TECH FOR GOOD INSTITUTE

Report — June 2023

From “Tech for Growth” to “Tech for Good”

Shaping the Next Phase of Southeast Asia’s Growth through Sustainable Digital Development

Table of Contents

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Funders do not determine research findings nor the insights and recommendations of research.

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About the Author: Tech for Good Institute

The Tech for Good Institute (TFGI) is a non-profit organisation on a mission to leverage the promise of technology and the digital economy for inclusive, equitable and sustainable growth in Southeast Asia.

With a population twice the size of the U.S. and strong demographics, Southeast Asia's digital economy is evolving rapidly. Technology has and will continue to have a tremendous impact in driving the region's development. We are optimistic about technology's potential to advance growth, within cultural, social, political and economic contexts that will shape the trajectory of innovation.

TFGI serves as a platform for research, conversations and collaborations on and for Southeast Asia while maintaining global connections. Our work focuses on topics at the intersection of technology, society and the economy, and is intrinsically linked to the development of the region. Through research, effective outreach and evidence-based recommendations, we seek to understand and inform policy with rigour, balance and perspective.

TFGI was founded by Grab with the vision to promote a thriving and innovative Southeast Asia for all. We welcome opportunities for partnership and support, financial or in-kind, from organisations and individuals committed to fostering responsible innovation and digital progress for sustainable growth in the region.

For more information about the Institute, please visit www.techforgoodinstitute.org.

Special Thanks

Infocomm Media Development Authority (IMDA)

The Infocomm Media Development Authority (IMDA) leads Singapore's digital transformation by developing a vibrant digital economy and an inclusive digital society. As Architects of Singapore's Digital Future, they foster growth in Infocomm Technology and Media sectors in concert with progressive regulations, harnessing frontier technologies, and developing local talent and digital infrastructure ecosystems to establish Singapore as a digital metropolis.

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ATxSG 2023 is Asia's leading technology event jointly organised by Infocomm Media Development Authority (IMDA) and Informa Tech - supported by the Singapore Tourism Board (STB). The event consists of two main segments, ATxSummit and ATxEnterprise.

ATxSummit comprises the invitation-only Plenary covering themes like generative AI, web 3.0 and trust, "soonicorns" and sustainability across four key pillars: Tech x Trust, Tech x Good, Tech x Builders and Tech x Creative. ATxSummit also features the ATxAI and SG Women in Tech conferences, alongside G2G and G2B closed-door roundtables to facilitate a closer partnership between the public sector and digital industry.

ATxEnterprise organised by Informa Tech and held at Singapore Expo, will host conferences as well as exhibition marketplaces comprising B2B enterprises across Technology, Media, Infocomm, Satellite industries and start-ups. ATxEnterprise consists of BroadcastAsia, CommunicAsia, SatelliteAsia, TechXLR8 and InnovFest x Elevating Founders.

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Executive Summary

The digital economy has the potential to drive Southeast Asia's development.

Digital technologies and the business models they enable will drive Southeast Asia's growth in and through the digital economy. This potential lies in the region's mobile-first population's adoption of digital tools, the integration of the digital and non-digital economies through online-to-offline (O2O) platforms, and increasing innovation and startup activity.

Southeast Asia's governments continue to prioritise digital transformation after the COVID-19 pandemic.

While strategies and implementation plans reflect the diverse economies and societies of SEA-6, Southeast Asia's governments share two common objectives: advancing the digitalisation of Micro, Small and Medium Enterprises (MSMEs) and key sectors, and the digitalisation of government and public services.

Common priorities to achieve these two objectives include:

1. developing digital infrastructure
2. building digital literacy
3. developing digital talent
4. fostering trust in the digital ecosystem
5. encouraging innovation and entrepreneurship
6. strengthening regional cooperation

Yet, digital transformation and the growth of the digital economy should not be pursued as standalone developments. The concept of "Tech for Good" emphasises that innovation should be at the service of national and regional economic, social and environmental goals.

“Tech for Good” and sustainable digital development can enable quality growth.

Governments all over the world are weighing up the costs of unintended consequences of rapid digitalisation. The approach of “Move Fast and Break Things,” popularised by early generations of digital startups, is giving way to a new paradigm in which digital economy companies (DECs) are called upon to innovate in a responsible and impactful way. The focus on solving isolated problems at scale is giving way to a deeper understanding of the complex interconnectedness between technology, economy and society. While economic value creation is crucial, it is not enough to achieve the broader objective of fostering quality growth for a sustainable, inclusive and equitable transformation of both the economy and society.

Given their scale, ubiquity and integration across all sectors, DECs play an influential role in shaping the digitalisation trajectory of the markets they serve. As the DECs develop, deploy and drive adoption for innovation, their products and services shape the digital economy and society. DECs can contribute to SEA-6’s development by striving for:

- Responsibility, ensuring that no harm is done;
- Supportive outcomes, when harms are mitigated;
- Facilitative outcomes, in which benefits are optimised through efficiency; and
- Transformative outcomes, requiring radical new approaches to address local, national or global challenges previously deemed intractable.

While transformative outcomes may dominate headlines, responsible, supportive and facilitative outcomes are all needed for the digital economy and technologies to serve society.

Stakeholders in SEA-6’s digital economy are ambitious for “Tech for Good.”

Stakeholders across the public, private and civil sectors in the region are keen to build on the progress already made in the digital economy. The growth of the digital economy must lead to sustainable digital development, empowering a confident digital society that leverages innovation to foster inclusive and equitable progress.

This next phase builds on the hard work of governments, DECs and stakeholders to facilitate sustainable transformation of both the economy and society.

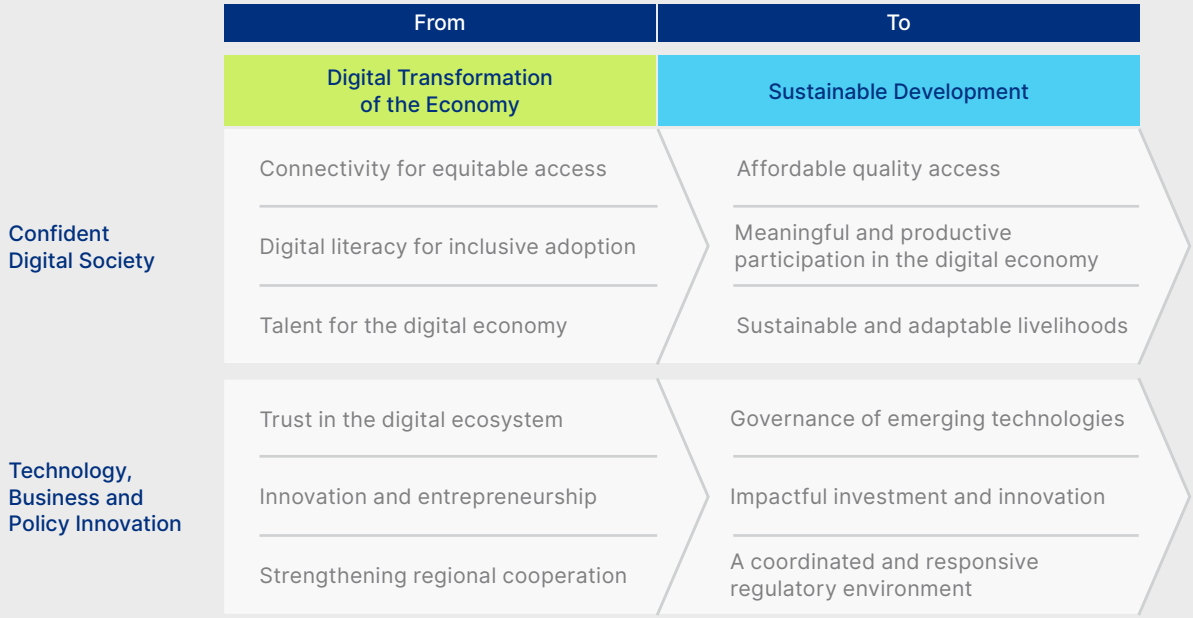
Broadened outcomes for sustainable digital development

While existing priorities for digital transformation remain, outcomes are broadened:

1. Affordable quality access
2. Meaningful and productive participation in the digital economy
3. Sustainable and adaptive livelihoods through the digital economy
4. Governance of emerging technologies
5. Impactful investment and innovation
6. A coordinated and responsive regulatory environment, nationally and regionally

Charting the next phase of growth for SEA-6

While existing priorities for digital transformation remain, they have broadened to enable sustainable development



Source: Tech for Good Institute, 2023

Commitment, cooperation, coordination and co-creation is vital to enable “Tech for Good” in SEA-6

Citizens and consumers deserve a commitment from the public, private and civil sectors to shared outcomes, new processes and perspectives, and a more collaborative and holistic approach to enable innovation within a confident digital society. In particular:

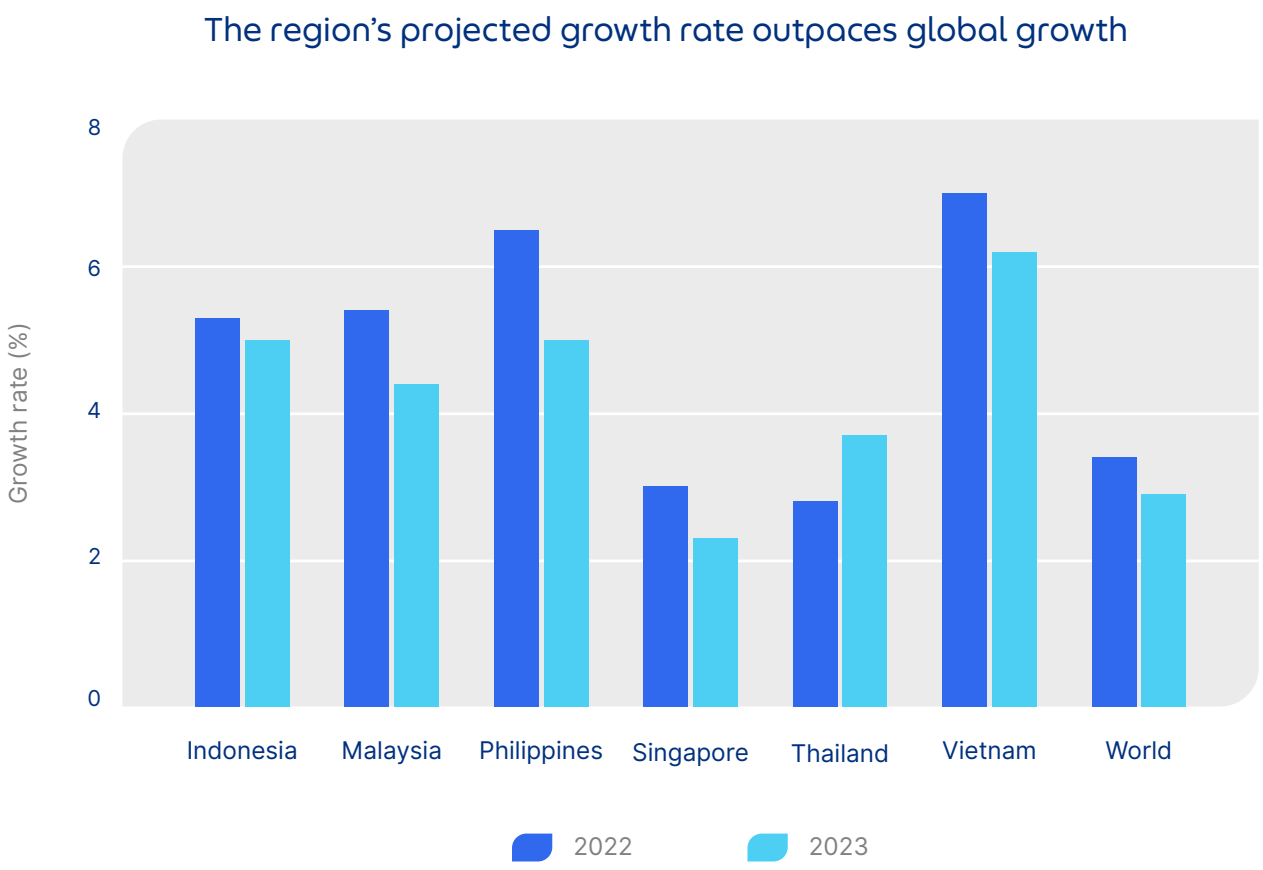
1. Rethinking governance and regulation to focus on outcomes to keep pace with technology and business innovation.
2. Pursuing responsible innovation so that digital products and services may be developed with the interests of society and the environment by design.
3. Fostering regional cooperation and partnerships.

For these commitments to bear fruit, the public, private and civil spheres need to **cooperate** towards shared outcomes, **coordinate** with clear communication to prevent knowledge or operational silos, and **co-create** solutions that are sustainable, inclusive and equitable. Such collaboration can inform policymaking and governance for the digital age, fostering an enabling environment for technological and business innovation while inclusively anticipating the needs of current and future stakeholders, such as youth or an ageing populations.

1. Tech for Growth

The economies of Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam (collectively SEA-6) are outpacing global growth.

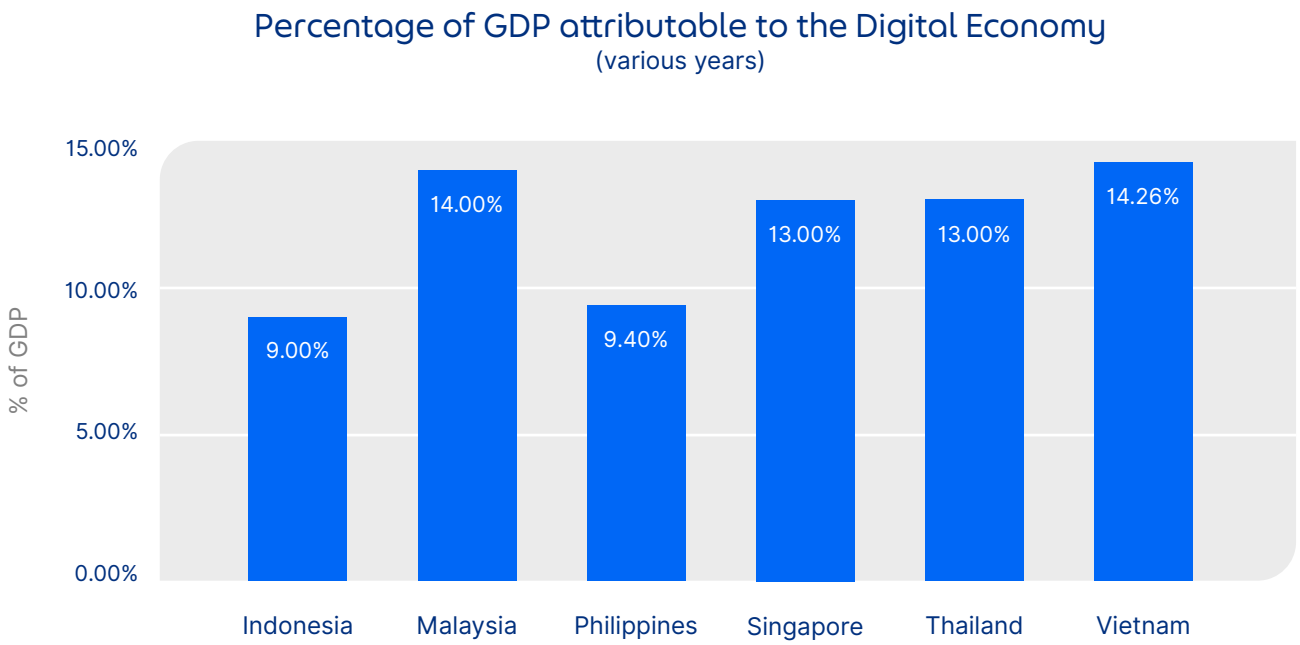
Figure 1. Southeast Asia's GDP growth forecasts, 2022-2023



Source: Southeast Asian Economies: Out of the Storm, Clouds on the Horizon, Fulcrum. https://fulcrum.sg/southeast-asian-economies-out-of-the-storm-clouds-on-the-horizon/

Over the last five years, the digital economy has become a significant contributor to this growth.

