ERIA Research Project Report FY2025, No. 14

ASEAN Digital Community 2045
Country Perspectives

Edited by
Lili Yan Ing

Economic Research Institute
for ASEAN and East Asia

ASEAN Digital Community 2045 Country Perspectives

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Chapter 1
The Digital Economy Ecosystem in Brunei Darussalam

Muhammad Anshari

1. Introduction

The global shift towards a digital economy is reshaping industries, and Brunei Darussalam is keenly participating in this transformation. The government has demonstrated a strong commitment to developing a robust digital economy by investing substantially in digital infrastructure and actively promoting digital technologies across all sectors.

Adopting a digital economy presents significant benefits for Brunei Darussalam, including improved efficiency in public and private services, stimulation of economic growth, and improvements in the standard of living. However, this transition also presents challenges that must be addressed to fully realise the benefits. Key challenges include the development of a comprehensive digital economy ecosystem, enhancement of the regulatory framework, strengthening of digital skills and innovation, and further improvement of digital infrastructure. Successfully navigating these challenges offers substantial opportunities for economic diversification.

Building a digital economy extends beyond the mere development of digital businesses, which constitute just one pillar of the broader digital economic ecosystem. Brunei Darussalam is committed to fostering a sustainable digital economy by developing an ecosystem based on four key pillars: smart government and governance, smart society, smart business, and smart environment. This policy paper aims to lay a solid foundation for the growth of Brunei Darussalam's digital economy by analysing the current digital landscape, identifying challenges, defining opportunities, and proposing policy recommendations to accelerate progress. By fostering digital innovation, expanding digital infrastructure, and nurturing digital skills, Brunei Darussalam can seize the opportunities of the digital economy and create a sustainable digital business ecosystem that promotes prosperity and inclusivity, in line with the goals of Wawasan Brunei 2035. The proposed measures in this policy paper are designed to support Brunei Darussalam's goal of becoming a leading digital economy in the region.

2. Background

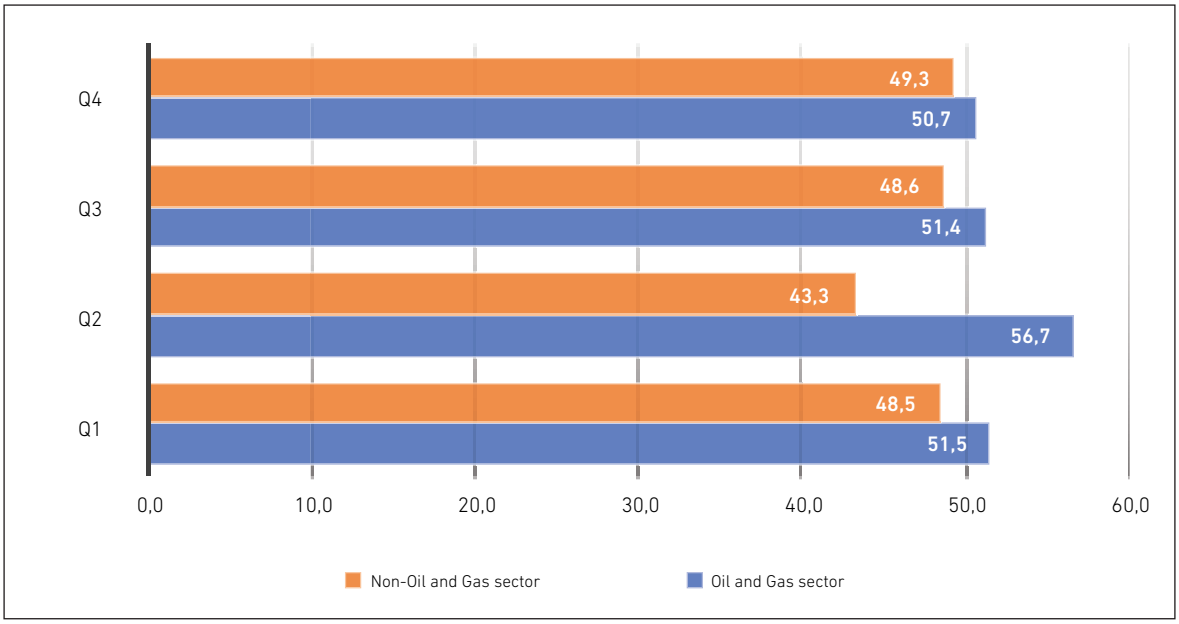
Brunei Darussalam, a small Southeast Asian country, is known for its oil and gas production. Located on the island of Borneo and a member state of the Association of Southeast Asian Nations (ASEAN), Brunei is celebrated for its dense forests and well-preserved natural environment. The country's commitment to a low-carbon future underscores its recognition of the importance of addressing climate change.

A significant portion of Brunei Darussalam's territory is covered by highly biodiverse tropical rainforests, earning it the titles 'Heart of Borneo' and 'Heart of the World' in the context of environmental conservation and biodiversity.

