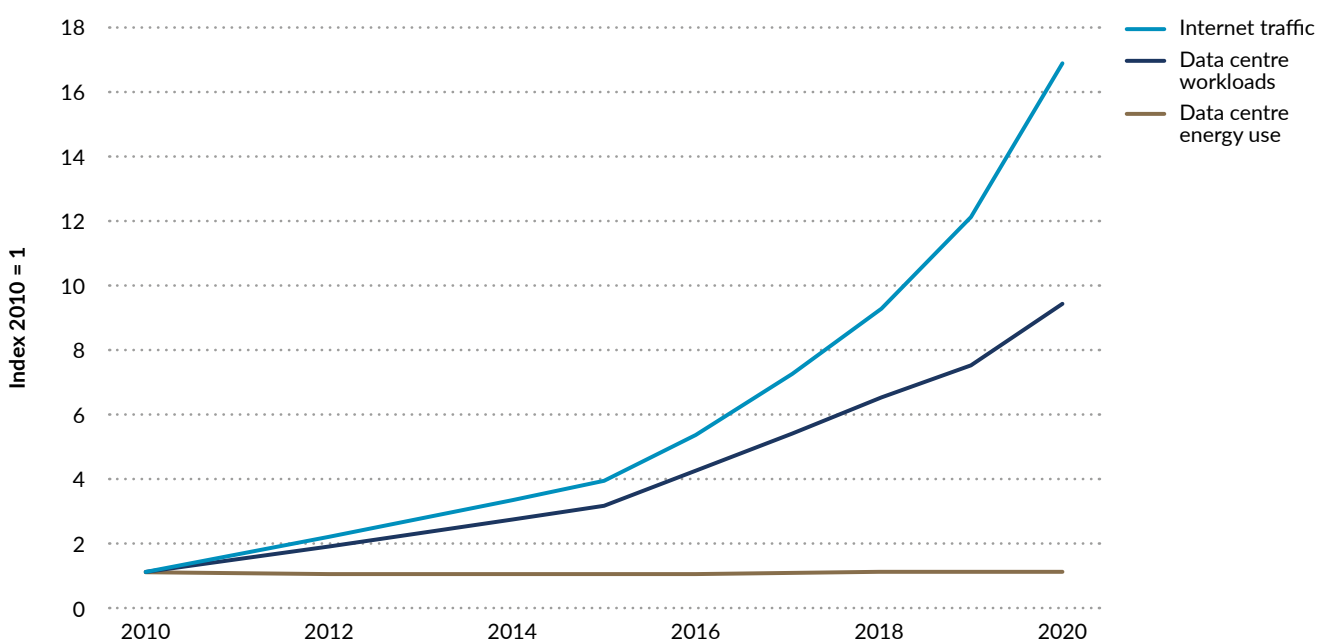
¹⁰³ SAP News. (2021, September 21). SAP aims to achieve carbon-neutrality by 2023. SAP News Center. Available: <https://news.sap.com/2021/03/sap-carbon-neutrality-goal-2023/>

¹⁰⁴ NCCS. (2022, March 21). Singapore and Indonesia Sign Memorandum of Understanding Concerning Cooperation on Climate Change and Sustainability. National Climate Change Secretariat Singapore. Available: <https://www.nccs.gov.sg/media/press-release/singapore-and-indonesia-sign-memorandum-of-understanding-cooperation-on-climate-change-and-sustainability>

6.2 Greening Data Centres

Sustainability standards with regards to data centres will inevitably be on the minds of policy makers. As referenced in the earlier section of this report, data centres are expected to multiply further even though they are acknowledged as a major contributor to carbon emissions. A survey conducted by Eco-Business and Digital Realty in Southeast Asia showed that sustainability is a significant priority when doing business with data centres.¹⁰⁵ As such, data centre providers are looking for the best way to reduce their carbon footprint by increasing the energy efficiency of their operations on a server level (innovative server design, better power use or incorporating artificial intelligence to improve efficiencies) and facility level (creative cooling techniques or use of low carbon building materials). The International Energy Association notes that increasingly efficient IT hardware and a major shift to hyperscale data centres have helped to keep electricity demand flat, despite exponential growth in demand for data centre services.¹⁰⁶

Figure 5: Global trends in internet traffic, data centres workloads and data centre energy use, 2010-2020