Figure 2: Contribution of the digital economy to total GDP across SEA-6[1]



Note: Figures used are latest data available from various years: Indonesia (2021), Malaysia (2022), Philippines (2022), Singapore (2020), Thailand (2021) and Vietnam (2022).

Source: Various sources compiled by Tech for Good Institute, 2023

1.1 The digital economy is accelerating growth in Southeast Asia

SEA-6's digital economy benefits from several factors enabling its growth, and it is expected to reach a gross merchandise value (GMV) of US$330bn by 2025, and US$1tn by 2030.[2]

Factor 1: Mobile-first populations, leapfrogging of legacy technology

Today, mobile devices are the main gateway to the digital products and services for much of Southeast Asia. There are an estimated 335.6 million smartphone users across SEA-6, accounting for 88% of internet users.[3] The region's mobile traffic accounts for almost two-thirds of all online traffic.[4] Consumers' mobile-first digital behaviour drives the adoption of digital products and services for both personal and work purposes, with an average usage of 4.6 hours on their mobile devices, which is 40% more than the global average of 3.25 hours.[5]

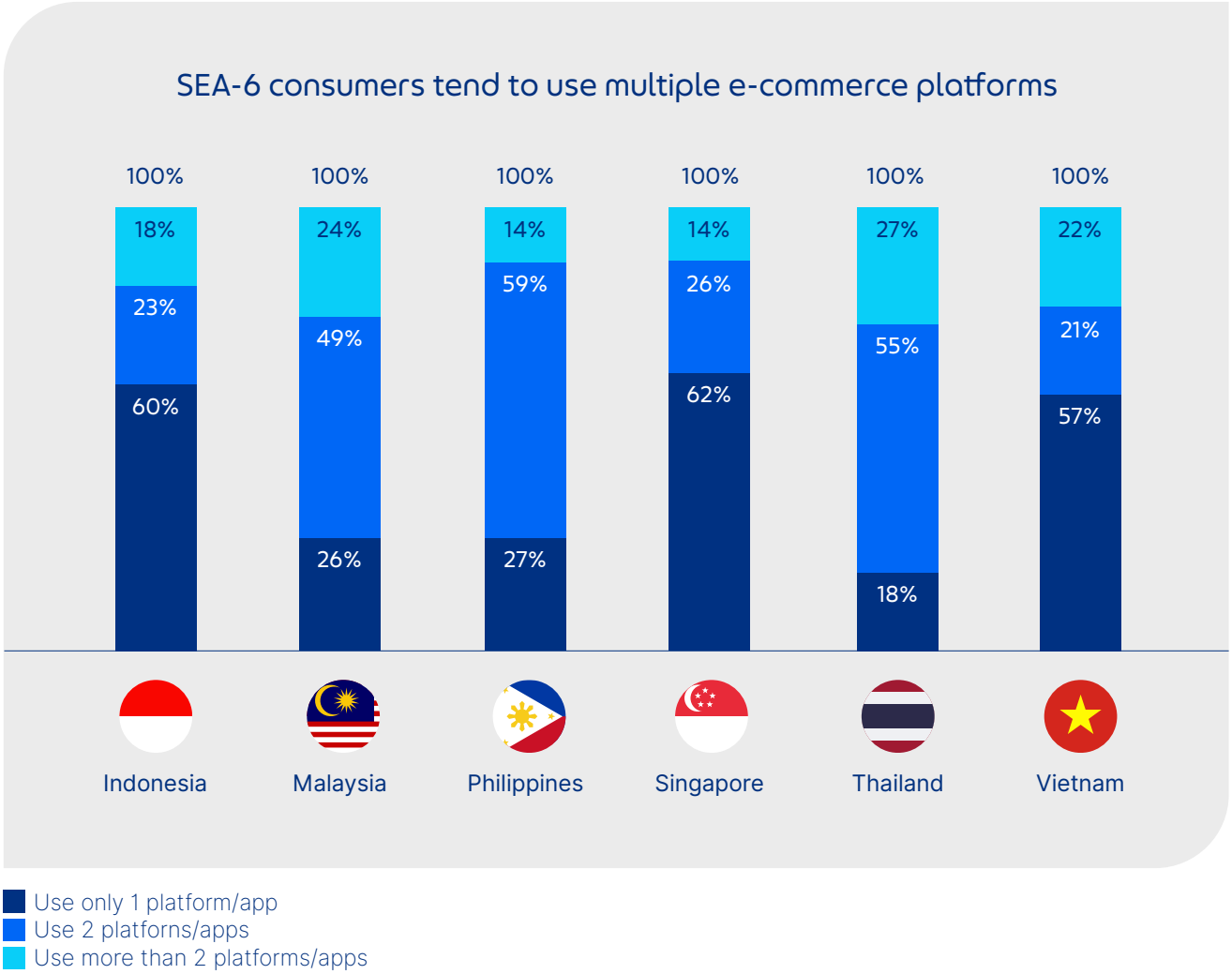
Factor 2: Continued digital transformation after the pandemic

COVID-19 lockdowns in the past three years accelerated digital adoption. For instance, 30% of surveyed consumers started using digital services only during the pandemic, and 90% expressed that they are likely to continue.[6] Online and mobile payments were adopted by 50% of these consumers. Furthermore, alternative e-commerce channels such as business messaging, peer-to-peer commerce and live selling are gaining popularity among Southeast Asian consumers and are shaping consumption habits.[7]

Factor 3: Integration of the digital and non-digital economies through online-to-offline platforms

Online-to-offline (O2O) platforms, such as e-commerce, ride-hailing and food delivery, have lowered barriers to entry to the digital economy for consumers and small businesses. The growth of e-commerce, for example, can be attributed to the proliferation of marketplaces where MSMEs can easily reach customers and complete transactions in Southeast Asia and beyond. DECs, such as Lazada, Shopee, GoTo and Grab, have played a crucial role in developing digital and physical systems. As such, the widespread use of multiple platforms by users in the SEA-6 region has contributed to the rapid expansion of the e-commerce sector within ASEAN's digital economy.

Figure 3: Usage of multiple e-commerce platforms across SEA-6



Source: Tech for Good Institute, 2021

Factor 4: Increasing digital startup activity

The entrepreneurial spirit runs deep in Southeast Asia. DECs, including digital startups, are poised for growth (see Box 1). Digital startups leverage digital technology to create, market and deliver its products or services, enabling it to be data-driven and scalable. While funding and valuations may have declined since the end of 2022, the region's early unicorns, such as Lazada, SEA Group, GoTo and Grab, have inspired the next generation of digital startups (see Figure 4).

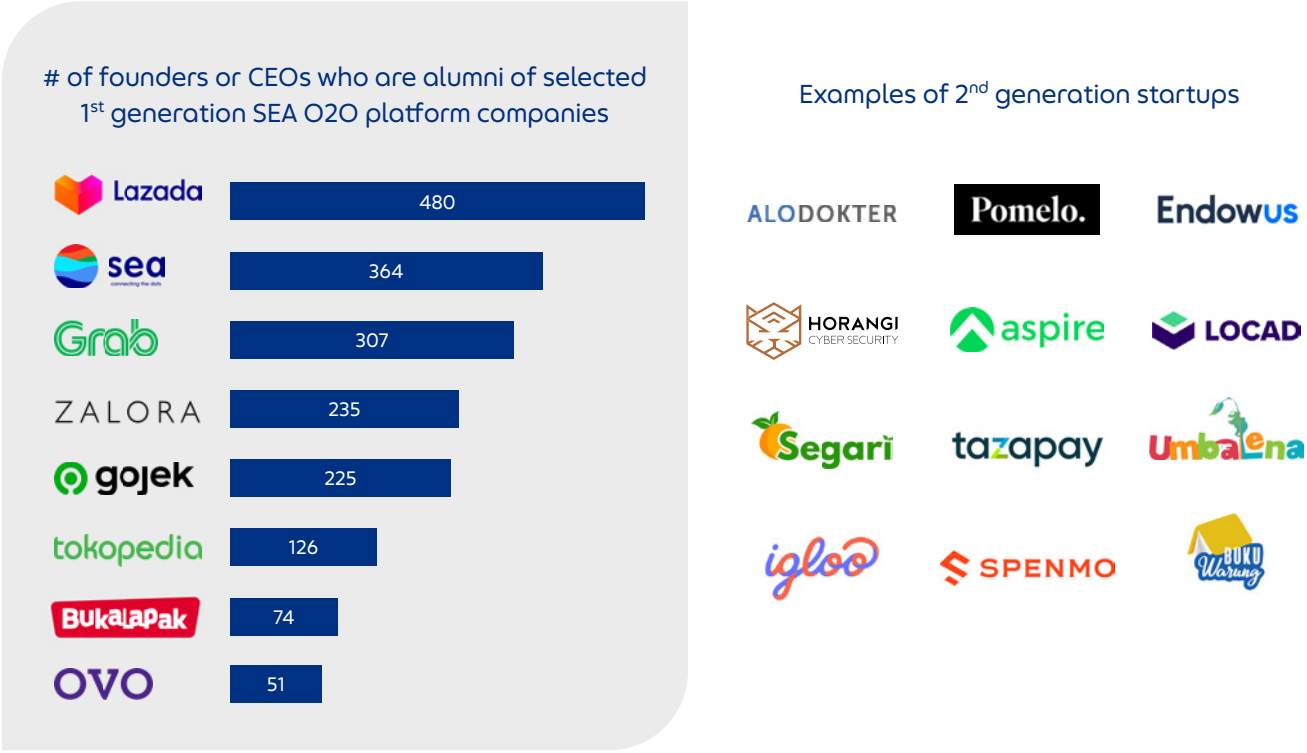
What is a Digital Economy Company?

Adopting the Organisation for Economic Cooperation and Development's (OECD) definition of the digital economy, this study defines the DECs as "companies either involved in economic activity as producers of digital contents, goods, and services or reliant on digitalisation to provide consumers with goods and services".[14] DECs are firms and businesses whose economic activities significantly rely on digital input, such as technologies, services and data.[15] DECs may be categorised as being involved in three tiers of economic activity:

- **Core:** Economic activity from producers of digital content, ICT goods and services. These DECs focus on information and communications technology, or online-only digital platforms. For example, Google, Facebook and LinkedIn.
- **Narrow:** Economic activity from companies that are reliant on digital input. These DECs develop uses for technology relevant to their contexts and market segments. For example, Grab uses data and technology to facilitate transactions between producers and consumers, bringing small businesses and consumers into the digital economy.
- **Broad:** Economic activity from companies significantly enhanced by digital input.[16] These DECs use digital input to improve rather than enable production. For example, Shein exclusively markets and sells its fashion products online rather than investing in offline marketing and brick-and-mortar stores.

Figure 4: First-generation DECs are inspiring new start-ups

First generation Southeast Asia Platforms have inspired the next batch of startups



Note: Based on LinkedIn scan of former employees of select 1st generation Southeast Asia platforms, that are currently holding 'CEO', 'Founder' or 'Co-Founder' positions in new start-up companies

Source: Tech for Good Institute, 2021

Digital startups are vital to a dynamic digital economy, "catalysing local innovation, creating jobs, and attracting both talent and funding to the ASEAN digital economy".[10] These startups disrupt industry incumbents, compete with established DECs and accelerate the training for new generations of workers to expand the pool of tech-savvy talents. This in turn will catalyse and attract additional investment, promoting further growth.

1.2 SEA-6 ambitions and objectives for the digital economy

While SEA-6 is often regarded as a potential single market of great promise, each government operates within its own unique political, geostrategic, social and cultural context. Yet, digitalisation brings common and cross-border opportunities and challenges, as evidenced by national digitalisation objectives.

Indonesia's digital economy is the largest market in Southeast Asia, making the country an attractive investment destination for businesses. It accounted for about 42% of ASEAN's digital economy in 2021,[11] and is projected to reach 1 US$30bn in GDP by 2025.[12] Currently, e-commerce and fintech are driving Indonesia's digital economy. Public-Private-Partnerships, such as Bangga Buatan Indonesia and Wiki Wirausaga Platform, aim to empower MSMEs and encourage the use of e-commerce. The Digital Financial Innovation Road Map and Action Plan 2020-2024 is one of the various programmes implemented by the Financial Services Authority of Indonesia (OJK) to guide growth in the fintech industry.

Malaysia has been working on digital transformation for its economy for more than two decades. The Malaysia Digital Economy Blueprint (MDEB) and the National Fourth Industrial Revolution (4IR) Policy serve as guiding frameworks for maximising the potential of digitalisation in the country. Malaysia Digital, also known as the Multimedia Super Corridor 2.0, plays a vital role in attracting companies, talent and investment to encourage Malaysian businesses and citizens to participate in the global digital economy. Malaysia's digital economy contributed 14% to the national GDP in 2022,[13] and is expected to rise up to 25.5% by 2025.[14]

The Philippines is one of the fastest-growing digital economies among other major ASEAN member states, expanding by 93% from 2020 to 2021.[15] In 2021 alone, the country achieved a GMV of US$17bn through digital transactions and is expected to reach US$40bn by 2025.[16] The Philippine Development Plan 2023-2028[17] introduced a Strategy Framework to advance research and development, technology, and innovation to foster a dynamic innovation ecosystem within the country. The framework outlines specific outcomes and action points to guide the government and the private sector in accelerating digital transformation. The key industries identified in the digital economy are e-commerce, fintech, platform companies and the gig economy.