In terms of purchasing power parity, Brunei Darussalam's gross domestic product (GDP) was officially estimated at $26 billion by the end of 2022 (World Economics, 2022), with an approximate population of 459,500. According to the World Economic Forum's ranking, Brunei is the 56th best country globally in terms of human capital. The country's economic and social growth trajectory has shifted to a new normal, influenced by macroeconomic factors, the volatility of the global oil and gas market, the inevitability of the Fourth Industrial Revolution (4IR), and the impact of the coronavirus disease (COVID-19) pandemic (Noeh et al., 2022).

As shown in Figure 1.1, during the first quarter of 2023 (Q4), GDP contributions were 49.2% from oil and gas and 50.8% from non-oil and gas. Growth in non-oil and gas was driven by subsectors such as air transport, which saw a significant increase of 285.1%. The finance sector also experienced significant growth, with a 71.7% rise, whilst other transport services grew by 33.1%. The upturn in the finance sector aligned with increased income from banking activities, whilst the growth in air transport and other transport services was attributed to a rise in passenger air arrivals and departures following the complete lifting of travel restrictions (Department of Economic Planning and Statistics, 2023).

Figure 1.1. Gross Domestic Product by Kind of Economic Activity, 2022–2023 (%)



Q = quarter.

Source: Department of Economic Planning and Statistics (2023).

Brunei Darussalam is actively developing a digital economy encompassing various sectors, including e-commerce, digital infrastructure, data analytics, artificial intelligence (AI), cyber-physical systems, and the Internet of Things (IoT), as it prepares for 4IR. The digital economy is expected to unlock new market opportunities, boost efficiency, and enhance overall well-being.

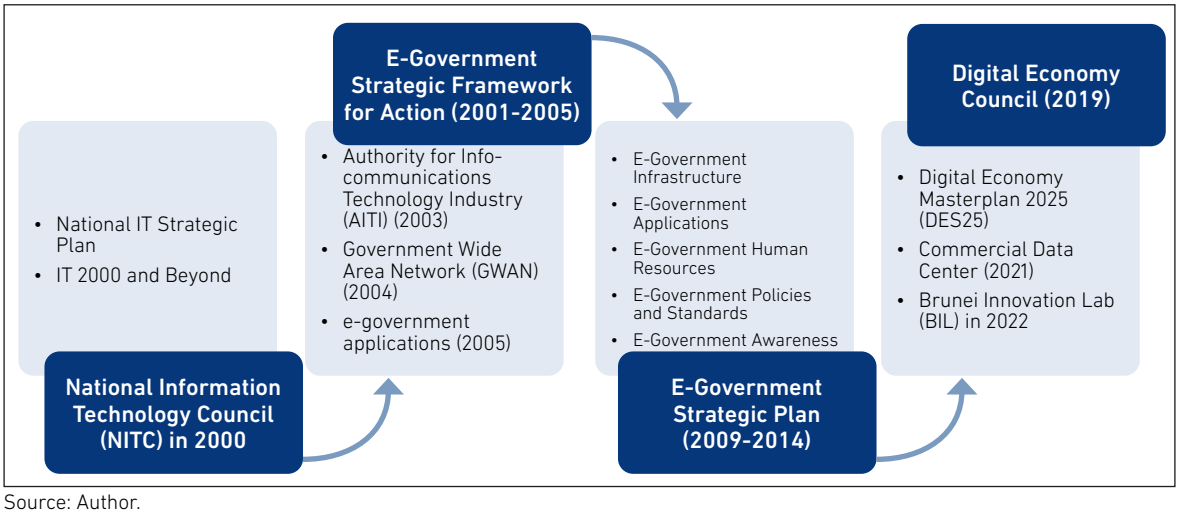
The Brunei Darussalam government has made significant progress in developing the country's information and communication technology (ICT) infrastructure to ensure affordable internet access for its citizens. By 2026, it is expected that 96.4% of the population will have internet access, with 137 mobile phone subscriptions per 100 residents and 16.05 fixed-broadband subscribers per 100 residents. In 2021, e-commerce contributed 19.5% to revenue (Statista, 2021). Furthermore, businesses in Brunei Darussalam are increasingly investing in cutting-edge technology. Since 2008, the government has introduced several top-down initiatives to support local start-ups, including the establishment of business incubators such as the i-Centre, the K-Hub, and the Creative Art Facility (CRAFT) in the Anggerek Desa Technology Park (Purwaningrum, 2017). Currently, 20 start-ups are active, with 9 based at the iCenter (Noeh et al., 2022).

The following section highlights the major milestones in Brunei Darussalam's digital transformation journey since 2000.

3. Development of the Digital Economy

The digital economy is a key enabler in Brunei Darussalam's journey towards becoming a smart nation. The smart nation initiative, driven by digital government, digital economy, and digital society, is a national endeavour aligned with the vision of Wawasan Brunei 2035, aiming to transform the country by 2035 (MTIC, 2020). Figure 1.2 shows the milestones in the development and transformation of Brunei Darussalam's digital economy.

Figure 1.2. Gross Domestic Product by Kind of Economic Activity, 2022–2023 (%)



Source: Author.

