

Key Messages:

- Digital transformation has led to unprecedented changes in *what* and *how* we trade – particularly since the coronavirus disease (COVID-19) pandemic, which induced digital-enabled innovation around the world, including in Southeast Asia and in particular the Association of Southeast Asian Nations (ASEAN) region.
- The digital divide is one of the main concerns in least developed and developing countries, including amongst ASEAN countries, as reflected in the use of digital technologies, internet speed, internet usage, and technology production (and patents).
- ASEAN countries should address the challenges of digital transformation and digital trade by implementing ASEAN commitments, improving the quality of key digital enablers for digital technology adoption, enhancing countries' preparedness for digital transformation, and improving the quality of privacy and competition/antitrust laws to address the costs and risks of digital transformation and optimise its benefits.

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Digital transformation (DX) is one of the most crucial innovations to have changed modern life over the last decade. The number of annual installations of industrial robots worldwide has more than doubled. Technological revolutions have led to unprecedented changes in what and how we trade. The Association of Southeast Asian Nations (ASEAN) is on track to grow its digital community, with a rising number of internet users and greater internet penetration. However, one of the main concerns in the growing DX era is the digital divide within and across countries including in ASEAN, which is reflected in the gaps in internet speed, usage, and technology production amongst ASEAN Member States. Other challenges in DX are privacy, cybersecurity, and competition concerns. The ASEAN Chairmanship in 2023 could address several DX challenges to move towards the vision of a thriving ASEAN Digital Community by 2040 through implementing ASEAN commitments, improving the quality of key digital enablers for digital technology adoption, enhancing countries' preparedness for digital transformation, and improving the quality of privacy and competition laws to address the costs and risks of DX.

Introduction

Technological advancement has vastly improved our quality of life. We have witnessed various technological revolutions that have changed the way we produce goods, organise our businesses, communicate, and conduct our daily lives. Previous paradigm-changing innovations included the steam engine and the introduction of electrical machinery. Digital transformation (DX) is one of the most crucial innovations to have changed modern human life, following on from the invention of the steam engine, electronic machinery, digital computers, and artificial intelligence (AI).¹ Amongst the various inventions, AI and robots are two technologies that are closely related to human activities. The development and implementation of AI and robots are digital innovations that are mostly applied

¹ For a detailed empirical analysis of robots and AI, see Ing and Grossman (2022).

across industries, particularly to perform mundane, repetitive, and predictable tasks more accurately. Furthermore, beyond the type of technologies, the use of DX between countries is also reshaping global trade through the innovation of electronic commerce (e-commerce) as a market platform for businesses across and within countries as well as in logistics, inventory, ICT, and payment systems.

Over the last decade, the number of annual installations of industrial robots worldwide has more than doubled, reaching more than 400,000 in 2021. China, Japan, the United States (US), the Republic of Korea, and Germany accounted for 76% of the total industrial robot installations (IFR, 2021). Other important markets in Asia include several Association of Southeast Asian Nations (ASEAN) Member States (AMS) – such as Singapore, which was the fifth largest market in 2020 with 5,297 units installed, followed by Thailand with 2,885 units installed. According to Stanford University's 2022 AI Index Report, private investment in AI reached about \$93.5 billion in 2021 – more than double the total private investment in 2020 despite the decreasing number of newly funded AI companies, which fell from 764 in 2020 to 746 in 2021. AI investment in 2021 was directed at data management, processing, and cloud areas, followed by medical and healthcare and fintech segments. The US with a total investment of \$52.9 billion leads the world in overall private investment in funded AI companies, followed by China with \$17.2 billion (Stanford University, 2021).