Singapore has made significant investment in modern physical and digital infrastructure, a strong digital talent base and robust Intellectual Property (IP) regulations to support the digital ecosystem.[18] The country's digital economy is estimated to reach US$30bn by 2025, primarily driven by the e-commerce and online travel sector, which are projected to contribute about US$11bn and US$9bn, respectively, by 2025.[19]

Thailand published a 20-year Digital Landscape Development Plan in 2017 that outlined long-term policy goals with actionable and measurable targets. The first phase focused on digital foundations such as connectivity and infrastructure, followed by a priority on digital inclusion. Thailand is now entering the third phase, aiming for full digital transformation by 2027. The final phase seeks to establish Thailand as a global leader in the digital economy. The Thailand Board of Investment projects that the country's digital economy will contribute about 25% of Thailand's GDP by 2027,[20] up from 17% in 2018.[21]

Vietnam's digital economy has seen significant growth over the past decade. In 2022, the digital economy recorded a 28% increase in GMV compared to the previous year. The country's GMV is expected to grow 31%, from US$23bn in 2022 to US$49bn in 2025.[22] Digital transformation has been a priority across most sectors, impacting infrastructure, cybersecurity, e-government, digital skills, Industry 4.0 and tax policies. Resolution No. 23-NQ/TW (22/3/2018) envisions that by 2030, multiple policies will be enacted by the Communist Party and State, making significant contributions to national industrial development. Vietnam's goal by 2045 is to achieve a modern and industrialised nation that ranks among the top three ASEAN countries of the global value chain. To further growth, Decision No. 411/QĐ-TTg was issued in 2022 to approve the National Strategy for Development of Digital Economy and Digital Society by 2025.

1.2.1 Common objective 1: Digitalisation and transformation of MSMEs and key sectors

While each SEA-6 country's strategy reflects the nature of its economy, state of development and national priorities, two common objectives were the digitalisation of MSMEs and key sectors, and digitalisation of government and public services.

To enable inclusive digitalisation, enhance competitiveness and build resilience in the digital economy, each SEA-6 government prioritises digital transformation of MSMEs and existing key sectors, such as agriculture, manufacturing, healthcare, finance and education. Examples of national initiatives include:

Indonesia

- Bangga Buatan Indonesia (Proud of Indonesian Products), a national multi-stakeholder movement, aimed to aid MSMEs through the COVID-19 crisis. This Public-Private-Partnership encourages the use of e-commerce platforms;
- Wiki Wirausaha Platform connects MSMEs with government agencies to address supply chain challenges; and
- The Broadband Commission launched initiatives to increase MSME digital connectivity, aiming to halve the number of businesses without internet access by 2025.[23]

Malaysia

- The Small and Medium Enterprises (SME) Corporation Malaysia and the Malaysia Digital Economy Corporation (MDEC) coordinate innovation and technology adoption programmes for MSMEs specific groups, such as women-owned businesses in e-commerce. SME Corporation Malaysia has also partnered with companies such as Fusionex to create hybrid platforms for networking and engagement;[24]
- MDEC launched the Digital AgTech to empower the local agriculture sector with 4IR technologies and improve farmers' livelihoods across the nation;
- MDEC led the Belanjawan 2021 Go eCommerce and Shop Malaysia Online initiatives to support Malaysian businesses in adopting e-commerce and e-payment platforms. The campaigns generated over RM4.6bn of GMV and has onboarded over 32 e-commerce partners such as Shopee, Grab and Lazada; and
- The eTunai Rakyat and the ePenjana eWallet programmes provide cash incentives for Malaysians to download popular eWallets such as Grab, Touch 'n Go and Boost, to boost implementation of digital payments.

Philippines

- The Bangko Sentral ng Pilipinas (BSP) launched several initiatives to promote adoption of digital payments, including the National Retail Payment System and the Digital Payments Transformation Roadmap;
- The Department of Trade and Industry (DTI) partnered with two DECs, Globe and Proxtera, to establish the SME Financial Empowerment Programme, providing MSMEs with financial skills and literacy needed to succeed in the digital economy;[25] and
- The DTI also created Shared Service Facilities to enhance MSME competitiveness through shared resources, including machinery, equipment, tools, systems, skills and knowledge support.[26]

Singapore

- The Infocomm Media Development Agency (IMDA) launched the SMEs Go Digital programme to help businesses leverage digital technologies and develop digital capabilities for growth in the digital economy. The programme offers additional development opportunities, such as the Grow Digital scheme to support MSMEs looking to access international markets and the Advanced Digital Solutions scheme that provides AI-enabled and cloud-based integrated solutions for MSMEs.

Thailand

- Thailand's Masterplan for the Digital Economy 2023-2027 encompasses action points and plans to facilitate the digitalisation of MSMEs.[27] This includes supporting 1,500 digital startups and MSMEs annually with ready-to-commercialise prototypes, coaching of more than 15,000 MSMEs to trade online and building at least 10,000 online community stores through digital community centres.

Vietnam

- The Ministry of Information and Communications (MIC) established the SMedx portal where MSMEs can increase knowledge of digital transformation and adopt customised strategies.[28] The portal is linked to 23 made-in-Vietnam digital platforms, with plans to incorporate 30 additional platforms in the future.

1.2.2 Common objective 2: Digitalisation of government and public services

In addition to economic digital transformation, government and public services are also ripe for digitalisation. The COVID-19 pandemic accelerated this effort and highlighted the value of digital technologies to facilitate communication and transactions between citizens, businesses and the government. Digitalisation not only yields efficiency gains but can also achieve significant satisfaction among constituents.[29] :

Indonesia

Presidential Regulation Number 95/2018[30] gave momentum for Indonesia's e-government initiatives, amongst which is the development of an integrated national portal for all government services. Sub-national and national initiatives include:

- The Banyuwangi District's Smart Kampung Programme by the East Java local government leverages e-budgeting and digital databases to improve the quality and accuracy of public services;[31]
- The Manajemen Integrasi Informasi dan Pertukaran Data (MANTRA) is a data-sharing system that provides Indonesians online access to public services;[32]
- The national platform One Data integrates data from various government agencies and makes it accessible to the public. This platform aims to improve transparency and promote data-driven decision-making;[33]
- The Electronic Identification Card (e-KTP) provides citizens with a digital identity card that can be used to access government services and complete transactions online;[34] and
- Patient medical records from various health facilities are integrated into a single Indonesia Health Services (IHS) platform, called SATUSEHAT.[35]

Malaysia

The Malaysia Digital Economy Blueprint[36] has set targets for the efficient and effective delivery of government services with targets of 80% end-to-end online services, all ministries and agencies providing a cashless payment option, and 80% usage of cloud storage across the government. Initiatives include:

- MyGovCloud is a cloud hosting service that provides government agencies a range of digital infrastructural resources, such as network, server, storage and operating system, which supports cloud-enabled applications. It is provided by the Public Sector Data Centre (PDSA) and managed by the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU);[37] and
- The Malaysia Government Central Data Exchange (MyGDX)[38] is a data sharing platform that boosts efficient coordination and security by providing integrated services across government agencies, ensuring streamlined provision of online services from end to end.

Philippines

The Department of Information and Communications Technology (DICT) created the E-Government Masterplan 2022[39] to promote open governance through the digital transformation of basic public services. The Masterplan aims to enhance efficiency, security and cost-effectiveness of public services for citizens and businesses. Some initiatives include:

- The Philippine e-Government Interoperability Framework establishes common language, standards and principles for technology-enabled platforms across national government agencies to ensure cohesion of ICT systems;[40] and
- The Electronic Business Permit and Licensing System, a project by the DICT and Department of the Interior and Local Government (DILG), covers end-to-end business registrations within local government units (LGUs).

Singapore

Singapore's Digital Government Blueprint[41] was launched in 2015 and has been continually updated. Key targets include stakeholder satisfaction, end-to-end digital options and transactions, transformative digital projects, use of artificial intelligence (AI) and data analytics, and commercial cloud migration. Some initiatives implemented include:

- SingPass is the national digital identity system[42] onboarded by more than 4.5 million individuals, covering 97% of citizens and residents aged 15 and above;[43]
- MyInfo is Singpass' personal data sharing consent product, while MyInfo Business plays a similar role for corporate information. Both enable citizens and businesses to securely and easily share their personal and corporate information with government agencies and other private sector organisations, streamlining verification;
- The Citizen Connect, formerly eCitizen, is a one-stop government portal, that provides citizens with access to a wide range of government services, including applying for permits, paying bills and accessing government information;
- GeBIZ, a government e-procurement portal, allows businesses to bid for government contracts online. The portal improves transparency and efficiency in the procurement process; and
- The Virtual Assistant "Ask Jamie" is a government implemented chatbot that improves customer service and reduces the need for physical visits to government offices.

Thailand

The Digital Government Development Agency (DGA)[44] advances the country's digital government implementation efforts. The DGA Digital Roadmap[45] was a two-year roadmap from 2018-2020 to promote digital government transformation in Thailand. These included government data exchange, one-stop services, government data centres, open government data, unified government communications, secure government intranet and digital transformation programmes.
Initiatives include:

- Thailand's e-government portal serves as a central information hub for the public to gain access to public services;
- The DGA has also developed the CITIZENinfo application to support searches on state agencies at 8,000 locations nationwide and provides access to the necessary forms for citizens conducting business with those state agencies; and

- The Thailand Government Information Exchange is a central database of government agencies intended to reduce documentation, improve efficiency by eliminating redundancy and promote the use of Digital ID.[46]

Vietnam

Vietnam's "National Digital Transformation Programme by 2025, with an orientation towards 2030" includes clear targets for e-government, such as the digitalisation of public services, public records and process. The Programme reflects the leapfrogging of digital technology experienced by the Vietnamese population, explicitly stating accessibility to services via mobile phone, rather than merely "online."[47] Initiatives include:

- Vietnam began its digital identity programme with a national population database, with a focus on launching e-identification and e-authentication.[48] The e-identification app VNEID was launched in August 2022;[49] and
- E-Cabinet streamlines government business processes across all departments.[50]

1.3 Common priorities to advance SEA-6 digital economy objectives

Governments across SEA-6 shared six common priorities in order to achieve the broad objectives of digitalising MSMEs, key industry sectors and government:

1. Developing digital infrastructure
2. Building digital literacy
3. Growing digital talent
4. Fostering trust in the digital ecosystem
5. Encouraging innovation and entrepreneurship
6. Strengthening regional cooperation

1.3.1 Common priority 1: Connectivity for equitable access

The COVID-19 pandemic revealed substantial gaps in many countries' digital infrastructure, highlighting the significance of digital connectivity as the baseline enabler for participation in the digital economy. Common goals to enhance these initiatives include rolling out high-quality broadband for nationwide coverage, improving affordability of broadband subscription, and providing mobile services in all villages, communities and tourist attractions. Here are a few examples of how governments in SEA-6 have invested in their physical and digital infrastructure:

Indonesia

- Construction of Base Transceiver Station (BTS) towers in 1,682 Indonesian urban villages. These towers are located in communities with limited cellular communications services;
- The deployment of High Throughput Multifunction Satellite (SATRIA-1) with a capacity of 150 GBPS provides internet access to 150,000 public facilities; and
- A telecommunications monitoring centre has been developed to oversee quality of experience (QoE) and quality of service (QoS).

Malaysia

- Building digital infrastructures as identified in the Jalinan Digital Negara (JENDELA) Plan, which was previously called the National Fiberisation and Connectivity Plan 2019-2023 (NFCP).[51]

Philippines

- The completion of Phase 1 of the National Broadband Plan (NBP) 2017 initiative is aimed at providing faster, more efficient and equitable broadband connectivity for the Philippines, including its remote areas. Currently with a completion rate of 73%, Phase 1 involves activating 28 nodes of the national fibre backbone located in 12 provinces between the cities of Laoag and Quezon. It is expected to serve the public by mid-2023;
- Advancing the Open Access in Internet Services Act to promote fair and open competition by lowering barriers to entry for the telecommunications industry to reduce the cost of internet services; and

- The e-Commerce Philippines Roadmap 2022 aims to speed up and broaden internet transactions by improving digital infrastructure.

Thailand

- In 2017, Thailand launched the Village Broadband Internet Project, or Net Pracharat (Net for the People). Since then, high-speed fibre-optic cable networks with free public Wi-Fi hotspots have been installed in 24,700 pilot villages around Thailand, expanding the reach of high-speed Internet services to the most remote places; and
- The National 5G Steering Committee established guidelines to encourage investment and usage of 5G technology in Thailand.

Vietnam

- Vietnam's 2021-2030 Socio-Economic Development Strategy identified comprehensive infrastructure development as a strategic goal, while the National Digital Transformation Programme focuses on strengthening digital infrastructure to offer all citizens high-speed internet connection at a low cost; and
- Resolution No. 52-NQ/TW (27/9/2019) aims to capitalise on the opportunities presented by the Fourth Industrial Revolution by undertaking various measures, which includes the development of technological infrastructure, and promoting the adoption of new technologies and innovative business models to support the growth of Vietnam's digital economy.

1.3.2 Common priority 2: Digital literacy for inclusive adoption

Governments recognise that although access is necessary but it is still insufficient. Digital literacy and adaptive ICT skills are vital for equitable and inclusive digital adoption, especially for populations that continue to struggle with digital inclusion such as the elderly, people with disabilities, people living in the rural areas and citizens who are less fortunate in society. Some government-led initiatives include:

Indonesia

- The Siberkreasi National Movement for Digital Literacy, which aims to accelerate digital literacy development by focusing on digital ethics, digital culture, digital skills, and digital safety. This initiative is a multi-stakeholder programme with institutional partners from the private sector, government, civil society, media and academic institutions.

Malaysia

- The Saya Digital initiative drives awareness of digital technology and encourages use of digital technology in everyday life;
- eRezeki helps urban B40 (bottom 40% income earners) and M40 (middle 40% income earners) families, non-income groups, senior citizens and youth to earn additional income from digital platforms;
- Gig workers can learn digital skills with the "GigUp" programme; and
- The Malaysian government encourages citizens to volunteer their time in digital training through the "My Ikrar" programme.

Philippines

- The Department of Education (DepEd) of the Philippines established the Digital Rise Programme to promote digital education by integrating technology into school curriculums and providing training for teachers.

Singapore

- Singapore's government started the Digital for Life (DfL) movement to engage citizens in digital literacy and to consider it as a lifelong learning opportunity. The Ministry of Communications and Information (MCI) and IMDA are partnering with the private and civil sectors to co-create opportunities in developing digital skills; and
- The Libraries and Archives Blueprint 2025 (LAB25), implemented by the National Library Board (NLB), seeks to promote lifelong learning and mastery of digital skills through immersive and interactive programmes.

Thailand

- The Ministry of Digital Economy and Society aims to train four million people in digital literacy through its Net Pracharat course.

Vietnam

- Resolution No. 52-NQ/TW (27/9/2019), Decision No. 392/QĐ-TTg (27/3/2015), Resolution No. 23-NQ/TW (22/3/2018), Decision No. 99/QĐ-TTg (14/01/2014), and Decision No. 21/QĐ-TTg (06/01/2021) identify digital training for the workforce as an enabler for Vietnam to actively participate in the Industrial Revolution 4.0 and to develop its digital economy;
- In 2017, the Directive No. 16/CT-TTg called for improvements in training and education in STEM and information technology in the national curriculum and vocational schools; and
- The Decision No. 749/QĐ-TTg (2020) highlighted the importance of affordable and accessible digital training.

1.3.3 Common priority 3: A digital workforce and talent for the digital economy

Governments across SEA-6 emphasised reskilling and upskilling the population to develop the workforce necessary for continued digital economy growth. Here are a few examples of such initiatives:

Indonesia

- Indonesia's Ministry of Communications and Information Technology collaborates with other government agencies to launch initiatives that offer digital literacy and digital skills training, such as the Digital Talent Scholarship programme to increase capabilities and competitiveness of human resources in the ICT field.