The first significant step was the establishment of the National Information Technology Council (NITC) of Brunei Darussalam in October 2000. The NITC was tasked with overseeing and coordinating the implementation of the National IT Strategic Plan, titled 'IT 2000 and Beyond'. This plan focused on three key areas: 1) driving the nation towards a paperless society, 2) promoting electronic government in the public sector, and 3) encouraging electronic business in the private sector. The National IT Strategic Plan represented the first wave of Brunei Darussalam's e-government strategy.

The second wave was marked by the E-Government Strategic Framework for Action, which spanned from 2001 to 2005. This framework outlined the key initiatives and projects required to implement e-government services and systems across various sectors. The framework encompassed four primary areas: e-government infrastructure, e-government applications, e-government human resources, and e-government policies and standards. Achievements during this period included the establishment of the Authority for Info-communications Technology Industry (AITI) in 2003 as the ICT industry regulator and promoter, the development of the Government Wide Area Network (GWAN) in 2004 for inter-agency communication, and the launch of various e-government applications (e-Customs, e-Pelita, e-TAFIS, e-Exams, e-Company Register) from 2005 onwards, which provided efficient, effective, and customer-centric services to citizens, businesses, and civil servants. Additionally, ICT policies and standards, such as the Government Computer Usage Policy, Government Email Usage Policy, Internet Access and Usage Policy, and Government Web Interface Standard Guideline, were formulated from 2006 onwards. The enhancement of ICT literacy and skills amongst civil servants and citizens was also a focus, with various training programmes and initiatives introduced from 2007 onwards, including the National ICT Competency Framework (NICF), the ICT Literacy Programme (ICTLP), and the ICT Scholarship Programme (ICTSP).

The third wave was the launch of the E-Government Strategic Plan launched on 30 May 2009, which spanned from 2009 to 2014. This plan comprised five key programmes: E-Government Infrastructure, E-Government Applications, E-Government Human Resources, E-Government Policies and Standards, and E-Government Awareness. The objectives of these programmes were to establish secure ICT infrastructure, develop e-government services, enhance ICT skills, enforce standards, and promote the use of e-government services amongst citizens, businesses, and civil servants.

In 2019, following His Majesty Sultan Haji Hassanal Bolkiah's titah (royal order) on his 73rd birthday, the Digital Economy Council (DEC) was established. The DEC was tasked with exploring the economic potential of the digital industry and providing strategic direction and leadership for digital policies and initiatives at the national level. Succeeding the NITC and the e-Government Leadership Forum (EGLF), the DEC has been instrumental in steering Brunei Darussalam's digital economy initiatives. The DEC launched its 5-year masterplan, the Digital Economy Masterplan 2025 (DE25), which aims to transform Brunei Darussalam into a smart nation, supporting the objectives of Brunei Darussalam's Vision 2035. These objectives include a high quality of life, a highly educated and skilled workforce, and a sustainable and dynamic economy.

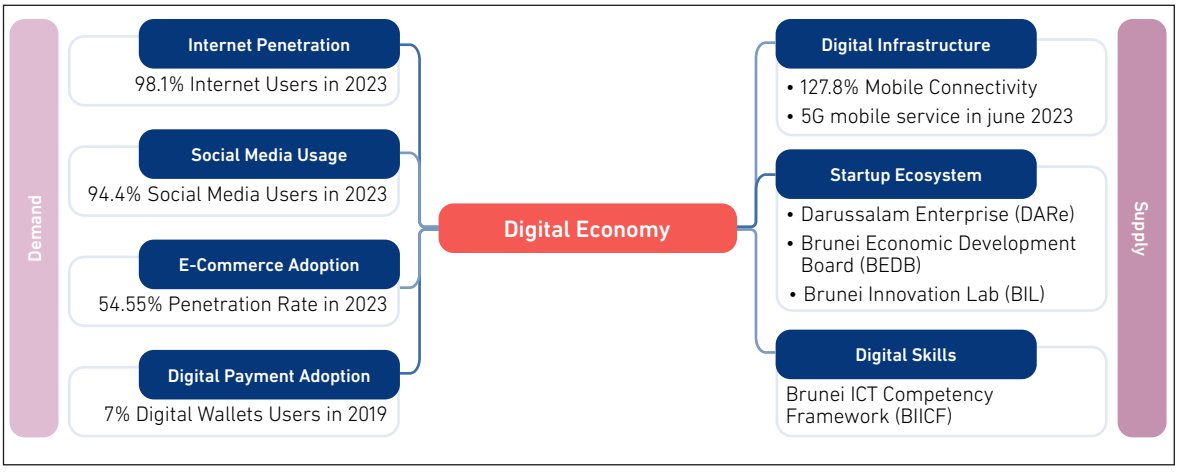
Further advancements include the establishment of a commercial data centre in 2021, which aims to provide innovative services to enhance productivity. In 2022, the Brunei Innovation Lab (BIL) was launched to spur the growth of tech businesses and their solutions through development programmes, funding, market access, and community building (The Scoop, 2020).