Source: International Energy Association¹⁰⁷

As Southeast Asia becomes an important market for data traffic and data centre growth, data centre providers will need to have a multi-pronged approach in meeting sustainability commitments. These include green building certifications, tapping more into renewable energy sources, reusing the heat energy from data centres, and shortening the rollout time to build the facilities. Increased efficiencies supported by digital solutions will help manage the energy consumption of data centres. For example, Singapore imposed a moratorium on new data centre projects in 2019 due to environmental concerns, but it was confirmed in March 2022 that a call for application (CFA) for new data centres would be made – subject to new requirements for data centres having a power usage effectiveness (PUE)¹⁰⁸ of 1.3 and below. These innovations and standards can be used as reference points for policymakers in the region as data centres and the digital economy grow.

¹⁰⁵ Eco-Business. (2020). *The future of data centres in the face of climate change*. Eco-Business. Available: <https://www.eco-business.com/research/the-future-of-data-centres-in-the-face-of-climate-change/>

¹⁰⁶ IEA. (2021). *Data centres & networks - Fuels & Technologies*. International Energy Agency. Available: <https://www.iea.org/fuels-and-technologies/data-centres-networks>

¹⁰⁷ *Ibid.*

¹⁰⁸ The PUE is the ratio of total amount of power used by a data centre facility to the power used to operate the IT equipment. A lower PUE represents higher efficiency.

6.3 Regional Efforts and Partnerships in ASEAN

The intersection between digital growth and sustainable commitments will need to be addressed on an ASEAN level. Six out of the 20 most vulnerable countries in the world are ASEAN member states.¹⁰⁹ The ASEAN Digital Masterplan 2025 recognises the need to address climate change while simultaneously growing the region's digital economy. Seven out of ten ASEAN member states have pledged to be carbon neutral by 2050, with the remaining three by 2060.¹¹⁰ According to the ASEAN Plan of Action for Energy Cooperation (APAEC),¹¹¹ the region has committed to a target of 23 per cent on renewable energy in total primary energy supply. For ASEAN, the aim is to build a leading digital community with secure and transformative services and technologies but to do so in a way that is greener and more sustainable. However, realistically, the region is focused on capacity building even as the bloc has initiated various efforts to tackle climate change. These efforts can be further developed in the future to consider the digital-sustainability nexus.

Table 5: ASEAN regional cooperation on climate change adaptation measures

ASEAN's Efforts to Tackle Climate Change
<ul style="list-style-type: none">• ASEAN Socio-Cultural Community (ASCC) Blueprint 2025• ASEAN Community Vision 2025• ASEAN Comprehensive Recovery Framework (ACRF)• Series of ASEAN Joint Statements on Climate Change since 2007 for each Conference of Parties• AWGCC Action Plan (Action Plan on Joint Response to Climate Change)• AADMR Work Programme (related to climate resilience)• ASEAN Tourism Strategic Plan 2016–2025• Vision and Strategic Plan For ASEAN Cooperation In Food, Agriculture, and Forestry (2016–2025)• ASEAN Guidelines on Promotion of Climate Smart Agriculture Practices• ASEAN Climate Resilience Network (ASEAN-CRN)• ASEAN Climate Outlook Forum• ASEAN Strategic Plan of Action on Water Resources Management• ASEAN Multi-Sectoral Framework on Climate Change (AFCC) and Food Security (AFCC-FS)

Source: ASEAN State of Climate Change Report¹¹²

Private sector partnerships will be crucial in this area. Sustainability will need to be embedded into the business matrix even as consumers and clients become more climate conscious. Existing operational structures and processes can be reapplied with a more sustainable focus and can cut across a business' entire value chain and operation.

“For ASEAN, the aim is to build a leading digital community with secure and transformative services and technologies but to do so in a way that is greener and more sustainable.”