Malaysia

- #MyDigitalWorkForce Movement is a collaboration between public and private sectors for digital upskilling to support retrenched workers in adapting and finding new jobs in the digital economy.

Singapore

- The IMDA offers the Company-Led Training programme (CLT) to accelerate the professional development of tertiary graduates and mid-career professionals through an on-the-job training programme, in partnership with technology companies to help workers achieve competencies for jobs in demand by industry. The CLT programme aligns to the country's Skills Framework for ICT. Key areas of expertise include AI, Cybersecurity, Internet of Things, Data Analytics and Blockchain.

Thailand

- The Digital Talent Development programme by the Digital Economy Promotion Agency (DEPA) offers training and certification in key digital skills such as data analytics, digital marketing and software development. DEPA also partners with universities and vocational schools to develop digital curriculum and provide training to students and professionals.

Vietnam

- Decree No. 36-NQ/TW prioritises funding for digital training programmes for workers in the digital sector, and calls for welfare policy modification for officials and workers in the information technology sector to attract higher retention rates;
- The Decree No. 26/NQ-CP and Decree No. 36-NQ/TW urges the development of a strong digital workforce to meet the requirement for sustainable growth and international integration. These policies also aim to provide welfare benefits to officials in the IT department of the government;
- Decree No. 41/NQ-CP recognises the need for tax regulations to support a range of incentives and aid in developing the information technology sector;

- Decision No. 99/QĐ-TTg (14/01/2014) focuses on improving the national capacity for security and safety through various measures. These include developing and training of human resources for information safety and security, enhancing the capacity and quality of training and research of crucial security training institutions and providing short-term training opportunities abroad for security officers. Moreover, it aims to build a number of key training institutions featuring international lecturers and researchers, advanced content for training programmes and modern equipment for teaching, learning and research; and
- The Decision No. 21/QĐ-TTg (06/01/2021) places an emphasis on training and expanding information security staff members, which plays a vital role in realising Vietnam's objective of becoming a global information security powerhouse. This effort contributes to the effective implementation of the National Digital Transformation Programme. Furthermore, this programme aligns with the advancement of e-Government, propelling Vietnam towards a digital government, digital economy and society.

1.3.4 Common priority 4: Fostering trust in the digital ecosystem

Risk and challenges have emerged from the rapid growth of the digital economy, including irresponsible collection and management of personal data, concerns around AI ethics, fraud and scams, identity thefts, and cyberthreats. Collectively, these undermine the confidence and trust of the digital ecosystem. SEA-6 governments are working to make the digital ecosystem safer and more trustworthy through data governance, cybersecurity and data privacy. Below are a few of the initiatives SEA-6 government have made:

Indonesia

- The Personal Data Protection Act legislation in 2022 aims to guarantee the privacy rights of Indonesian citizens while encouraging growth of the digital economy and communications technology sector;[52] and
- The government has updated cybersecurity rules and regulations for the financial sector, including banks and other financial services providers. Now, regulations require risk assessments, risk management, data protection, incident response planning and employee capacity development programmes.

Malaysia

- Malaysia's Personal Data Protection Act was passed in 2010;
- The Malaysia Cybersecurity Strategy 2020-2024 seeks to enhance national security and protect businesses through five main pillars, namely Effective Governance and Management, Strengthened Legislative Framework and Enforcement, Innovation, Capacity and Capability Building, and Global Collaboration;[53] and
- The 4IR Policy highlights the importance of an agile regulatory framework, approach and governance to build trust and a conducive environment for innovation.

Philippines

- The Philippine National Development Plan (PDP) includes a section on building a high-trust society (Malasakit). More specifically, Chapter 5 of the PDP focuses on ensuring responsive, people-centred, technology enabled and clean governance; and

- The Data Privacy Act of 2012 (RA 10173) aims to protect personal data while aligning the country to international standards.[54]

Singapore

- The Ministry of Communications and Information (MCI) developed new codes of practice that set baseline standards to create a safer online environment. These standards include:
    - Child safety: to protect the young population from harmful content and information;
    - User reporting: to create a responsive mechanism and feedback loop where users can identify and report harmful content, and for platforms to respond and act on user reports; and
    - Platform accountability: to promote transparency on how online platforms are handling cases.[55]
- The Cybersecurity Act is the legal framework for the oversight and maintenance of national cybersecurity;[56]
- The Personal Data Protection Act was amended in 2020 to strengthen data protection, including increasing the maximum financial penalties for data breaches;[57] and
- The Cyber Security Agency of Singapore's Cyber Trust Mark and Cyber Essentials Mark recognise businesses with good cybersecurity practices, with the aim of building public confidence.[58]

Thailand

- Digital Thailand[59] is a strategic plan that aims to leverage digital technology to bolster sustainable growth in both the economy and society. Strategy 6 of the blueprint aims to cultivate trust and confidence in the use of digital technology through various key initiatives. These include updating and issuing laws relevant to digital security and data piracy, such as the personal data protection law, and establishing the ASEAN-Japan Cybersecurity Capacity Building Centre;
- Thailand's Personal Data Protection Act sets standards for personal data protection and is modelled by the EU's General Data Protection Regulation to make equitable standards; and
- The Cybersecurity Act aims to govern cybersecurity activities to prevent and combat threats.

Vietnam

- The National Cybersecurity and Safety Strategy is designed to protect the national cyber infrastructure and focus on protecting information systems;
- The Decree No. 53/2022/ND-CP includes guidelines for critical information systems combating illegal online activities and provisions on data localisation; and
- Decree No. 13/2023/ND-CP, or the Decree on Personal Data Protection, addresses data collection, processing and storage takes effect on July 1, 2023.

1.3.5 Common priority 5: Encouraging innovation and entrepreneurship

Southeast Asia thrives as a vibrant region for entrepreneurs, startups and innovation.[60] Moreover, governments in the region have invested in supporting the expansion of digital startups and other high-growth enterprises.

Indonesia

- The Indonesian Chamber of Commerce and Industry created KADIN CIPTA, a platform that provides data, information and analysis for ecosystem facilitation by the Chamber and with other government agencies; and
- Several programmes, such as the 1000 Digital Startup Movement and the 2019 National E-Commerce Roadmap (currently being updated), are developed to strengthen the digital ecosystem.

Malaysia

- The Digital Free Trade Zone initiative eases access to cross-border infrastructure, remove complex trade regulations and processes, and foster knowledge-sharing for businesses;
- Port Klang Net is a platform to enable stakeholders across the logistics value chain to communicate in real-time;
- The MATRADE Digital Trade Platform (MDTP) enables Malaysian exporters to pivot into the digital space. Along with sustainability, digitalisation is an important export agenda item;[61] and
- The establishment of the multi-stakeholder platform, MyDigital Alliance Leadership Council, encourages innovative People-Private-Public Partnerships for the development of transformative cloud-first and digital-native policy recommendations, with the goal of advancing Malaysia's digital economy.

Philippines

- The Republic Act (RA) 8792 (Electronic Commerce Act of 2000) promotes electronic transactions and creates a safe environment for online merchants and consumers;
- The 'E-Commerce Philippine Roadmap 2022 aims to accelerate and broaden internet transactions by improving the digital infrastructure;
- The Inclusive, Innovation and Industrialisation Strategy focuses on attracting investments and making the Philippines a future hub in the global and regional production network of multinational companies;
- The Republic Act 11337 (also known as the Innovative Startup Act) intends to foster an entrepreneurial culture in the Philippines by encouraging innovative new businesses through incentives and removal of developmental constraints; and
- The Republic Act 11293 (also known as the Philippine Innovation Act) serves as a roadmap for innovation objectives. It is expected to scale up action in all areas of education, training, research and development, and internationalisation activities as a driver of sustainable and inclusive growth.

Singapore

- The Research, Innovation and Enterprise 2025 Plan intends to develop the country's science and technology capabilities for a stronger post-pandemic economy;
- The Digital Government Blueprint highlights the need to align research and development (R&D) activities towards Singapore's digital government efforts, including the research facilitation to address current government needs and sowing the seeds of future digital capabilities through R&D in research institutions;
- The Open Innovation Platform (OIP) which is a virtual crowd-sourcing platform that aims to connect startups, companies and research institutes to solve real business challenges and develop innovative solutions; and
- AI Singapore is a nationwide programme that aims to foster collaboration between research institutions and AI-driven DECs in Singapore, facilitating innovation and governance of the country's AI efforts.

Thailand

- The Thailand Digital Economy and Society Development Plan seeks to provide support mechanisms for 1,500 digital startups annually with ready-to-commercialise prototypes, coach 15,000 startups to trade online, build at least 10,000 online community stores through digital community centres and pilot the development of smart farms for organic product traceability (e.g. rice, vegetables and fruits); and
- The Higher Education, Science, Research and Innovation Policy and Strategy (2020-2027) comprises four platforms that advance the process of implementation. These four platforms are: 1) manpower and knowledge; 2) research, development and innovation for grand challenges; 3) research, development and innovation for competitiveness; and 4) research and development for area-based development and inclusiveness.

Vietnam

- The government passed Decision No. 1813 (1813/QĐ-TTg) to promote digital payments and e-commerce. It also encourages cashless payments between 2021 to 2025.

1.3.6 Common Priority 6: Regional Integration

For the digital economy to promote economic growth and create job opportunities, SEA-6 governments generally recognised the importance of improving the region's competitiveness in the global marketplace. ASEAN frameworks promote regional digital connectivity to enable the smooth flow of data, goods and services.

Broader trade deals such as the Regional Comprehensive Economic Partnership supports Southeast Asia's digital economy through ICT-related trade facilitation, cross-border data flows, digital commerce, consumer data production and cybersecurity.[62]

Table 1: Key ASEAN Initiatives for Digital Alignment and Integration

Digital Economy Pillar	ASEAN Initiatives
Comprehensive	• Bandar Seri Begawan Roadmap
Digital Infrastructure	• ASEAN Agreement on Electronic Commerce
E-Commerce	• ASEAN Agreement on Electronic Commerce • RCEP (Chapter 12 covers three principles of e-commerce provisions, namely (1) data free flow, (2) prohibiting requirements for data localization, and (3) prohibiting requirements for source codes) • Digital Economy Framework Agreement - in discussions
Data Protection	• ASEAN Framework on Personal Data Protection • Digital Economy Framework Agreement - in discussions
Cybersecurity	• ASEAN Cybersecurity Cooperation Strategy • Digital Economy Framework Agreement - in discussions
Entrepreneurship	• ASEAN Framework for Promoting the Growth of Digital Startups
Cross-border Data Flows	• ASEAN Data Management Framework and Model Contractual Clauses • Digital Economy Framework Agreement - in discussions
Artificial Intelligence	• ASEAN Guidelines on AI Ethics and Governance - in discussions

Note: List not exhaustive.
Tech for Good Institute (TFGI) complitation.

The adoption of the Consolidated Strategy on the Fourth Industrial Revolution (4IR) for ASEAN[63] during the 38th and 39th ASEAN Summits, and the ASEAN Agreement on Electronic Commerce formed the basis for the region's push for digital transformation through encouraging private investment in digital infrastructure development (5G networks and data centres), cloud computing, cybersecurity, artificial intelligence and smart manufacturing. The Bandar Seri Begawan Roadmap, endorsed in 2021, identified priority action areas to realise a an ASEAN-wide digital economy. The Roadmap has paved the way for current discussions for an ASEAN Digital Economy Framework Agreement to establish trade rules and lower operating barriers to entry by 2025.[64]

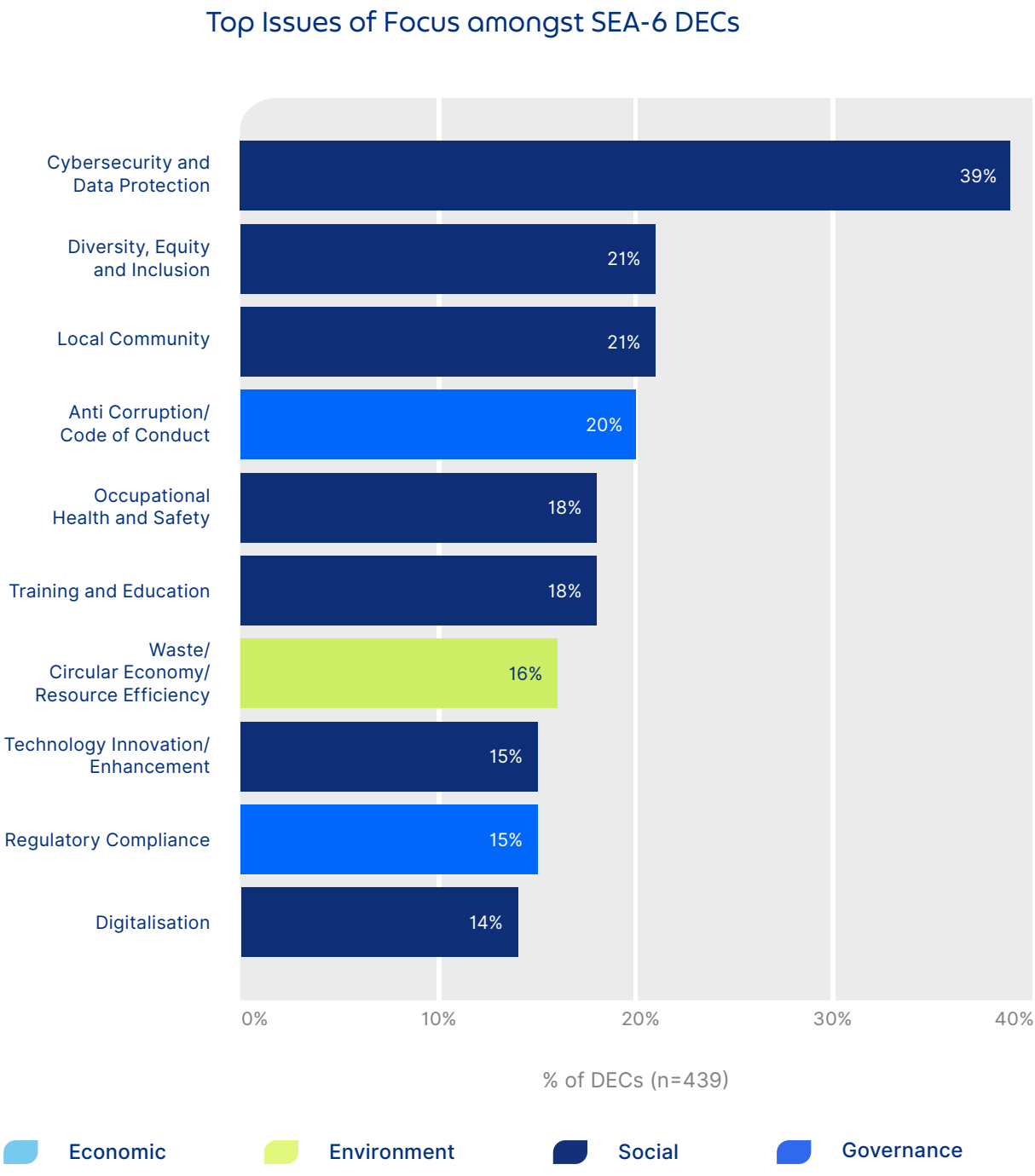
2. Potential of Digital Economy Companies and Technologies

In addition to government efforts, DECs play a significant role in driving the digital economy and shaping digital society in SEA-6. DECs and their investors have recognised market opportunities in SEA-6's mobile-native, young and ambitious populations, as well as addressing business opportunities within local development needs for mutually beneficial outcomes. Digital solutions, for example, have been employed to resolve urbanisation challenges, such as traffic congestion, water and air quality, energy demand, and the health and wellbeing of the community.[65] The scale, ubiquity and integration of DECs' products and services in the economy and society mean that it has the potential to significantly influence the direction of SEA-6's digital economy and society.