Digital Economy Components: Demand and Supply

Figure 1.3 shows the demand and supply dynamics that support Brunei Darussalam's digital economy. On the demand side, Brunei Darussalam is experiencing a strong momentum towards digital transformation. As of January 2023, internet penetration reached an impressive 98.1% of the population, with 442,200 internet users (Datareportal, 2023). Social media usage is similarly widespread, with 94.5% of the population actively engaging on social media platforms (Datareportal, 2023). E-commerce adoption has been steadily increasing, boasting a penetration rate of 54.55% in 2023 (Statista, 2023). The increasing demand for e-commerce is driven by the public's growing preference for online shopping, spurred by factors such as convenience, accessibility, and the widespread use of mobile devices. The emergence of mobile commerce and social commerce has further accelerated the growth of the digital economy, with businesses increasingly leveraging social media platforms and personalised shopping experiences to meet the evolving preferences of consumers.

However, despite the high rates of internet and mobile device penetration and the growing acceptance of online business platforms, a significant portion of the population still prefer cash payments over digital payment methods. A survey conducted by the Authority for Info-communications Technology Industry (AITI) in 2019 revealed that 39% of customers preferred cash payments, whilst only 22% opted for credit cards, 18% for debit cards, and a mere 7% chose third-party payment providers or digital wallets (AITI, 2019).

Figure 1.3. Digital Economy: Demand and Supply Side in Brunei Darussalam



Source: Author.

On the supply side, Brunei Darussalam benefits from a relatively well-developed digital infrastructure, with high-speed internet networks and extensive mobile phone coverage. According to the International Telecommunication Union (2022), the country had 576,000 active cellular mobile connections by early 2023, translating to 127.8% of the population (Datareportal, 2023). Brunei Darussalam recently launched its 5G mobile service, offering ultra-high-speed internet access with speeds of up to 300 MB per second, a significant improvement compared to the 20 MB–80 MB per second speeds available on the 4G network (The Scoop, 2023).

The government has introduced several initiatives to foster a conducive environment for the digital economy and encourage entrepreneurship. Darussalam Enterprise (DARe), for instance, provides funding, mentoring, and business development services to start-ups, whilst the Brunei Economic Development Board (BEDB) focuses on economic diversification and fostering innovation. The Brunei Innovation Lab (BIL) also facilitates collaboration amongst local and international start-ups, industry experts, investors, and other stakeholders, thereby fostering an ecosystem of innovation.

Whilst Brunei Darussalam has made progress in developing digital skills, there remains a need for more comprehensive training and education programmes to meet the demands of the digital economy. The Brunei ICT Competency Framework (BIICF) serves as a guide for ICT professionals, but further efforts are required to upskill and reskill the workforce, ensuring they possess the necessary digital competencies to thrive in the rapidly evolving digital landscape. By leveraging its robust digital infrastructure, government initiatives, and continued emphasis on skill development, Brunei Darussalam can strengthen the supply side of its digital economy, creating an environment conducive to innovation, entrepreneurship, and economic growth (BIICF, 2023).

4. Key Projects for the Digital Economy

The Digital Economy Masterplan 2025 (DE2025) serves as a comprehensive road map for Brunei Darussalam's transition to a digital economy. The master plan outlines strategic thrusts focused on industry digitalisation, government digitalisation, fostering a thriving digital industry, and the development of manpower and talent. It prioritises projects across nine priority clusters: logistics and transport, energy, business services, tourism, financial services, health, agri-food, education, and halal (Figure 1.4).

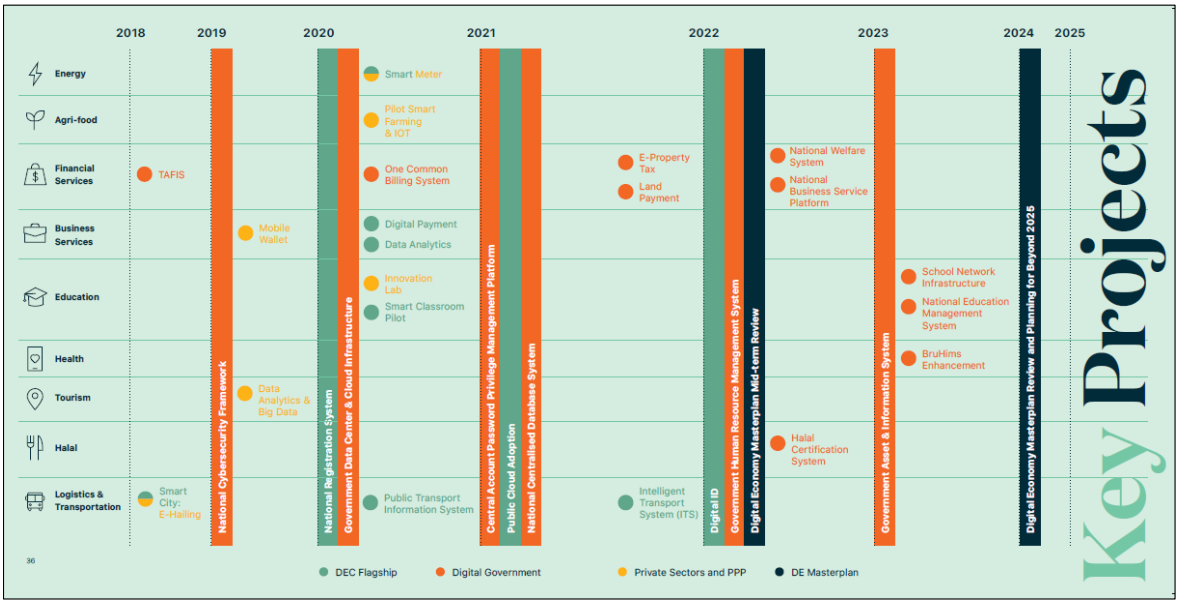
DE2025 identifies 17 key projects designed to advance these strategic thrusts and enablers. In the energy sector, initiatives are centred on optimising energy production, distribution, and consumption through smart grid systems and the integration of renewable energy. The agri-food project aims to enhance the agricultural sector by implementing precision farming, optimising supply chains, and promoting sustainability.