Technological revolutions have led to unprecedented changes in *what* and *how* we trade. In 2030, global digital trade is projected to reach more than \$10 trillion – 10 times higher than the \$1 trillion recorded in 2010. ASEAN is on track to grow to \$360 billion by 2025 and \$1 trillion by 2030 in the digital economy (Google, Temasek, and Bain & Company, 2021) as digital consumption has become a way of life. About 80% of 440 million internet users in Southeast Asia have made at least

one purchase online, with internet penetration at about 75%. Almost 70% of internet users in several AMS have made at least one purchase online (Figure 1).

The coronavirus disease (COVID-19) pandemic has induced users to adopt online services and increase the number of digital consumers – 20 million new digital consumers were added in the first half of 2021, reaching a total of 350 million digital consumers in ASEAN (up from 290 million before the pandemic). Figure 2 shows that most AMS increased their information and communication technology (ICT) goods exports and imports from 2019 to 2020. Singapore and Indonesia recorded the highest growth in ICT goods imports in 2020 (Figure 2).

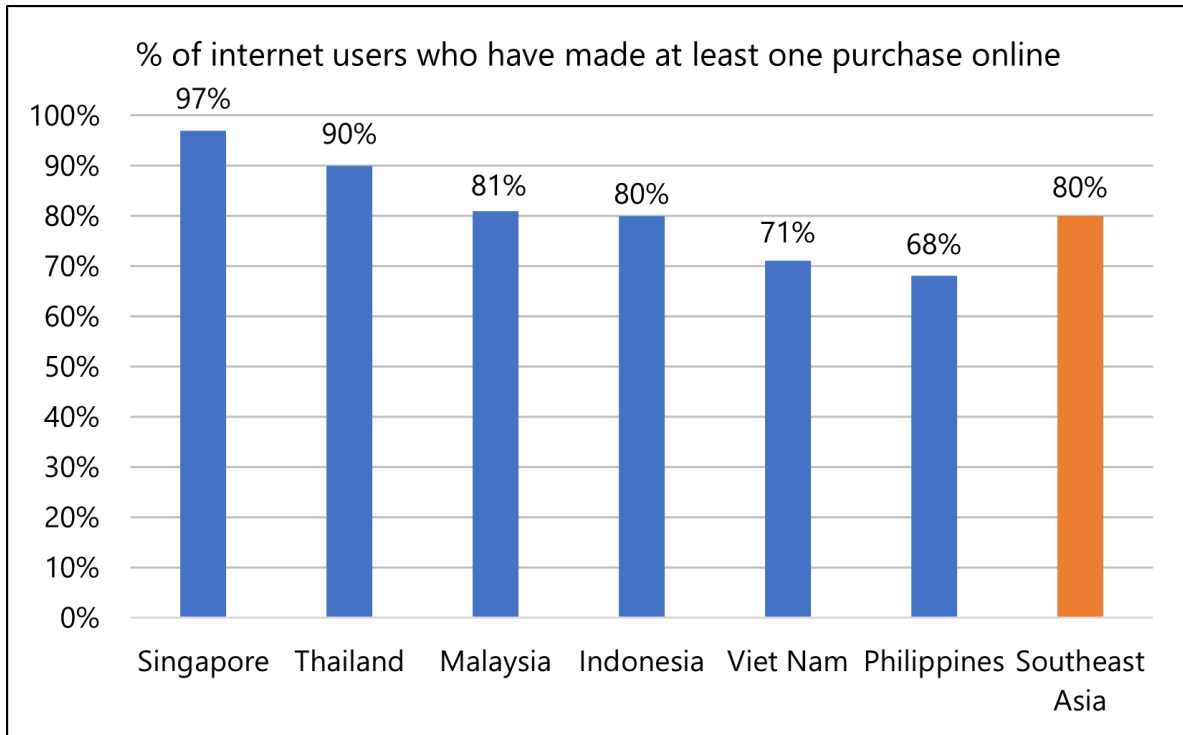
The Digital Divide in ASEAN

DX has been accelerated by the challenges stemming from COVID-19, which have induced digital-enabled innovation around the world, including in the ASEAN region. Despite the slowdown in 2022, Southeast Asian tech start-ups raised about \$8.2 billion in 2020 and ASEAN had more than 30 unicorns in 2021 – start-ups with a value of \$1 billion or more (Marsan, 2022). However, one of the main concerns in the DX in ASEAN is the growing digital divide within and across countries.