2.1 Current priorities of Digital Economy Companies in SEA-6

While DECs possess the potential to endorse equitable and sustainable development in the region, many are currently focusing on more immediate concerns. A 2022/23 study of 439 DECs in SEA-6 with the Tech for Good Institute and Centre for Governance and Sustainability of NUS Business School found that top issues of focus for DECs are cybersecurity and data protection, and diversity, equity and inclusion.[66] These issues directly relate to risk mitigation, maintaining a licence to operate and employee concerns, respectively. Despite the digital economy's significant carbon footprint and Southeast Asia's vulnerabilities to climate-related disasters, climate change or carbon was not identified as a high priority among the analysed DECs.

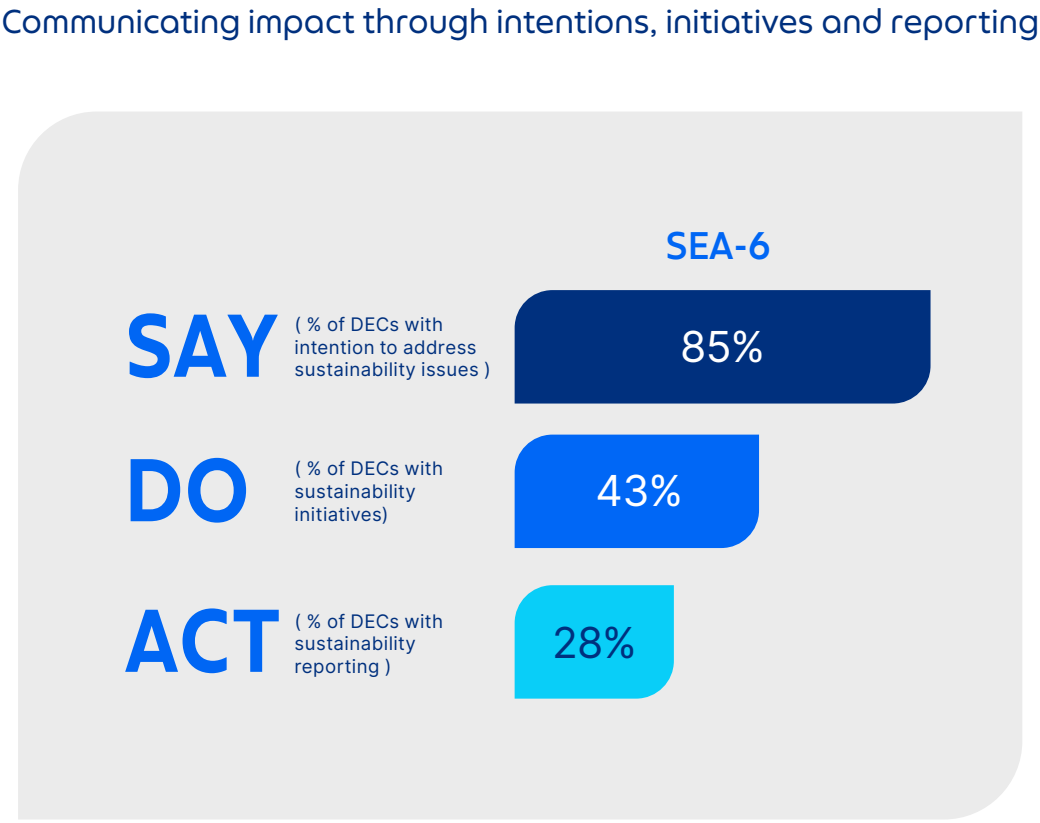
Figure 5: Current non-financial areas of concern for DECs



Source: Tech for Good Institute and NUS Centre for Governance and Sustainability, 2023

DECs are aware of the need to mitigate negative impact and expectations to demonstrate positive impact. 85% expressed intention towards sustainability and impact, largely through its websites or other corporate channels. However, less than half (43%) actually implemented initiatives to put these intentions into action and only 28% reported on their non-financial impact through annual reports or standalone sustainability reports, with clear targets and evidence on its progress to achieve them.

Figure 6: Significant opportunity to align intention with action for impact



Source: Tech for Good Institute and NUS Centre for Governance and Sustainability, 2023

2.2 How technology may support more than economic growth

This “Say-Do-Act” funnel suggests that many DECs have yet to recognise impact as an **investment** narrative, to **integrate** environmental, social or governance issues into its business models, products or services, or to **institutionalise** it as organisational practice.

This could be attributed, in part, to the vague and imprecise understanding of how technology can effectively contribute to sustainable growth.

Figure 7: Roundtable comments from tech ecosystem stakeholders across SEA-6 (January-March 2023)

A common definition of “Tech for Good” proves elusive

Participants in this study articulated many ways in which technology should and could contribute to sustainable growth.

> *DECs must develop products that do no harm by default.*
> **Indonesia**

> *“Tech for good” would lead to an inclusive digital society with a proactive and tech-enabled government.*
> **The Philippines**

> *Sustainable development should be a core pillar of the digital economy. DECs should adopt green technologies and sustainable business models. For instance, data centers can investigate off-grid energy solutions to lessen their carbon footprint. The government can also incentivize DECs to access and pilot green technologies.*
> **Malaysia**

> *Doing good for society involves more than just complying with existing rules and regulations. Compliance regulations establish the minimum standards to which DECs must adhere, in order to maintain their licence to operate. DECs should differentiate between compliance and social impact for the betterment of society. This will enable DECs to reach their full potential in contributing to society.*
> **Singapore**

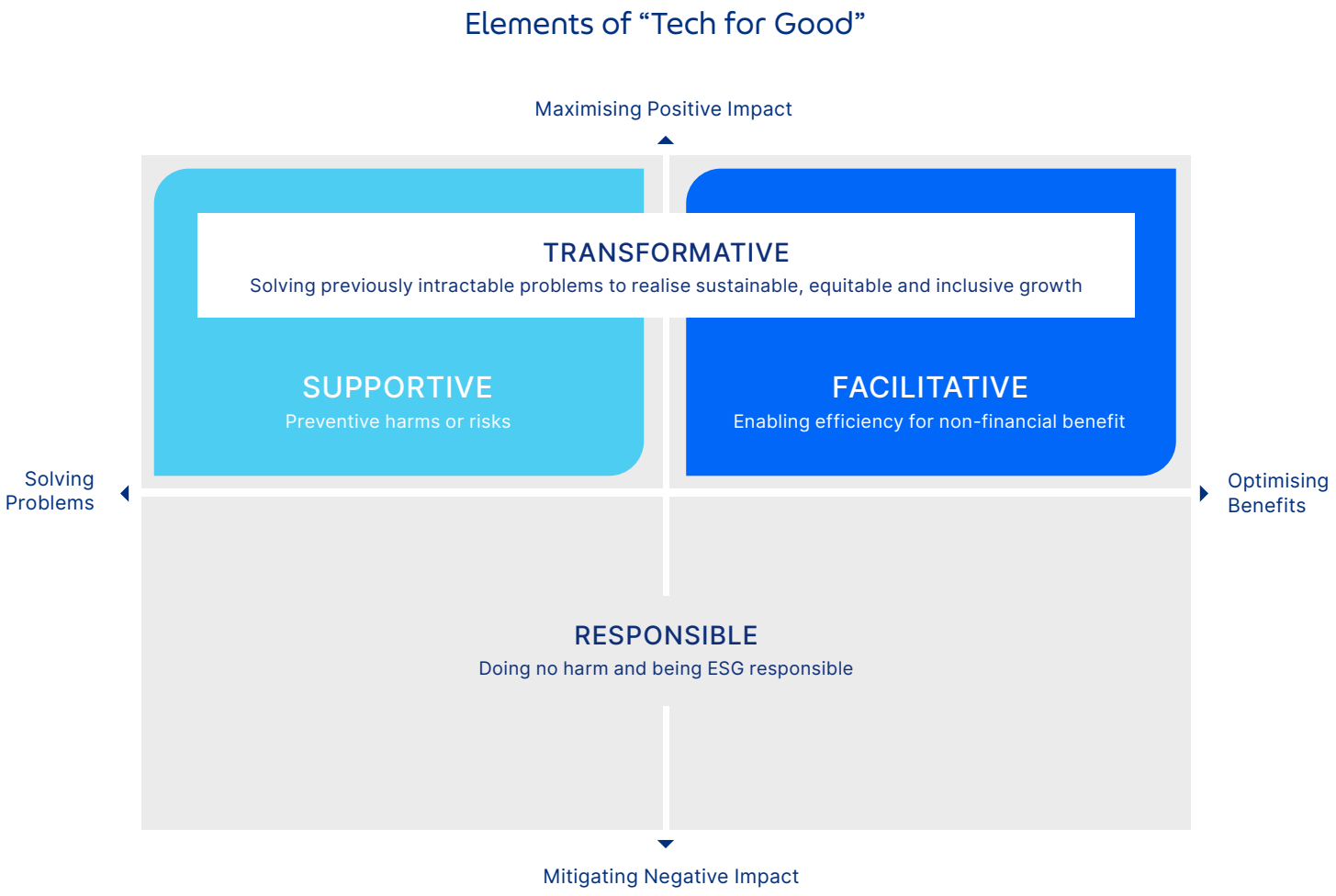
> *“Tech for Good” addresses national challenges. For example, as the population ages, tech can ensure that Thai seniors remain active contributors of the economy through digital platforms.*
> **Thailand**

> *Currently, DECs in Vietnam appear focused on growth and scaling their businesses. A good outcome for Vietnam is to have DECs that are more mindful of their carbon emissions and footprint.*
> **Vietnam**

Source: Tech for Good Institute, 2023

The different interpretations of technology's promise may be visually represented as in Figure 8. Responses varied largely along two key dimensions: whether the use of technology adequately mitigates its own negative impact and maximises its positive impact (vertical axis), and how technology adds value to society either by solving problems or optimising benefits (horizontal axis). There are at least four ways in which "Tech for Good" may be realised by examining different expectations regarding what DECs are expected to deliver.

Figure 8: Different types of Impact with Tech for Good



Source: Tech for Good Institute, 2023

2.2.1 Responsible Tech

One view was that "Tech for Good" should simply signify being **Responsible,** i.e. avoiding harmful outcomes with whatever is necessary to maintain the licence to operate. This view calls on DECs to refrain from abusing power, adhere to existing regulations, use AI responsibly, act fairly and transparently, and reduce their carbon footprint. Responsible DECs should conduct internal assessments to examine its systems, processes, products and services to actively identify and mitigate any potential negative impact to society or the environment. In particular, roundtable participants highlighted the digital economy's carbon footprint, and the need to ensure that inclusion, security and data protection are part of the fundamental design of digital products and services.

2.2.2 Supportive Tech

Many roundtable participants emphasised that "Tech for Good" should go beyond "do no harm." Actively preventing harm is one way of producing positive outcomes for the economy, society and the environment. In line with this perspective, "Tech for Good" could have a **Supportive** function, using data and predictive modelling to detect, mitigate, thwart or neutralise harms. Supportive technologies include identifying systemic vulnerabilities in cybersecurity infrastructure and taking pre-emptive measures to mitigate threats, predicting failures, combating fraud, fostering trust through privacy-enhancing technologies, facilitating detection of misinformation, enhancing weather monitoring and improving disaster risk readiness and response, among other applications.

2.2.3 Facilitative Tech

"Tech for Good" can also have a **Facilitative** function by enhancing productivity and efficiency. Digital technologies can be leveraged to support decision-making, automation for repetitive tasks to reduce manual labour and minimise errors, and communications that facilitate cross-border collaboration in real-time. Digitalisation has played a role to streamline processes, improve convenience and optimise use of resources.

Examples of facilitative tech include the deployment of e-government solutions to deliver government services, platforms that match supply and demand for services, and automating routine tasks.

2.2.4 Transformative Tech

In common parlance, "Tech for Good" is most often associated with **Transformative** impact, in which complex or intractable problems are solved at scale. One sector that has experienced such radical and disruptive approaches is the financial services sector. MSMEs have historically faced challenges to access financing due to physical inaccessibility, lack of formal documentation and insufficient collateral to secure credit. Today, digital financial services can develop credit risk models to provide financing options for MSMEs with any collateral, opening new avenues and opportunities for MSMEs.

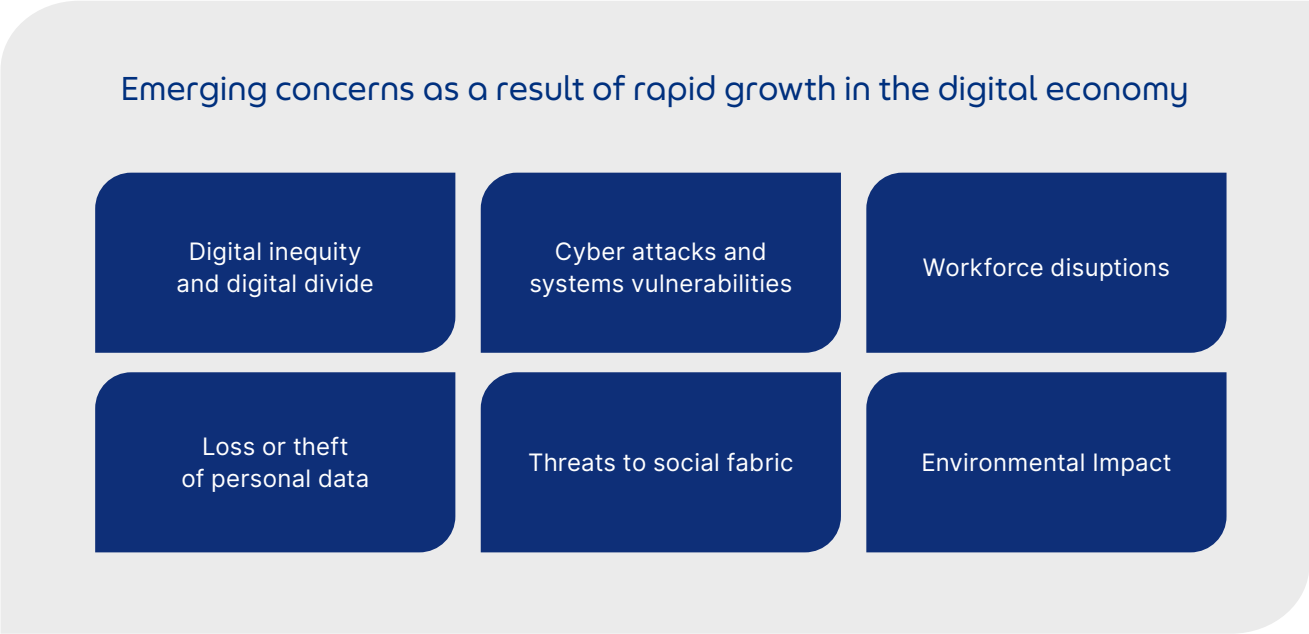
Instead, the framework illustrates the range of ways in which DECs may deliver positive impact beyond economic growth. Of course, these perspectives of "Tech for Good" are not mutually exclusive. For example, supportive, facilitative, and transformative tech should also be responsible in the first place.