In the financial services sector, digital transformation initiatives include the development of digital banking, fintech innovations, and e-payment systems to enhance financial inclusion and operational efficiency. The business services project focuses on digitalising service sectors, fostering entrepreneurship, and improving competitiveness through e-commerce platforms and digital marketing solutions.

In the education sector, digital technologies are being leveraged through e-learning platforms, digital content development, and skills training to enhance access to quality education and develop a digitally literate workforce. The health project utilises telemedicine, health data analytics, and digital health applications to enhance healthcare accessibility and outcomes.

In the tourism industry, digital technologies are employed through digital marketing campaigns and smart tourism solutions. Looking ahead, Brunei Darussalam could explore virtual reality experiences to attract visitors and improve tourism. The halal project, aimed at developing Brunei Darussalam as a regional and global halal hub for goods and services, should be supported by robust digital solutions such as halal certification, traceability, and marketing, thereby enhancing the global competitiveness of the halal industry. In logistics and transport, Brunei Darussalam's strategic location in Borneo should be leveraged to optimise logistics operations and improve transport systems through smart logistics solutions and real-time tracking technologies. This would allow Brunei Darussalam to capitalise on the significant market opportunities in Borneo, provide innovative services and goods, and potentially emerge as a high-tech hub for the region.

Figure 1.4. Key Projects for Digital Economy



Source: Ministry of Transport and Infocommunications (2020).

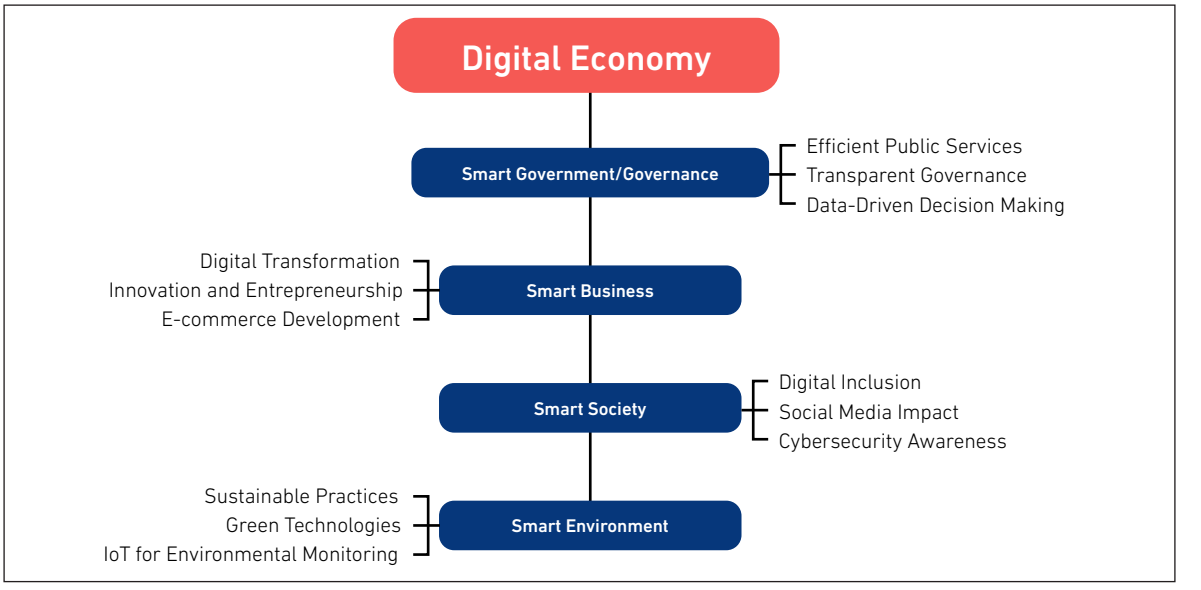
5. Policy Recommendations

Brunei Darussalam's abundant oil and gas reserves have long been its main sources of income, exports, and government revenue. However, this dependence also leaves the country vulnerable to global commodity price fluctuations and the risk of resource depletion. Diversifying the economy is, therefore, essential to building resilience and achieving sustainable development. The following policy recommendations are intended to guide economic diversification, supported by the digital economy initiatives outlined in the Digital Economy Masterplan 2025 (DE2025). These recommendations include developing a digital economy ecosystem, enhancing the regulatory framework, strengthening digital skills and innovation, and advancing digital infrastructure.