Capability of technology deployment could be a key issue of DX given the uneven deployment of digital technologies due to limited capabilities. Countries are unevenly prepared for DX due to several digital divides, including amongst AMS. At least three indicators contribute to the digital divide in ASEAN:

First, **internetspeed**. According to Speedtest (2022), the internet speed in Indonesia is 21.95 Megabits per second (Mbps), compared with 213 Mbps in the Republic of Korea. Amongst the AMS, Singapore recorded the highest internet speed at 211.36 Mbps (10 times faster than Indonesia), while the

Figure 1: Online Purchases in Selected ASEAN Member States



Source: Google, Temasek, and Bain & Company (2021).

three countries with the lowest internet speeds in ASEAN are Cambodia (19.31 Mbps) and Myanmar (18.35 Mbps). The internet speed in Singapore is almost 50 times faster than the connection in Timor-Leste.²

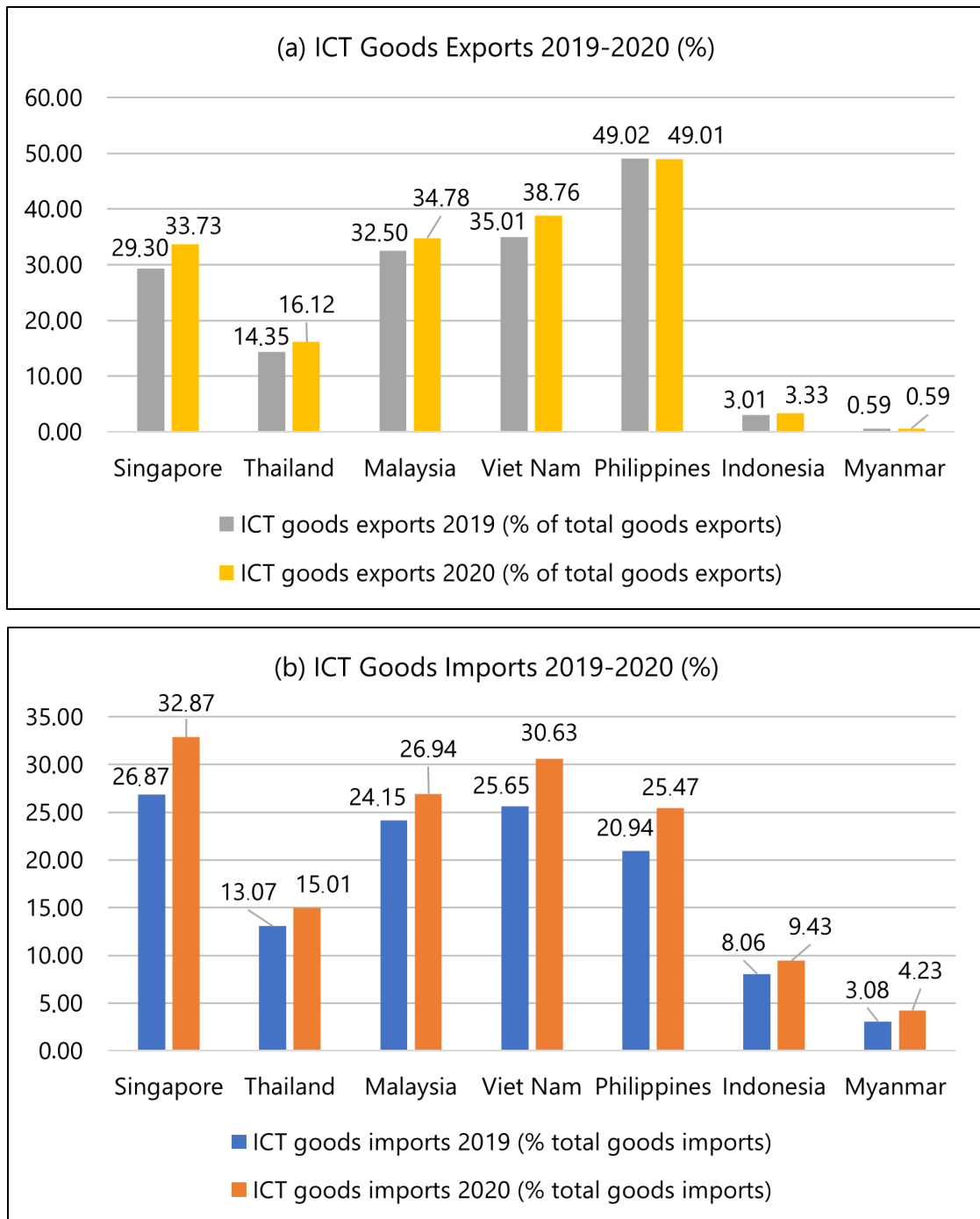
Second, **internet usage**. In 2020, while the number of internet users comprised almost 90% of the population in high-income countries, it was about 45% of the population in lower middle-income countries and less than 21% in low-income countries (Ing and Rodrik, 2022). In ASEAN, Brunei Darussalam had the highest number of internet