3.
Shaping the Next Phase of Growth for Southeast Asia

While rapid digitalisation has produced economic and social benefits for many, it is increasingly evident that growth cannot be pursued at all costs. The consequences of growth in the digital economy must be managed in a more proactive manner to ensure an inclusive, equitable and sustainable future for all. Roundtable participants highlighted six key concerns over the rapid development of the digital economy in SEA-6:

1. Digital inequity and digital divide
2. Cybersecurity and vulnerability of digital systems
3. Workforce disruptions
4. Data protection
5. Threats to social fabric
6. Environmental impact

Figure 9: Key concerns over the rapid growth in the digital economy in SEA-6



Source: Collated by Tech for Good Institute (TFGI)

Digital inequity and the digital divide

Although the digital economy has created new opportunities, there is a "digital paradox" risk, where a shift to digital widens rather than reduces social and economic gaps between those adopting digital technology and those who have not.[67] Benefits of the digital economy accrue to those with access, skills and resources. Unchecked, rapid digitalisation will reinforce inequalities within societies, and between mature and less mature economies. Ensuring equitable digital access for all demographics will be a significant challenge for many countries.

Cybersecurity and vulnerability of digital systems

The growing integration and dependence on technology have resulted in a rise of cybersecurity threats for public and commercial systems. Cybercrimes significantly diminish profits while hindering continued investment and growth in the regional digital economy.[68] As an old adage goes, it is only a matter of "when" and not "if" a cyber-attack happens to a government, organisation or individual. Southeast Asia is not spared from cyberattacks. The United Nations Office on Drugs and Crime noted a 600% increase in cyberattacks in the region in 2021,[69] with countries feeling the rising costs of hacks. The average cost of a data breach in the region in 2020 was US$2.71 million per organisation, an increase from US$2.62 million in 2019.[70]

In addition, continued threats posed by cyber criminals would erode trust in the digital system.[71] If citizens and consumers are not confident that their data, money or digital assets are safe, adoption of digital technologies will slow dramatically, affecting online transactions from e-commerce to digital payments, as well as e-government services.

Workforce disruptions

The digital transformation of industries often includes automating systems and tasks, to achieve optimal or even improved results. Job redefinition and displacement is likely, as seen in manufacturing, retail and transportation. Furthermore, the rise of digital has facilitated innovative forms of productive work, such as in the sharing and gig economies. These new work models do not conform to traditional employment structures, thus necessitating a reassessment of social protection and labor laws.

Data protection

Our increased dependency on digital technologies has resulted in the vast amounts of personal data collected by companies and governments. While this data holds significant value, its true worth is often not realised at the point of data transaction. The collection, storage and processing of personal data by multiple entities have given rise to concerns that data owners lack adequate control over their data, or that personal information could be used for unauthorised purposes, such as identity theft, fraud or surveillance.

Data protection concerns are continually evolving, even as regulators strive to establish and implement regulations and practices that safeguard individuals and their data. In SEA-6, data protection regulations exist but are not yet aligned in substance or practice, raising concerns over the transfer of personal data across borders.

Threats to social fabric

In 2021, internet users in SEA surpassed the global average of spending time online by almost seven hours, with the Philippines taking the top spot, spending close to 11 hours a day online. Meanwhile, Malaysia, Indonesia and Thailand were ranked within the top 10 most active Internet users in the world.[73]

Roundtable participants raised many concerns linked with this phenomenon. Social media platforms have become fertile grounds for disinformation and misinformation, fueled by the manipulation of micro and nano-influencers, alternative news and closed groups.

Due to social media algorithms prioritising content that generates reactions, users tend to find themselves trapped in filter bubbles, where they are increasingly exposed to content that reinforces their existing beliefs and perspectives. This dynamic leads to heightened polarisation and the formation of echo chambers, making it easier for misinformation and fake news to spread quickly and extensively, often leading to confusion, anxiety and division in society and even influencing the outcome of elections.[74]

Concerns were also raised about the role of foreign actors in manipulating public opinion. In early 2022, Russian narratives on the war in Ukraine were commonly found on social media within the domain spaces of Singapore and the Philippines.[75] The issue has prompted ASEAN governments to mainstream misinformation and disinformation as integral components of regional security concerns, as the persisting fake news landscape has drastically impacted internal affairs. The threat of externally-influenced disinformation and misinformation campaigns poses an even greater threat to ASEAN's digital sphere and social fabric.[76]

Environmental impact

The rapid expansion of the digital economy across SEA-6 has had consequential environmental impact. While the development of the digital economy significantly reduces the carbon emission intensity, it has been found to increase per capita carbon emissions.[77]

Southeast Asia faces a twofold challenge — promoting sustainable development, while grappling with the effects of climate change caused by previous decades of emissions by advanced economies. Today, SEA is highly susceptible to climate disasters. As ambitious development plans unfold, energy-related emissions in Southeast Asia are projected to more than double by 2030,[78] emphasising the crucial role of energy in driving these plans forward.

The digital economy requires substantial amounts of energy to power data centres, servers and devices. As the digital economy scales, emissions from transport, food delivery and e-commerce alone are projected to reach some 20 metric tons of carbon dioxide by 2030, based on Scope 3 emissions.[79] Despite data centres being a large source of carbon emissions for all DECs, only a mere 28% of data centres in the Asia-Pacific possess access to essential energy efficiency metrics.[80]

Governments are taking steps to address this issue, but not in a coordinated way. For instance, Singapore issued a moratorium on new data centres in 2019 and has been refining standards for Green Data Centres, with the latest version issued in 2023.[81] This new standard defines a framework for systems, processes and performance metrics.

Beyond energy and carbon emissions, data centres require vast amounts of water for cooling, putting stress into the ecosystems and supply. The development of data centres and digital infrastructure requires land, which could lead to displacement, deforestation and habitat loss, thereby affecting biodiversity. Furthermore, the manufacturing and disposal of electronics contribute to the growing issue of e-waste.

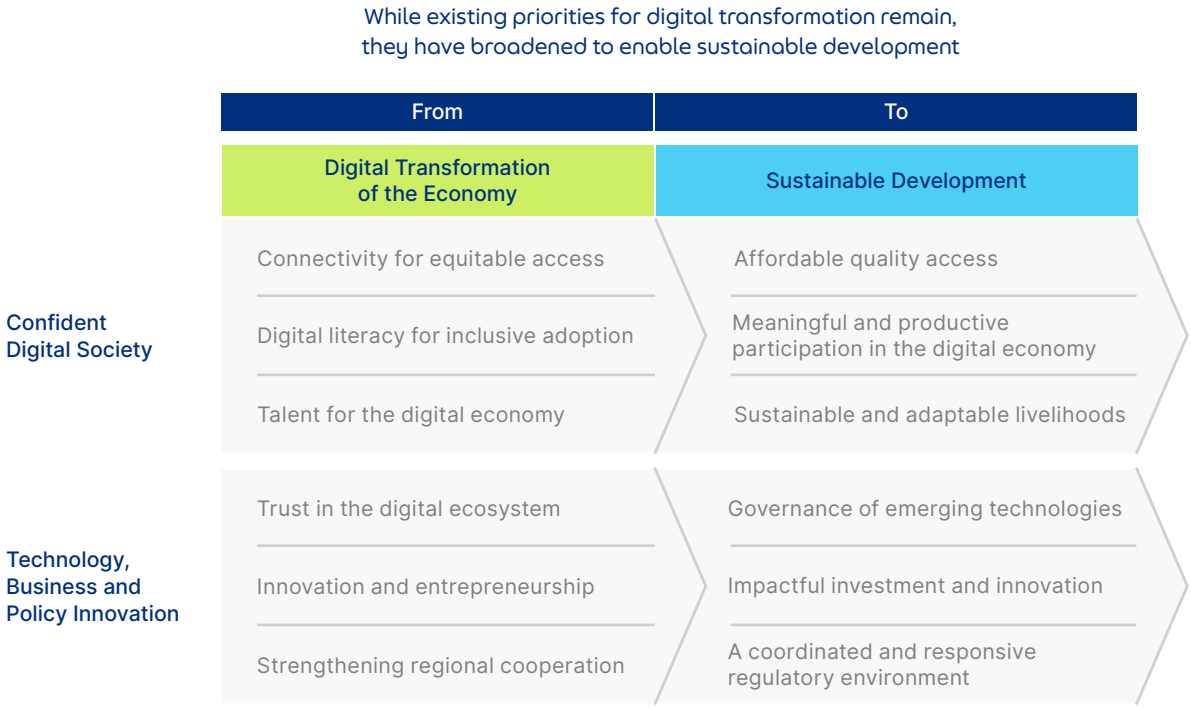
3.1 From “Tech for Growth” to “Tech for Good”

To shape an inclusive, sustainable and equitable future for Southeast Asia, it is essential for DECs and governments to navigate these challenges while fostering innovation that ensures inclusive benefits from the digital economy. Merely relying on economic growth metrics alone are no longer sufficient. The concept of “good” includes other measures that point towards sustainable growth to advance an inclusive and thriving digital society within a vibrant innovation ecosystem. It is therefore timely to reframe current targets set at the national and regional levels to better align with the vision of advancing high quality growth that facilitates sustainable, inclusive and equitable transformation for the economy and society.

This next phase builds on the hard work of governments, DECs and stakeholders to date. Key enablers are needed to focus digital transformation towards a more sustainable transformation of both the economy and society. While existing priorities for digital transformation remain, the desired outcomes encompass broader objectives:

1. Affordable quality access
2. Meaningful and productive participation in the digital economy
3. Sustainable and adaptive livelihoods through the digital economy
4. Trust and confidence in emerging technologies
5. Impactful investment and innovation
6. A coordinated and responsive regulatory environment, nationally and regionally

Figure 10: Broadened Outcomes and Priorities for Digital Transformation and Innovation



Source: Tech for Good Institute, 2023

3.2 A shared outcome: Realising sustainable digital development for quality growth

Solely focusing on growth of the digital economy is not enough. Growth must serve a broader objective of achieving sustainable, inclusive and equitable transformation of both the economy and society. Digital technologies and the associated business models have the potential to facilitate these goals, but the need to mitigate the risk for negative disruption is also very real. By committing to sustainable digital development, SEA-6 can achieve a climate-resilient and inclusive prosperity while protecting citizens and maintaining national autonomy.

Governments and DECs are in a unique position to cooperate to make sustainable digital development a reality. Malaysia's Digital Economy Blueprint, previously mentioned, explicitly recognises the contribution of the digital economy to Malaysia's overall economic growth. In Vietnam, there is a growing emphasis on the environmental and social responsibilities of DECs, not only to mitigate negative consequences, but to also attract impact investment into the country.

DECs can ensure a safe, just and fair digital economy through responsible operations, while addressing and mitigating environmental pressures of growth. By adopting facilitative, supportive and even transformative solutions, DECs can prevent harm, maximise benefits and develop new approaches to solve the most pressing issues in SEA-6.

Digital startups, with its agility and proximity to the target markets, are uniquely placed to spur fit-for-purpose innovation and are well placed to address social and environmental challenges in SEA-6 while simultaneously creating economic value.

3.3 Enablers for sustainable digital development

For a growing digital economy to enable sustainable digital development and quality growth, two broad enablers and six sub-enablers were identified in the roundtables.

3.3.1 A confident digital society

A confident digital society gives equal access and opportunities for all individuals to participate and benefit from both the digital economy and society. Sustainable digital development builds on current national priorities for:

- Affordable quality access
- Meaningful and productive participation in the digital economy
- Resilient and flexible livelihoods through the digital economy

From connectivity for equitable access, to affordable quality access

A robust and resilient digital infrastructure is the foundation of a confident digital society. It provides reliable, affordable and quality access to digital services and content, even in remote or underserved areas.

Quality digital connectivity is increasingly crucial for active participation in both the economy and society, as seen during the COVID-19 pandemic. The lack of access impacted citizens beyond the commercial domain, including education, healthcare and public information.[82] Recognising its importance, Malaysia classified communication services as a public utility in 2021, alongside water and electricity.[83]

Although the lack of digital reach to remote and isolated communities remains a concern, efforts are underway across SEA-6 to bridge connectivity gaps caused by geography, cost or circumstantial factors.

While access is the first step, the quality of connectivity is equally important to enable productive use of digital products and services. For example, MSMEs need high-speed and reliable access to seamlessly integrate e-commerce and other digital tools into its operations for receiving and fulfilling orders in a timely manner, and responding to consumer inquiries. To fully optimise the benefits of the digital economy, communities need to have globally-competitive connectivity infrastructures, including investments in 5G cellular technology.

As with any other type of infrastructure, collaboration between government, citizens and an ecosystem of core service providers is necessary. Multilateral organisations, governments and DECs can bring technical assistance, financing options and other models and solutions to ensure that the benefits of digital infrastructure development are equitably enjoyed.[84]

From digital literacy for inclusive adoption, to meaningful and productive participation in the digital economy

Digital literacy should encompass more than teaching technical skills to ensure safe adoption of digital technologies. Simply using digital tools does not automatically guarantee equitable economic opportunity. For example, low-income youth in Singapore tend to spend more online time on social media and communication apps or entertainment apps. While they are theoretically digitally connected and digitally-literate, they are not employing this connectivity to learn, increase employability or improve their prospects. This phenomenon of "invisible illiteracy"[85] contributes to an "inclusion paradox,"[86] where digital consumption is concentrated in the "timepass economy,"[87] in which online time and connectivity is spent in the pursuit of leisure, rather than on productive work and gainful employment.[88]

For SEA-6 to transition from a market of consumers into an ecosystem of sustainable digital development, individuals need to go beyond mere Internet usage and embrace the opportunities afforded by connectivity.

As a first step, digital literacy programmes should be extended into businesses, MSMEs and individuals, so that everyone can apply their skills for productive and meaningful ends. Digital literacy programmes can help users understand how they can maximise their use of digital solutions and understand the corresponding risks that come with it.

Digital literacy, however, is not enough. Digital adopters must also be equipped with relevant knowledge to gain the benefits of digital products and services. As in the case of digital financial services, for example, while digital literacy might correlate with digital payment adoption, financial literacy was a significant predictor of financial product adoption such as insurance, investment, and loans.[89]

Since emerging technologies evolve rapidly over time, digital fluency is an ongoing investment rather than one-off effort. An illustration of this approach was offered at the Vietnam roundtable. In farming communities, community-based organisations and the community collaborate to develop and deploy scalable solutions in agriculture, which will greatly benefit the farmers and boost Vietnam's economic production both in urban and rural areas.