Policy 1: Developing a Digital Economy Ecosystem

Brunei Darussalam faces three main challenges in developing its digital economy. First, whilst internet penetration is high at 95%, digital activities have not yet reached their full potential in creating value-added services, employment, and innovation. Second, the relatively small scale of the economy requires the optimisation of larger market opportunities. Third, there is a need for robust legal frameworks, particularly in data protection and security, to foster the growth of the creative industry and digital market. Therefore, developing a comprehensive digital economy ecosystem is highly important, as it will integrate all digital potential into a unified and cohesive structure.

Figure 1.5. Policy Recommendations for a Digital Economy Ecosystem



Source: Author.

The digital economy ecosystem is expected to significantly impact economic diversification. It is defined as an integrative approach to fostering a sustainable digital economy, necessitating the development of four key supporting factors: smart government and governance, smart business, smart society, and smart environment (Figure 1.5). Through this ecosystem, Brunei Darussalam can create a more focused business digital environment, such as a digital ecosystem within the halal hub or a smart eco-health and tourism digital ecosystem, thereby expanding new demands by increasing economic scale. The digital economy ecosystem is a key enabler of innovation, automation, and the development of a smart and resilient economy.

Brunei Darussalam must develop interconnected networks of organisations, individuals, and technologies that collaborate and interact within digital business ecosystems. These ecosystems are characterised by the exchange of data, services, and resources, enabling participants to create value, drive innovation, and expand markets. One way to expand the digital economy is to develop a multi-sided market where all actors (public, service providers, businesses) play the role of ecosystem leaders or keystones (Almunawar and Anshari, 2020).

To become a key player in the global halal hub and Islamic finance sector, targeting the global Muslim market, which is expected to reach around 2.2 billion by 2030, Brunei Darussalam requires a robust digital ecosystem (Allied Market Research, 2022). The digital ecosystem for the halal hub model comprises several key components. A halal certification platform streamlines the process for businesses to obtain halal certifications, ensuring compliance with standards. A digital marketplace connects halal producers, suppliers, and buyers, expanding market reach. Supply chain traceability employs technologies for end-to-end product traceability. Digital marketing and branding utilise digital platforms for targeted advertising and content marketing. Digital logistic management optimises supply chain operations, including inventory management and delivery. Digital payment systems facilitate secure and seamless transactions for halal products. Lastly, a collaboration and partnership network fosters collaboration amongst stakeholders, enabling knowledge sharing and joint projects to strengthen the halal product ecosystem. These components create a comprehensive digital ecosystem that supports Brunei Darussalam's position as a halal hub, promoting the growth and trade of halal products within Borneo, ASEAN, and the global Muslim population.

Another example is the digital ecosystem of smart eco-health and tourism. Brunei Darussalam is renowned for its ecotourism, which can be enhanced or combined with strategies to develop health tourism. Brunei Darussalam's natural resources, such as rainforests, hot springs, and beaches, offer significant health benefits. These resources can be utilised to promote Brunei Darussalam as a destination for health tourism, a sector focused on improving health and well-being. Health tourism packages can be developed that combine ecotourism activities with health-promoting activities. Brunei Darussalam could support the digital economy in the region by investing in medical tourism infrastructure, promoting itself as a medical tourism destination, and improving digital health technologies. Health tourism could create new healthcare jobs, attract foreign investment, and boost the tourism industry whilst advancing the country's healthcare system and facilities. By developing health tourism, Brunei Darussalam can become a major hub for digital innovation in healthcare. This would create new opportunities for businesses and consumers, driving economic growth. Moreover, developing health tourism could also improve Brunei Darussalam's healthcare system, benefiting both residents and tourists. Developing health tourism is a strategic pathway to economic diversification, offering the potential for job creation, foreign investment, and improved healthcare facilities.

Policy 2: Enhancing the Regulatory Framework

Brunei Darussalam has established several rules and regulations pertaining to digital and IT sectors. Key examples include the following:

- **Personal Data Protection Order.** This proposed legislation aims to establish a comprehensive data protection regime, safeguarding individuals' personal data from misuse by private sector organisations. It also facilitates cross-border data flows, thereby supporting the growth of the digital economy.
- **Authority for Info-communications Technology Industry of Brunei Darussalam Act (AITI Act).** This act establishes AITI as the regulator and promoter of the ICT industry. AITI is empowered to issue licenses, impose fees and charges, conduct investigations, and ensure compliance with relevant laws and regulations.
- **Telecommunications Order.** This order regulates the provision of telecommunications services and facilities in Brunei Darussalam. It outlines the duties and obligations of telecommunications service providers and users and defines the powers and functions of AITI as the telecommunications authority.
- **Electronic Transactions Order.** This order provides the legal framework for electronic transactions in Brunei Darussalam, recognising the validity and enforceability of electronic records, signatures, and contracts.
- **Computer Misuse Order.** This order protects digital activities from offences such as unauthorised access, modification, interception, or impairment of computer data or systems. It also addresses the possession or distribution of hacking tools or devices.