¹⁰⁹ ASEAN. (2021). ASEAN Digital Masterplan 2025. Association of Southeast Asian Nations. Available: <https://asean.org/wp-content/uploads/2021/08/ASEAN-Digital-Masterplan-2025.pdf>

¹¹⁰ Nikkei Asia. (2022, April 24). MUFG to help ASEAN adopt tech for slower shift away from carbon. Nikkei Asia. Available: <https://asia.nikkei.com/Business/Finance/MUFG-to-help-ASEAN-adopt-tech-for-slower-shift-away-from-carbon>

¹¹¹ ASEAN Centre for Energy. (2021, July 7). ASEAN Renewable Energy Outlook. ASEAN Centre for Energy. Available: <https://aseanenergy.org/asean-renewable-energy-outlook/>

¹¹² ASEAN. (2021). ASEAN State of Climate Change Report. Association of Southeast Asian Nations. Available: <https://asean.org/wp-content/uploads/2021/10/ASCCR-e-publication-Final-12-Oct-2021.pdf>

Furthermore, new technological innovations likely stemming from the private sector will be the drivers of sustainability solutions. For example, the use of blockchain technology¹¹³ is being discussed as a more accurate method of tracking and tracing scope 3 emissions. SAP and Unilever are working to track whether palm oil is purchased from a sustainable source in real-time using blockchain technology to monitor the supply chain.¹¹⁴ Indonesia *Rekosistem* is an end-to-end zero waste management start-up working with AWS to digitalise the waste management supply chain and to generate energy from biodegradables.¹¹⁵ Artificial Intelligence (AI) and machine learning also play a part in ensuring data centres are more efficient. Migrating IT systems to the cloud are also seen as a way of improving efficiencies.

Project collaboration and greater cross-border cooperation on standards for renewable energy in the region would help catalyse the vision of an ASEAN Power Grid that was first envisioned in 1999. This is especially important for Singapore, given the government's plan to import 30 per cent of the country's electricity from low-carbon sources by 2035. Currently, Singapore is trialling a 100 MW hydro trial import from Laos, via existing grid connections through Thailand and Malaysia. A similar 100 MW trial will see Singapore importing solar energy from Indonesia. Singapore's Sembcorp is also involved in financing and a separate 1 GWp solar project in Batam, Bintan and Karimun (BBK), which will export some power to Singapore while reserving some for domestic Indonesian use. Another Singapore firm, Quantum Power Asia, is investing with partners in a 3.5 GWp solar facility in Indonesia's Riau Islands, which will also export power to Singapore. In addition, a consortium of firms led by Australia's Sun Cable is exploring the possibility of building an Australia-Asia Powerlink that will deliver renewable energy from Australia to Singapore and the region through undersea cables.¹¹⁶

Going forward, countries in the region will need to improve their sourcing and storage of renewable energy and can be worked out through government-to-government dialogues on decarbonisation solutions. Measures such as certified renewable energy certificates (RECs), and the mutual recognition of RECs between countries could help support the development of clean energy infrastructure in the region. With climate change increasingly becoming a pressing issue, businesses will be looking to government regulators to facilitate cross-border alignment of respective national policies, particularly in energy-intensive and trade-exposed sectors.

The social side of sustainability

Many corporations have their own ESG (Environmental, Social and Governance) criteria that not only play a role in mitigating climate change but also ensure equality and human rights. While the social pillar is an important part of overall sustainability, the focus of this report has been on the more measurable aspects of how to 'green' digital growth. Some of the social challenges have been touched upon in the section on digital inclusion of this report but can be further developed in the area of diversity and inclusion e.g. gender, ethnicities, elderly etc.

¹¹³ although with its own carbon footprint

¹¹⁴ Unilever PLC. (2022, March 24). SAP, Unilever pilot blockchain technology supporting deforestation-free palm oil. Unilever. Available: <https://www.unilever.com/news/press-and-media/press-releases/2022/sap-unilever-pilot-blockchain-technology-supporting-deforestation-free-palm-oil/>

¹¹⁵ Ayu, M.G. (2022, April 28). AWS Active Bantu Perkembangan Teknologi Startup dengan Memanfaatkan Teknologi Cloud dan Machine Learning. Cloud Computing Indonesia. Available: <https://www.cloudcomputing.id/berita/aws-active-bantu-startup-dengan-cloud>

¹¹⁶ AAPowerLink. (2022, March 13). Large scale renewable energy. AAPowerLink. Available: <https://aapowerlink.sg/>

7. Recommendations and Best Practices

In consultation with digital economy stakeholders through high-level closed door roundtables and individual interviews, the SIIA has identified some key recommendations and best practices to address the emerging policy challenges for ASEAN's digital future. These cover the government interventions needed and the increasingly important role of the private sector in the digital economy. An assessment of the goals for ASEAN as a digital "community" will also need to be considered.