From developing a digital workforce and talent for the digital economy, to sustainable and flexible livelihoods through the digital economy.

Existing national priorities focus on developing the existing workforce to participate in digital economy growth through reskilling and upskilling programmes. However, ensuring long-term resilience of the population requires a more comprehensive review of productive work to enable sustainable and adaptive livelihoods in the future.

Across the six roundtables, there was a shared recognition that productivity gains brought about by digitalisation and automation will cost jobs, but also create new ones. As technology replaces traditional jobs, reducing citizens' reliance on economic activities that might be vulnerable in the future has become an urgent imperative. Even those currently proficient and knowledgeable in today's digital technologies are not immune to the risk of disruption. Therefore, initiatives that equip the workforce with the evolving skills demanded by the digital economy and transferable skills across industries becomes increasingly important. Participants in several roundtables called for regular reviews of national skills roadmaps to ensure continuous talent development to meet the current and future needs of industry.

In addition to jobs, roundtable participants foresaw a digital society that is adaptive to disruptive changes in the economy and that caters to the changing needs of the individual. Traditional norms such as lifelong employment, working for a single employer at pre-determined locations or being physically sited with colleagues and managers are no longer the only model of productive work. Roundtable participants observed that a digital-ready workforce would possess the flexibility to pivot to different types of work, accommodating external factors like macroeconomic fluctuations, or personal needs and motivations throughout the course of one's productive life, which is expected to extend far beyond today's typical retirement age. The digital economy holds the potential for sustainable and adaptive livelihoods by enabling individuals to generate income and maintain a decent standard of living in a way that is human-centred, environmentally sustainable and economically viable over the long-term.

3.3.2 Technology, business and regulatory innovation

All roundtable participants agreed that continued innovation was essential to sustainable digital development in SEA-6. However, innovation must go beyond technology and business models. Sustainable digital development requires SEA-6 to invest in interconnected and interdependent types of innovation, spanning technology, business and regulatory innovation to:

- Encourage investment in emerging technologies while ensuring responsible development, design, deployment and disposal of products and services;
- Enable impactful investment and innovation; and
- Cultivate a coordinated and responsive regulatory environment

From fostering trust in the digital ecosystem, to governance of emerging technologies

As new technologies are created and adopted, new products, services and business models will emerge. Thus, establishing trust in the ecosystem relies on safe development and deployment of these emerging technologies.

The onus to ensure responsible development and use of new technologies such as artificial intelligence (AI) is currently largely in the hands of the DECs that are investing in the technologies for commercial gain. A proactive and collaborative approach from society, industry, and government is needed to address knowledge asymmetries as a first step in ensuring appropriate governance of these technologies and their applications.

Trust is built on transparency and accountability. DECs should be transparent in their data collection and processing, and provide effective guardrails to protect consumers from unintended consequences. Responsive feedback mechanisms, particularly around addressing complaints can also contribute towards a more trusted digital experience for consumers.

Governance of emerging technologies requires alignment on outcomes. One current concern of artificial intelligence (AI) models, for example, is that the human generated content on which the models are trained are inherently biased. The increasing use of algorithms increases the risk of perpetuating real-world and historical biases in the digital space.

This is particularly important in light of recent advancements with generative AI. Current examples have demonstrated the ability to create content. Generative AI for code is the natural next step. In the same way that one does not need to be an artist to generate a picture or poem today, software development will be democratised and no longer the domain of software developers. AI product companies will be likely to outnumber but be reliant on companies developing fundamental AI technology and tools. Deep understanding of how a digital product or service works will be increasingly elusive, not only to regulators, customers and consumers, but also to product deployers themselves.

In addition to the need for new competencies to develop, operate and manage emerging technologies, therefore, users must also be empowered with the knowledge and skills to use new technologies in a responsible and sustainable manner.

Building trust in emerging technologies thus requires frequent and open engagement with stakeholders, including users, policymakers and civil society organisations. All stakeholders must be involved in the development, testing and deployment of emerging technologies to ensure that they are safe, ethical and meet societal needs. Multi-stakeholder processes are also needed to develop and implement fit-for purpose frameworks and standards to guide the responsible development and use of emerging technologies.

From encouraging entrepreneurship, to fostering innovation through impact investment

The digital economy thrives on innovation and entrepreneurship, creating new opportunities for economic growth and development. Roundtable participants called for an emphasis on prioritising investments in impactful innovation to address urgent social and environmental challenges.

There is much scope to align innovation with the developmental goals of the country and region. DECs have the potential to "solve social problems, meet the needs of people, and work toward developing sustainable solutions for the future."[90] The SDG Investor Maps produced by SDG Impact, for example, identifies viable and desirable investment opportunities for digital innovation in Indonesia, Thailand and Vietnam in areas such as ed-tech, telemedicine, and agritech.[91] These sectors are also crucial to alleviate poverty, address the asymmetric access to basic services, and can provide livelihood opportunities.

A focus on impactful investment and innovation requires a shift in focus from inputs to outcomes. Traditional measures of digital economy growth, such as size of investment, number of startups, gross merchandise value or monthly transacting users are important but insufficient in capturing the impact of innovation and entrepreneurship on society.

As evidenced in the "Say-Do-Act Gap" of current DECs in SEA-6, intention must translate to action and action must be measured and verified to ensure that desired outcomes are aligned across stakeholders, including but not limited to investors, entrepreneurs, policymakers and society. Only then can incentives be similarly aligned, so that investors and entrepreneurs may be recognised for creating solutions that address social or environmental challenges, in addition to generating financial return.

From strengthening regional cooperation, to cultivating a coordinated and responsive regional regulatory environment

Achieving sustainable digital development requires a balance between innovation and governance. Imposing overly stringent government measures, especially ex-ante regulations, could potentially stifle innovation and progress. Instead, a responsive regulatory environment is key to ensuring that technology delivers on its promised impact. Roundtable participants called for a thorough and iterative review of policies, addressing "archaic acts'' and misalignment of existing policies. This process should be informed by a deeper understanding of technology developments, policymaking processes and policy intent. Roundtable participants called for a proactive mindset to ensure that policymaking is well-informed through research and industry consultations. Trust-building and knowledge-sharing sessions were highlighted as essential for establishing open lines of communication and close collaboration between the public, private and people sectors. These would serve as precursors to formal consultations to formulate fit-for-purpose policies, which would include engagement of stakeholder groups built into the policymaking process to better understand trade-offs, have a holistic view of its effects and engage in robust discussion on practical implementation.

Data, the hallmark of the digital economy, can also contribute to evidence-based research to inform policy development. Partnerships between governments and academics can support data-driven approaches in regulatory innovation, finding fresh perspectives and new ideas to advance the country's digital transformation agenda. DECs are also encouraged to support academic research by providing technical assistance and sharing relevant data.

Given the integration of digitalisation across government, industry, and society, effective policy coordination mechanisms within government are more important than ever. Most roundtable participants acknowledged that their current regulatory landscapes featured bureaucratic overlaps and policy misalignment across agencies. Knowledge-sharing and coordination mechanisms will streamline business processes for DECs while regulatory coherence enables efficient implementation and effective governance to achieve desired outcomes.

Finally, aligning national policies with international standards will support sustainable digital development and provide policy clarity as DECs expand their markets. ASEAN's potential hinges upon the creation of a globally competitive and fully integrated single market. At the same time, ASEAN is highly diverse, with each country requiring fit-for-purpose solutions. Regional cooperation and alignment, such as the Framework for Promoting the Growth of Digital Startups in ASEAN,[92] can facilitate a freer flow of data, ideas, goods, services, capital and talent across countries, allowing DECs to grow and scale.

Nevertheless, regulation is not the only solution to every issue in the digital economy. Breakthroughs and innovations in DECs are unpredictable and uncertain. Regulation should strike a balance between accommodating innovation and protecting societal and national interests. Roundtable participants cautioned against overly stringent or premature regulation that could stifle innovation or prove impractical to implement. Other approaches to ensure responsible governance of emerging technologies and new business models include industry self-regulation, codes of conduct, governance frameworks, pilots and regulatory sandboxes. Sandboxes offer controlled environments for provisional deployment of new products and services, allowing observation and management of outcomes and consequences within a reasonable testing time frame. The data and knowledge gleaned from these efforts may help companies and regulators in managing associated risks and ensuring smoother implementation to the wider market.

4. Recommendations

To realise the potential of “Tech for Good” to drive sustainable, equitable and inclusive growth across SEA-6, we need a **commitment** to shared outcomes, new processes and perspectives. In particular:

1. Rethinking governance and regulation to focus on outcomes, to keep pace with technology and business innovation.
2. Pursuing responsible innovation so that digital products and services may be developed with the interests of society and the environment in mind.
3. Fostering regional cooperation and partnerships.

Roundtable participants highlighted elements of what a more collaborative approach might look like: **cooperation** towards shared outcomes, **coordination** with clear communication to prevent knowledge or operational silos and **co-creation** to ensure inclusion of diverse or underrepresented interests so that the needs and rights of all parties are respected. Such collaboration can inform policymaking and governance for the digital age, fostering an enabling environment for technological and business innovation while inclusively anticipating the needs of current and future stakeholders, such as youth or an ageing populations.

Table 2: From promise to progress: delivering Tech for Good for a more inclusive, sustainable and equitable SEA-6

Commitment: Rethinking governance and regulation to focus on outcomes, to keep pace with technology and business innovation.	
Cooperation	Engage a wider stakeholder set, including end-users and citizens, in the policy-making process for a more inclusive and robust assessment of impact
Coordination	Establish policy coordination mechanisms to strengthen analysis on policy trade-offs and drive win-win outcomes
Co-creation	Expand toolkit of policy practice and governance levers to balance innovation and risk management
Commitment: Pursuing responsible innovation so that digital products and services may be developed with the interests of society and the environment by design	
Cooperation	Encourage awareness of the environmental and social impact though disclosures by both public and private sector providers of digital products and services
Coordination	Explicit metrics of sustainable digital development for quality growth, so that success looks beyond financial and commercial gain
Co-creation	Shared sustainable development outcomes with policy momentum and investment opportunity, to identify points of convergence for contribution
Commitment: Fostering regional cooperation and partnerships	
Cooperation	Expand existing cooperation initiatives to align on principles for sustainable digital development, while remaining flexible enough to account for diversity in the region
Coordination	Where appropriate, develop standards based on mutually-agreed principles for practical adoption
Co-creation	Encourage innovative partnerships to leverage the collective and complementary strengths of countries, DECs, the public, and people sector, to drive impact at scale

Source: Tech for Good Institute, 2023

Appendix: Country-level perspectives

Summaries of insights and perspectives from each country's roundtable

Indonesia

Affordable quality access

- As Indonesia improves its internet coverage, digital inclusion should be emphasised. This means expanding internet access beyond major metro areas such as Java, Sumatra, and Kalimantan. Developments of digital infrastructure should include remote provinces to ensure no one gets left behind.
- The digital divide between urban cities and rural communities is still a persistent problem in Indonesia. One of the major barriers to entry in the digital economy is the high cost of internet service. It is important for the government and internet service providers to work together to make online connectivity more affordable, especially for lower income households. Cultivating a more competitive internet service industry is a step towards lowering the cost of online connectivity in the country.
- Having reliable internet connectivity will encourage more meaningful participation in the digital economy. While initial access is crucial, the quality of connectivity must be raised to a standard that enables productive use of digital products and services. For example, high-speed internet will enable MSMEs to access e-commerce platforms, fulfil orders in a timely manner and respond to consumer inquiries more efficiently. As a result, consumers will have a convenient and positive user experience, which encourages repeat usage of the e-commerce services. A reliable internet service can also inspire and encourage more users to take part in economic activities online.

- Digital inclusion must include the marginalised population, such as persons with disabilities (PWDs) and the elderly, and can be achieved by leveraging well-designed digital products and services. Enhancing informational and educational campaigns on how to pursue digital inclusion is of the utmost importance.

Trust and confidence in emerging technologies

- The implementation of a digital consumer protection law in Indonesia, building on the existing data protection law, is necessary to safeguard consumers from fraudulent activities online. This would help foster greater trust among consumers participating in the digital economy.
- Building trust in technologies can also be achieved through digital literacy. These programmes aim to educate users on maximising the benefits of digital solutions while understanding the corresponding risks that come with it. As technology advances rapidly, it is crucial to regularly update digital literacy initiatives to remain relevant.
- On top of digital literacy programmes, data literacy initiatives would be beneficial for Indonesia. It is important for consumers to understand the kinds of data they share online, including whether or not data is safe to be made publicly available and how data is processed. A data-literate population contributes to greater trust in the digital economy.
- Establishing an AI governance framework will help set guidelines for the appropriate use of emerging technologies by DECs. A mechanism should be in place to minimise unintended consequences associated with AI, ensuring accountability and responsible use practices. For example, transparency regarding customer data usage is crucial to increase consumer confidence in the digital ecosystem.

A coordinated and responsive regulatory environment, nationally and regionally

- To create a responsible regulatory environment, the Indonesian government should allocate sufficient resources to support the development of new technologies, and proactively create spaces where DECs and consumers can help shape regulations and policies. This helps to lend predictability in the regulatory environment.
- Indonesia's current regulatory landscape is fragmented. It currently has 26 different agencies that look after different pillars of technology and the digital economy. There is a pressing need to establish coordination mechanisms to facilitate knowledge-sharing and avoid working in silos. A cohesive regulatory landscape is crucial to improve the ease of conducting business for DECs and ensure effective policy implementation to meet its intended outcomes.
- Striking a balance between innovation and regulation is crucial for the Indonesian government. Policies need to be agile and fit-for-purpose as short-sighted policies are restrictive and may hinder businesses' ability to innovate. DECs can contribute by exercising self-regulation and initiating industry-wide guardrails (e.g. industry codes of conduct) to address risks and unintended consequences to users.

Malaysia

Meaningful and productive participation in the digital economy

- Malaysia's National Fourth Industrial Revolution (4IR) Policy places a strong emphasis on the welfare of *rakyat* (people). To achieve digital inclusion, immediate attention is needed for specific segments of the population, such as the bottom 40% (B40) socio-economic group, those residing in rural areas (e.g. Sabah, Sarawak and Terengganu), and people with disabilities. A human-centred approach to the design of digital products and services is necessary to promote inclusion. This can be done through conducting impact assessments, facilitating knowledge-sharing opportunities, and implementing an ethics review process. Encouraging consumer participation in the design of product processes can also be effective in ensuring that the benefits of the digital economy are accessible to those who need it the most.

Sustainable and adaptive livelihoods through the digital economy

- Investing in human capital will enable a future-ready and resilient workforce for Malaysia. A collaboration between the government and DECs calls for a prioritisation of the national reskilling programme. For instance, introducing extensive training in e-commerce and social media usage for the general population to catalyse more economic activities. This in turn can drive economic empowerment for the population, especially those in the B40 group.