Recommendations

1. **Regulation of emerging technologies.** Clear ethical guidelines and principles should be incorporated into the regulatory framework for emerging technologies such as AI, Big Data, and IoT. These guidelines must align with national values and international standards. Reinforcing data protection and privacy regulations is crucial to ensure responsible use of data collected through IoT devices, giving individuals control over their data. Furthermore, innovation incentives should be implemented to encourage companies and start-ups to develop AI, Big Data, and IoT solutions that address societal or business challenges whilst adhering to regulatory requirements.

2. **Cross-border regulatory framework.** Brunei Darussalam, along with Indonesia and Malaysia, shares Borneo, the world's third-largest island, home to 23 million people. The island's strategic location presents an opportunity to create cross-border digital platforms that can connect businesses and consumers across the region. Digital payments offer a simple and low-cost alternative for those without access to traditional banking services. Additionally, the logistics and supply chain infrastructure in Borneo needs development to support the digital economy. Digital freight platforms can connect businesses with transport providers and track goods, improving efficiency and transparency. Enhancing transport infrastructure, such as roads, railways, and ports, is essential for more efficient movement of goods and services.

Enhancing digital cross-border connectivity would greatly benefit the digital economies of Brunei Darussalam, Indonesia, and Malaysia. This would open new opportunities for trade and investment, contributing to economic growth. Improved connectivity would enable Brunei Darussalam businesses to access larger markets, diversify revenue streams, and foster collaboration and knowledge sharing amongst entrepreneurs and innovators. It would enhance digital services and infrastructure, such as e-commerce platforms and online payment systems, benefiting businesses and consumers. Moreover, it would create jobs, drive skills development, and nurture a thriving start-up ecosystem. Enhanced connectivity would facilitate tourism promotion, cultural exchange, and government collaboration, fostering economic integration and sustainable growth across the region.

When cross-border digital transactions occur, policies on data privacy and security should address cross-border data transfers, ensuring that data is protected to the same standards regardless of location. Data localisation requirements, which mandate that certain types of data be stored locally, should also be considered to enhance data privacy and security.

Brunei Darussalam has been actively engaged in regional and international cooperation frameworks to promote trade, the digital economy, and cross-border activities. As a member of the ASEAN Free Trade Area and various ASEAN-led free trade agreements, Brunei Darussalam participates in negotiations for the Regional Comprehensive Economic Partnership and is a signatory to the ASEAN Agreement on Electronic Commerce. Brunei Darussalam is involved in negotiations for the ASEAN Digital Economic Framework Agreement and is a founding member of the Digital Economic Partnership Agreement, demonstrating its commitment to fostering a conducive environment for the digital economy.

Policy 3: Strengthening Digital Skills and Innovation

Brunei Darussalam has achieved high internet adoption and a low level of digital divide, providing a solid foundation for national development. The narrow digital divide is characterised by widespread internet access and strong ICT skills across different age groups. Whilst Brunei Darussalam boasts a high level of digital literacy, specific upskilling policies are necessary to meet the demands of emerging technologies such as IoT, AI, cyber-physical systems, machine learning, and Big Data, particularly in response to 4IR.

One policy recommendation is the implementation of Education 4.0. This forward-looking learning strategy aligns with the demands of the upcoming 4IR (QS, 2019). To bridge the digital gap and prepare students for the future, the education system, from primary to higher education, needs to develop curricula that meet the requirements of Education 4.0 (Samiha et al., 2022). Curriculum redesign is crucial to prepare Brunei Darussalam's future workforce (Anshari et al., 2022). Whilst Education 4.0 will require the current workforce to enhance their ICT skills and knowledge, the full potential of digital technology cannot be realised without adequate education and skill training.

To promote innovation in digital skills, specific policy measures can be adopted:

1. **Develop a national digital skills strategy.** Identify the key digital skills required to sustain the digital economy.
2. **Allocate funds for digital skills programmes.** Government funding should support digital skills initiatives.
3. **Collaborate with the private sector.** Governments should partner with private companies to co-develop and deliver digital skills programmes.
4. **Encourage research and innovation in digital skills education.** Continuous innovation in education and training is essential to keep pace with the rapidly evolving digital landscape.

These measures collectively contribute to fostering innovation in digital skills and ensuring that the workforce is well-prepared for the challenges and opportunities presented by 4IR.