- 1 Build on multi-level governance¹¹⁷ to address emerging digital policy challenges.** As the digital economy grows in ASEAN, there is a need for interoperability, capacity building, regulatory certainty, and sustainability. This report recognises the ongoing efforts to address these challenges on multiple levels i.e. i) individual governments have their national policy plans, ii) ASEAN as a bloc provides necessary frameworks, iii) the private sector implements norms and standards individually and collectively. ASEAN stakeholders can build on these existing initiatives and seek to harmonise such actions. This also provides an opportunity for private-public partnerships. For example in the area of sustainability, as more companies adopt emissions reduction or climate neutrality commitments, dialogue between the private sector and governments can help gauge collective progress being made towards the Paris Agreement.
- 2 Provide more platforms for dialogue between the private sector and ASEAN regulators.** Open and regular discussions between regulators and industry across the region can help map out operational pain points and the areas that need improved efficiencies. These conversations can also help improve security measures in the online space and enhance the digital user experience. Experiential sharing from tech companies that work across many jurisdictions will shed light on policy implementation challenges and potential solutions.
- 3 Recognise that capacity building remains a priority for ASEAN.** Action is needed to support the digital onboarding of SMEs and the growing demand for digital talent. Capacity-building can take the form of upskilling initiatives and in providing incentives and subsidies for small businesses to digitally transform. However, digital economy stakeholders consulted for this report noted that capacity building also needs to be looked at broadly, especially given the diverse levels of digital adoption in ASEAN. For example, there is still a pressing need to build the capacity of government officials in the area of digital applications, tech infrastructure, and cybersecurity. This will enable the region to be better equipped to address the aforementioned digital policy challenges. A mid-term review of the ASEAN Digital Masterplan scheduled for 2023 will provide a fuller picture of what is needed to strengthen ASEAN's digital ecosystem.
- 4 Encourage interoperability and secure open systems in ASEAN.** In recognition of geopolitical tensions and the threat of bifurcation, ASEAN should build an interoperable system that is inclusive and open. This would allow for healthy competition in advancing digital systems and mitigate the trend of technological decoupling caused by restrictive policies by countries such as the US and China. ASEAN should be able to have options in acquiring digital infrastructure, equipment and software and this should include supporting resilient and open supply chains. Digital economy agreements could help kickstart more open and inclusive digital transactions and priority should be given to supporting the ASEAN Digital Economy Framework Agreement.

¹¹⁷ Multi-level governance refers to how power is spread vertically between many levels of government and horizontally across regions such that non-state actors and NGOs can participate. For more info: <https://www.oecd.org/regional/multi-levelgovernance.htm>

- 5 Harmonise standards on cross-border data flows.** In the area of data management, existing regional frameworks such as the EU's General Data Protection Regulation (GDPR) and the Asia-Pacific Economic Cooperation (APEC) Cross Border Privacy Rules system (CBPR) provide reference points for the ASEAN Data Management Framework (DMF). Countries in ASEAN have begun implementing their own Personal Data Protection Act (PDPA) and should continue to harmonise data privacy standards. Due to the borderless nature of the digital economy, these standards for businesses will not only serve the needs for ASEAN but should be global and international in nature. SMEs would be able to benefit if the requirements are scalable. A trusted data corridor among like-minded countries can also be established to ensure secure data sharing and transfer. The use of blockchain technology to facilitate data sharing already exists¹¹⁸ between supply chain ecosystem partners.
- 6 Socialise and provide clarity on ASEAN level initiatives to build digital trust.** Governments will need to educate enterprises on the fundamentals and benefits of incorporating digital trust. ASEAN level initiatives such as the ASEAN Model Contractual Clauses (MCCs) are a good first step to provide guidance on digital data management. Yet, the actual take-up rate by small businesses seems low. National governments will need to promote an awareness of such data certification systems in their digital policy strategies. This would make it easier for businesses to conduct online transactions across borders and enable the next stage of growth.
- 7 Regionalise sustainability commitments.** A sustainability strategy needs to accompany ASEAN's digital transformation and policy will be key. Collective efforts will be needed from all ASEAN governments to prioritise clean energy infrastructure, enable corporate renewable energy investment, set ambitious carbon goals, and work with the private sector to achieve them. This includes the continued greening of data centres and adopting innovations such as the cloud, artificial intelligence, and machine learning. It would be beneficial for ASEAN to begin discussions on harmonisation of carbon pricing, for instance working towards a regional carbon tax or joint emissions trading scheme (ETS). The continued growth and greening of data centres will also be essential to support digitalisation goals of the region. Participation from the private sector will be salient as companies receive more scrutiny from investors and stakeholders on their ESG standards. More can also be done to equip and incentivise SMEs to adopt environmental practices. Ultimately climate action is tied to business survival.