- Investing in digital skills will also allow the labour force to adapt to economic shocks. As technology permeates all sectors of the economy, these acquired digital skills become versatile and transferable across industries. A digital-ready workforce can seamlessly pivot to complementary jobs, including gig work, in response to various economic conditions.

- Digital upskilling will make Malaysia's digital economy competitive in the long-run. With a focus on the youth, which represent a substantial portion of the country's labour force, Malaysia can attract greater investments if there is a steady supply of digital talent. Moreover, a digital talent base supports the development of a dynamic digital startup ecosystem, which further contributes to increased innovation in the country.

Trust and confidence in emerging technologies

- The Malaysian government must confront key risks and challenges associated with online spaces. For example, harmful online content that promotes misinformation, disinformation and malinformation are immediate issues of concern for policymakers. To address these issues, the government should consider establishing a governance framework that ensures safe online discourse and interactions. For example, providing clear guidance on regulation of bots, which may be used to propagate misleading and harmful information, will protect users from harmful content.

- The private sector plays a key role in creating a safe environment for Malaysians online. Together with regulators, DECs can provide inputs for agile and forward-thinking regulations. Within its own systems and platforms, DECs should also implement content moderation policies that protect the interest of the people. Additionally, DECs can afford to be more transparent about the use of data to gain the trust of its users.

- Safe online spaces are all about creating a secure and reliable online experience for Malaysians. This includes ensuring data protection and cybersecurity practices are in place for both the government and the business sector.

Impactful investment and innovation

- DECs are encouraged to adopt green technologies and more sustainable business models. For example, data centres can explore off-grid energy solutions to reduce carbon footprint. The government can help by providing incentives to help DECs access and pilot green technologies, and set up an ESG fund to nurture impact-driven startups that focus on sustainability. One effective strategy could involve acknowledging DECs that make progress towards advancing ESG goals.
- Consistent ESG reporting should be practiced by all DECs in the digital economy, especially discouraging greenwashing. There should be a mechanism that allows the public and people sector to hold DECs accountable to its ESG commitments.

A coordinated and responsive regulatory environment, nationally and regionally

- The government plays a central role in implementing responsive regulations and guidelines that would facilitate a level playing field in the digital economy. This encourages innovation among businesses, resulting in better quality products and services. Healthy competition may also drive prices down of a digital good, thus making it affordable to a larger population.
- Addressing the presence of “Archaic acts” and the misalignment between existing competition policies and digital economy policies requires a comprehensive policy review. Old laws need to be updated to keep up with current technological trends. Therefore, a central agency might be needed to regulate and define the standards and guidelines for the digital economy, but avoid overregulation as it will hinder creativity and innovation.
- Policy coordination is vital for the growth of the digital economy. Policymakers should not operate in silos, but instead adopt a mechanism that would promote effective management. In addition, policy coordination should extend beyond government-to-government collaboration and encompass impactful public-private cooperation.

Philippines

Affordable quality access

- To fully maximise the benefits of the digital economy, the Philippines need to have a globally-competitive connectivity infrastructure. There is great demand for efficient and equitable digital access and connectivity, where users, particularly the poor and marginalised, have access to adequate internet connection even in distant regions i.e. throughout the over 7,000 islands of the archipelago.

Meaningful and productive participation in the digital economy

- Efforts must go into enhancing digital literacy to ensure positive and productive participation of the Filipino population. This includes leveraging digital tools online, being responsible users of technology and protecting individuals from online harm. The awareness of the public's legal rights in the economy should also be promoted.
- A collaborative reskilling and upskilling initiative between the government, DECs, academic institutions and civil society is needed. For example, having a national ICT skills roadmap to further develop local digital talent so that the population can more productively contribute towards digital economy growth.
- Facilitating the scaling of digital solutions for underserved segments, such as populations residing in geographically-isolated and disadvantaged areas, is crucial in order to achieve significant impact. Additionally, capacity-building and skills training must be extended to provincial communities. In the Philippines, a thriving digital economy means being able to succeed in driving digital transformation from Batanes to Sulu. DECs with a wider reach can play an active role in building up talent in rural communities.
- Digital inclusion should be an integral part of the country's digital transformation plans. This would encompass intentional efforts to drive digital access and literacy to specific important groups, such as rural communities, underserved populations, women, the elderly and persons with disabilities. It is imperative that DECs consider this as it develops new products and services.

Trust and confidence in emerging technologies

- An effective approach to foster trust in the ecosystem is to have verified digital identities for every citizen. Therefore, the government's efforts to establish the Philippine Identification System (PhilSys) must be prioritised. Beyond that, the government should consider collaborating with DECs to drive further innovation of trust-enabling technologies that can better meet the needs of the ecosystem (e.g. digital signatures for e-commerce transactions, verification tools for official digital documents, etc.). To promote broader adoption, the Department of Trade can explore the possibility of issuing accreditation to providers of these solutions.
- When striving to promote digital adoption of key sectors such as e-commerce and digital financial services, it is essential to safeguard users' privacy rights. To further develop trust, DECs in these sectors should also endeavour to be reasonably transparent in consumer data collection and provide effective guardrails that can further protect users from unintended consequences. Incorporating responsive feedback mechanisms, especially in addressing complaints, can enhance the level of trust in the digital experience.

Impactful investment and innovation

- Policymakers should proactively take measures to enable growth of tech startups and companies with operations in the Philippines, providing support to those that have the potential to create a bigger impact to the Filipino population. Grants and subsidies can be used as incentives to steer innovation towards solving the country's intractable challenges.
- To keep pace with innovation, the government can consider developing sandboxes, providing a controlled environment for testing and piloting emerging tech solutions and business models within a reasonable testing time frame. This will help provide an opportunity for companies and regulators to better manage associated risks and ensure smoother implementation to the wider market.
- Innovation can also be promoted by protecting intellectual property (IP) rights. Government representatives encouraged DECs, startups in particular, to file more IP applications, using campaigns, rewards and other related incentives. It is important to review the national IP strategy to support further innovation in the digital economy of the Philippines.
- Academic institutions can play a greater role in driving innovation. Schools and universities should expand their work with the public and private sectors to develop related assessment frameworks for new technologies.

A coordinated and responsive regulatory environment, nationally and regionally

- Evidence-based research can help sharpen the approach for policy development. The government can leverage academic knowledge and expertise to develop a data-driven approach in regulatory innovation. Research by various universities offer new perspectives to frame issues and catalyse new ideas to advance the country's digital transformation agenda forward. DECs can also support academic research efforts in the field by providing technical assistance and sharing relevant data.
- Establishing effective communication channels and fostering strong collaboration among the public, private and people sectors are essential to address concerns and unlock growth opportunities associated with the digital economy. For example, when crafting new rules and regulations, consultations between these stakeholder groups should be built into the process to better understand trade-offs, build a holistic view on its effects and start robust discussions on practicality of implementation. Promising opportunities for such collaborations arise in the progression of high-priority bills relevant to the digital economy: E-Governance Bill and the Internet Transactions Act, Spectrum Management Bill (regarding the allocation and management of radio frequency spectrum), Open Access Bill, Modernisation Bill for the National Telecommunications Commission and the Social Entrepreneurship Bill.

Singapore

Meaningful and productive participation in the digital economy

- Despite Singapore's investments in access and infrastructure, the key challenge lies in empowering the population to effectively leverage technology to improve their quality of life and achieve greater productivity.
- Digital competency programmes are needed not only for businesses and MSMEs but also individuals to tackle the issue of "invisible illiteracy." This term refers to people who are digitally literate, but do not derive long-term value from online activities. It is important to distinguish between those who use the digital space for upskilling and re-skilling to those whose predominantly consume technology for recreation. The goal is to equip digital society with the correct mindset to flourish in the digital economy.
- Technology should support and enhance the lives of citizens as confident participants in the digital economy and society, rather than create excessive dependency.
- Participation in the digital economy and society requires strengthened data protection and best practice in cybersecurity.

Impactful investment and innovation

- Doing good for society is more than simple compliance with existing rules and regulations. It is necessary to distinguish between compliance for profit's sake and social impact for society's sake to maximise the potential of DECS' contribution to society. Compliance regulations serve as the baseline standards for DECs to uphold its license to operate. There is further opportunity to strengthen incentives and facilitate the pursuit of social impact programmes. In order to achieve this, DECs and the government should collaborate to complement the existing regulatory landscape with efficient incentive schemes.
- Singapore offers a wide array of grants and subsidies available to DECs. One way to promote social impact is to incorporate ESG pillars into the allocation of these grants and subsidies. For example, the government and investors can highlight the need for ESG initiatives as a criteria for accessing the incentive schemes. Priority can be given to DECs with high impact potential, and it could also help foster a new generation of DECs with a stronger focus on sustainability and social responsibility.
- Both producers and consumers in the digital economy should observe "ethical consumption", being mindful and intentional of the choices made in the digital economy. For businesses, this could include sourcing from suppliers who have more sustainable business practices. For consumers, it starts with awareness of the impact of products and services used.

A coordinated and responsive regulatory environment, nationally and regionally

- As Singapore strives to become a global hub for digital services, the government is working hard to develop a trusted ecosystem that enhances the country's global competitiveness.
- Enhancing security is a key focus. There are currently initiatives to improve the security posture of DECs in Singapore. However, it is crucial to extend the focus to MSMEs, if they are to be integrated into the global value chain. For example, MSMEs can play a vital role as third-party suppliers for larger firms. Both the government and DECs can support MSMEs to develop the necessary capabilities.
- Policy innovation is vital to encouraging innovation while mitigating risks. For example, Singapore has several sandbox initiatives in place to test products and policies before widespread deployment. For example, the government recently launched a sandbox for privacy-enhancing technologies.
- Singapore would also benefit from exercising "predictive interventions" in policymaking. By taking an anticipatory approach, the seamless adoption of emerging technologies can be facilitated, all the while remaining vigilant of possible risks.

Thailand

Meaningful and productive participation in the digital economy

- Digital equity is not merely providing physical infrastructure for a fast and reliable internet access, but also making the effort to ensure that there is a level playing field for all businesses involved. For example, MSMEs need support to be competitive in the digital economy. In this regard, the government can provide incentive schemes and grants for MSMEs. DECs also have a role to play to support smaller players in the ecosystem. Established DECs can offer their platforms and services to allow MSMEs to participate in the digital economy. A good outcome for Thailand is a vibrant ecosystem with opportunities for MSMEs to develop, scale, and grow.
- Thailand should consider establishing a National Startup Strategy, with a particular emphasis on inter-capital collaborations with cities like Manila and Ho Chi Minh. As part of this strategy inter-city collaborative agreements should be included to facilitate impactful connections between urban and rural MSMEs. This approach would create additional opportunities for MSMEs to expand their growth further.

Sustainable and adaptive livelihoods through the digital economy

- A digitally-proficient society is one that is creative and adaptive to disruptive changes in the economy. Thailand should use this opportunity to ensure its youth uses technology to their advantage. Digital literacy initiatives can focus on the use of emerging technologies such as AI and cloud services. This is particularly important for the Thai youth, who will soon join the workforce. Thus, academic institutions are a key partner of the government to ensure that the labour market is equipped with the necessary skills to sustain the growth of the digital economy.
- The advent of automation in manufacturing poses new challenges for society. Technology should be used in a way that also protects the people's welfare, without sacrificing productivity. As technology replaces traditional jobs, the government should focus on research and development of how Thais can take advantage of new employment opportunities enabled by digital tools.
- Anticipatory measures should be implemented to address the needs of Thailand's ageing population. Technology can play a crucial role in enabling active participation and contribution of the economy as individuals age. Digital platforms can be used to provide economic opportunities specifically designed for the elderly. This, however, should be coupled with appropriate digital literacy training to prepare the ageing population to the risks associated with such technology.

A coordinated and responsive regulatory environment, nationally and regionally

- Today, the digital space facilitates changes and allows flexibilities in workforce structure. In the case of platform applications, for example, employer-employee relations have significantly undergone changes. Thai DECs now adopt nomenclature unseen in recent history (e.g., "platform-partner" as opposed to "employer-employee"). This has caused grey areas in implementing existing laws as new terms are still not included in current regulations. Therefore, there is a need to clarify, and where relevant, update labour laws to provide predictability and certainty as DECs continue to operate in the country.

- Understanding the policymaking process is just as important as understanding the rationale behind policy development. Governments and DECs should create spaces where consultations and knowledge-sharing sessions can help create responsible policies for the digital economy. Moreover, fit-for-purpose policies are needed to promote innovation and growth. There is no one-size-fits-all solution, given the rapid changes and the continuous iterations for both public and private sector in the digital sphere.
- There is a need to harmonise working relationships across government agencies so that policies on people's welfare and safety will be maximised. While non-conventional shifts in doing business may be challenging to address, policy coordination would strengthen the quality of regulations that will be introduced.

Vietnam

Affordable quality access

- Although efforts are being made to integrate rural communities with urban and digitally-upgraded ones, the lack of digital reach to remote and isolated communities remains a concern. The participation of community-based organisations, alongside the communities, is crucial in bringing digital transformation on the ground. It is also important to involve farmer villages, as the development of scalable solutions in agriculture will greatly benefit them and boost Vietnam's economic production both in urban and rural areas.
- Vietnam's youth is proficient and knowledgeable in the use of digital technologies. However, digital literacy is only evident within Vietnam's "educated market". More needs to be done to bridge the digital divide, and ensure that proficiency in digital permeates all segments of the population. Having a diverse talent pool can serve as a valuable resource for attracting new investment opportunities into Vietnam.

Impactful investment and innovation

- DECs in Vietnam have areas of improvement when it comes to environmental initiatives, as the current priority is focused on growth and scaling businesses. It would be good for Vietnam to have DECs that are more mindful of its carbon emissions and footprint. In order to achieve this, the government may introduce corporate governance standards to encourage greater social responsibility among DECs. Given the increasing availability of impact investing opportunities in the country, it is beneficial for Vietnamese DECs to pursue these areas of environmental sustainability.

A coordinated and responsive regulatory environment, nationally and regionally

- The Vietnamese government supplemented its 2021-2030 Socio-Economic Development Plan with its own National Digital Transformation Programme. However, there are challenges in implementation because Vietnam is still in the early stages of the digital transformation journey. In addition, policies need to be updated and formulated to address new challenges introduced by the digital economy. For example, Vietnam's legal provisions on e-commerce are relatively short compared to other laws, which indicates the need for more discussions to further enhance the regulatory environment.
- DECs, especially digital startups, are at the forefront of dealing with Vietnam's challenging regulatory environment. Complicated and overlapping policies breed confusion for the private sector and MSMEs. There is a need to streamline several redundant laws that pertain to the digital economy and align it with international standards. Moreover, the private sector noted that laws should be flexible and adaptable, given that new innovations might not be covered by existing laws.
- As a tool to foster innovation, sandboxing can be used in certain strategic sectors of Vietnam's digital economy (e.g. fintech) while addressing associated risks.
- Clear regulatory guidelines on foreign investment is also needed for digital transformation of Vietnamese industries. For example, ongoing discussions on the Public Property Management laws help understand how foreign ownership in the digital economy can impact the overall interests of the Vietnamese people.

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