users (95.0% of the population), followed by Singapore (92.0%) and Malaysia (89.6%), while the countries with the lowest number are Myanmar (35.1%), the Lao People’s Democratic Republic (33.8%), and Timor-Leste (29.1%) (World Bank, 2021).

Third, **technology production**. From 2016 to 2020, the average number of patent applications in high-income countries was about 19,000, dropping to about 1,500 for lower middle-income countries – and falling to less than 100 patents on average for low-income countries. Singapore and Indonesia had the highest number of patent applications in ASEAN in 2020, at 1,778 and 1,309, respectively. According to World Bank (2021), Thailand (863), the Philippines (476), and Brunei Darussalam (5) had the lowest number of patent applications, while some countries had missing data.

² For mobile lines, the median internet speeds in AMS are 77.48 Mbps in Brunei Darussalam, 64.92 Mbps in Singapore, 38.23 Mbps in Viet Nam, 34.63 Mbps in Thailand, 30.08 Mbps in Malaysia, 26.07 Mbps in the Lao People’s Democratic Republic, 25.67 Mbps in Myanmar, 22.56 Mbps in the Philippines, 17.91 Mbps in Indonesia, and 17.01 Mbps in Cambodia.

Figure 2: ICT Goods Exports and Imports in Selected ASEAN Member States



ICT = information and communication technology.
 Source: World Bank (2021).

The three DX gap indicators reflect a huge digital divide, both in the world and amongst AMS. Countries have various DX readiness levels, and most low- and middle-income countries have huge development gaps with developed countries. The digital divide is mostly dependent on countries' education, skills, and infrastructure (Ing and Rodrik, 2022).

DX in ASEAN: Progress and Challenges

In recent decades, ASEAN has developed several strategies on DX issues to advance the ASEAN Economic Community, such as the ASEAN Digital Masterplan 2025, ASEAN Digital Integration Framework Action Plan (2019–2025), and ASEAN Agreement on E-Commerce Work Plan (2021–2025). These are all parts of the ASEAN Digital Economy Strategy, which aims to establish an open, secure, interoperable, competitive, and inclusive digital economy within ASEAN. The strategies focused on several issues: (i) digital connectivity (infrastructure and data) and cybersecurity; (ii) interoperability and harmonisation of laws, regulations, and standards; and (iii) digital talent, innovation and research and development (R&D), investment, and start-ups (Rillo, 2022). The latest document is Bandar Seri Begawan Roadmap – An ASEAN Digital Transformation Agenda to Accelerate ASEAN's Economic Recovery and Digital Economy Integration (ASEAN, 2021). The roadmap may be perceived as a response to the COVID-19 pandemic, which forced the region to adopt digital technology. Through the roadmap, ASEAN aims to ensure that DX within the region provides a fair share of benefits to all AMS. The roadmap provides plans for ASEAN to take concrete steps to develop an enabling environment for a robust ASEAN digital economy and ensure that the region emerges stronger and more resilient from the disruptions of COVID-19 (ASEAN, 2021).