¹¹⁸ SGTraDex is an example.



8. Conclusion

ASEAN's digital future offers much promise and excitement with businesses having the opportunity to reach a wider virtual market and with consumers experiencing the ease of online services. The benefits and potential for ASEAN's economy are evident in the e-commerce boom, the utilisation of digital payments, and access to health and education digital tools. The cross-cutting nature of digitalisation will continue to transform industries and propel growth.

While much has been said in the public sphere about ASEAN's digital economy prospects, there have also been emerging challenges that policy makers will need to address. The need for regulatory frameworks to keep up with commercial developments is an issue all governments have to deal with. The onset of the pandemic highlighted some of these concerns such as the digital gap and lack of access to digital services. More broadly, external factors such as geopolitical tensions and the globalised nature of the digital economy will need to be taken into consideration as ASEAN continues to develop economic and political ties.

This report has not only presented ongoing policy risks and commercial concerns but it has also highlighted the significance of sustainability as a policy area of focus that will need to be prioritised in the charting of ASEAN's digital future. Although ASEAN has pressing needs in the areas of digital infrastructure, digital skills and capabilities, the risk of neglecting the sustainability aspect of digital growth would be detrimental for ASEAN's digital progress. This is even more so because digital growth can also provide technological solutions to address environmental challenges.

The next step forward in charting ASEAN's digital future would be to recognise the cross-cutting nature of digitalisation and sustainability and to harness both areas for the development of ASEAN's future economic growth.



Appendix: Participating Organisations

1. Alibaba Group
2. ASEAN Secretariat
3. Amazon Web Services (AWS)
4. City Developments Limited
5. Cyber Data Centre
6. Equinix
7. Expedia Group
8. Flash Express (Thailand)
9. FoodPanda
10. FPT Asia Pacific
11. Google LLC
12. Grab Holdings
13. Hinrich Foundation
14. Hitachi Asia
15. Huawei International
16. IBM Consulting
17. Infocomm Media Development Authority Singapore
18. Lazada Group
19. Mastercard Inc.
20. Meta Platforms
21. Microsoft Corporation
22. Mitsubishi Corporation
23. Monetary Authority of Singapore
24. Personal Data Protection Committee of Thailand
25. RMIT University Vietnam
26. SAP SE
27. SGTech
28. TMA Logistics
29. United Overseas Bank
30. United Parcel Service Singapore (UPS)
31. Visa Inc.
32. Vietnam Association of Small and Medium Enterprises (VINASME)

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Established in 1962, the Singapore Institute of International Affairs (SIIA) is a non-profit and independent think tank committed to producing policy analysis, fostering in-depth dialogues and bridging gaps between policymakers, private sector decision-makers and experts to shape public policy and social responses. Centred around ASEAN focused themes, the institute aims to deliver policy analysis in international affairs and on issues driving environmental sustainability. The SIIA has been consistently ranked as one of the leading think tanks in Southeast Asia and the Pacific, in the Global Go To Think Tank Index by the University of Pennsylvania. Since 2017, the SIIA was ranked the No. 1 independent think tank in Asia. It was also recognised as one of the top 50 think tanks globally, excluding the United States of America. For two consecutive years since 2019, it was recognised as the No. 1 think tank in South Asia, Southeast Asia, and the Pacific (excluding India). In 2020, it was also recognised as one of the think tanks with the best policy and institutional response to the COVID-19 pandemic.

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The SIIA's ASEAN programme produces policy analyses and facilitates dialogue on how politics and socioeconomic policies in ASEAN impact business and investment in the region. Also closely watched are emerging trends in key economies as well as ASEAN's relations with major partners China, Japan, the USA and the EU. In recent years, the SIIA has done key work on Myanmar and Indonesia, providing assistance and advice in close cooperation with their government agencies. Key research output includes special reports evaluating the changing political and economic landscape as well as the business and investment opportunities of the respective countries. Key platforms developed by the SIIA to facilitate dialogue are the ASEAN and Asia Forum (AAF) and the ASEAN Myanmar Forum (AMF). These events bring policy makers and the business community together to facilitate dialogue about the region's political, economic and strategic challenges.



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