Despite the ongoing progress on ASEAN digitalisation, AMS are facing several challenges

related to DX, besides the digital divide within the region:

First, **privacy**. Information and data on private individuals are exposed to service providers. The pervasive exchange of data has fuelled concerns about the use and misuse of data.

Second, **cybersecurity**. The expansion of rapid digitalisation and the use of data by businesses and consumers for communication, digital trade, and as a source of access to information and innovation, comes with increased threats – e.g. threats against data, threats against systems, and threats against people.

Third, **competition**. Technological advancement enables firms to produce and operate on massive economies of scale, which builds up market concentration. Market concentration reduces competition and can be a barrier for micro, small, and medium-sized enterprises (MSMEs), and start-ups to be on a level playing field, as big tech players tend to use integration to dominate markets and capture more revenue, at the cost of consumers.

ASEAN Digital Community in 2040

Considering the advantages and challenges of DX, the ASEAN Chairmanship in 2023 could address challenges to advance the ASEAN Digital Community by 2040.

First, AMS should implement DX and digital trade commitments. ASEAN has made great progress in DX and digital trade issues, including the ASEAN Digital Masterplan 2025, ASEAN Digital Integration Framework Action Plan (2019–2025), and Bandar Seri Begawan Roadmap – An ASEAN Digital Transformation Agenda to Accelerate ASEAN's Economic Recovery and Digital Economy Integration. AMS need to operationalise and implement the frameworks and commitments. The ASEAN Chairmanship in 2023 could start by following up on prior commitments and identify specific actions for workable commitments.

Second, AMS need to improve the quality of key digital enablers for the adoption of industrial robots, automation, and AI. The key digital enablers include digital infrastructure and the necessary technologies, such as electricity, broadband, cloud computing, big data, blockchain, the internet of things (IoT), 3D printing, and virtual interaction or production (Ing and Rodrik, 2022). In addition, it is important for ASEAN to improve the quality of laws and regulations, data security, and governance, as well as skilling, reskilling, and upskilling human capital. This requires AMS commitments to ensure digital inclusiveness for all.

Third, AMS should promote efforts to improve preparedness, as DX in the end is about people. This includes efforts to improve preparedness for digital and AI technologies – not only in high-tech developed countries or countries that have successfully adopted digital technology, but for all AMS – to tackle the digital divide within the region. To achieve this, ASEAN needs to call for better cooperation amongst AMS in providing incentives for the adoption of ‘good technology’ – technology that improves productivity yet has no or little impact on labour replacement and environmentally friendly or supporting sustainable activities – especially for countries with low levels of technology development.

Fourth, as DX comes with cybersecurity risks, the role of government as a secure and trusted digital connectivity provider is important to guarantee the prosperity of the societies and economies. Government needs to develop a high-quality national cybersecurity agency that is in charge for several matters, such as national cybersecurity strategy, protecting critical digital infrastructure, responding to cyber incidents, defining cybersecurity standards, and increasing the awareness of the societies. At a regional level, it is also important for AMS to ensure coordination and integration of their cybersecurity strategies.

Last, AMS need to improve the quality of privacy laws and competition or antitrust laws. It is crucial for AMS to have an integrated and standardised privacy law and competition law that can be implemented in all AMS to achieve the ASEAN Digital Community by 2040. An integrated and standardised law and regulations could help ASEAN build a stronger and inclusive community in DX and digital trade.

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