Policy 4: Digital Infrastructure Development

All the above policy recommendations require a solid foundation of digital infrastructure. Fast and affordable internet connectivity is a necessity. Digital data and service providers must expand access to internet work connections, especially in rural or remote areas, by providing reliable mobile data infrastructure. Affordable internet services should be a priority, improving broadband affordability across Brunei Darussalam to encourage broader participation in the digital economy. The business sector should invest in developing digital infrastructure initiatives, such as fintech (digital payment, crowdfunding, peer-to-peer lending) and digital marketplaces. Enhanced digital infrastructure will enable businesses to extend their market reach beyond Brunei Darussalam, whether regionally or internationally.

Businesses should adopt new approaches and technologies associated with 4IR, such as 5G networks, Big Data, 3D printing, IoT, AI, and expert systems. These technologies will support optimisation and provide a competitive advantage in the local market whilst expanding market opportunities across Borneo, ASEAN, and Asia.

6. Conclusion

The oil and gas sector remains the main contributor to Brunei Darussalam's economy, but the government is taking steps towards developing a digital economy to achieve economic diversification. Central to this effort is the creation of a digital economy ecosystem, which will transform extensive digital activities into thriving digital business activities. The digital economy ecosystem will drive progress in various niche areas where Brunei Darussalam can excel, such as the halal hub and the Islamic financial hub. This will stimulate the movement of goods, people, and services; encourage new investments; create jobs; and further diversify the economy. Brunei Darussalam can position itself as a leading destination for health tourism, empower its population with digital skills, foster regional collaboration, and ensure a resilient digital infrastructure. These policy recommendations will enable Brunei Darussalam to fully harness the potential of the digital economy.

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Chapter 2
The Digital Economy in Cambodia

Pheakdey Heng

1. Introduction

Cambodia has emerged as one of the world's fastest-growing economies, maintaining an average gross domestic product (GDP) growth rate of over 7.7% from 1998 to 2019 (World Bank, 2022). However, the coronavirus disease (COVID-19) pandemic significantly impacted the economy in 2020, leading to a 3.1% contraction in GDP. Despite this setback, economic recovery gained momentum in 2022, with real growth accelerating to 5.2% (World Bank, 2023). As Cambodia transitioned to the 'living with COVID-19' phase towards the end of 2021, the economy firmly returned to its pre-pandemic growth trajectory. According to the World Bank's projections, Cambodia is expected to achieve a GDP growth rate of 5.5% in 2023 (World Bank, 2023). The country's economic growth has been driven by various sectors, including agriculture, manufacturing, and services, with the digital economy increasingly becoming a key driver of growth.

The digital economy in Cambodia encompasses the production, distribution, and consumption of goods and services through digital technologies. The term includes a wide range of activities, such as e-commerce, digital payments, digital media, and online services.

Although still small and in its early stages of development, Cambodia's digital economy has shown significant potential. The Asian Development Bank (ADB) estimated that Cambodian tech and digital businesses reached $470 million in 2019, with online travel accounting for 37.9%, e-commerce 27.6%, e-services 7.8%, digital media 10.2%, advertising technology 12.7%, and transport 3.8% (ADB, 2021).

However, Cambodia's digital adoption has been lagging compared with other countries in the region. The World Bank's Digital Adoption Index, which measures countries' digital adoption across the dimensions of people, government, and business, placed Cambodia at a low score of 0.4 on a scale of 1.00 in 2016. A more recent Global Readiness Index also ranked Cambodia low (92nd out of 146 countries), indicating a limited readiness for digital adoption (CISCO Global Digital Readiness Index 2021).

Table 2.1. ASEAN Digital Readiness Index

Country	Overall DRI Score	Basic Needs	Business & Government Investment	Ease of Doing Business	Human Capital	Start-Up Environment	Tech Adoption	Tech. Infra.
Singapore	2.37	0.93	1.83	1.69	1.67	4.16	2.1	1.95
Malaysia	0.46	0.58	-0.08	0.89	0.5	-0.1	0.58	0.43
Thailand	0.32	0.65	-0.31	0.7	0.36	-0.44	0.73	0.24
Vietnam	0.22	0.44	-0.42	0.28	1.11	-0.46	0.29	0.1
Philippines	-0.25	0.15	-0.35	0.09	-0.23	-0.57	0.12	-0.74
Sri Lanka	-0.32	0.54	-0.77	-0.41	-0.22	-0.49	-0.23	-0.33
Cambodia	-0.38	-0.31	-0.55	-1.34	0.31	-0.53	0.26	-0.14
Myanmar	-0.85	-0.61	-0.98	-0.75	-0.76	-0.6	-0.7	-0.73
Lao PDR	-0.89	-0.24	-0.88	-1.13	-0.14	-0.6	-1.28	-1.1

Source: Global Digital Readiness Index 2021.

The COVID-19 pandemic acted as a catalyst for digital transformation in Cambodia. The adoption of remote work, e-commerce, digital payments, digital education, and digital government services saw significant growth and adoption as organisations and individuals adapted to the challenges posed by the pandemic. These changes are likely to have a lasting impact on Cambodia's digital landscape as businesses and sectors continue to embrace and invest in digital technologies to navigate the evolving needs and expectations of a post-pandemic world.

Post–COVID-19 digital growth in Cambodia has been driven by several factors, including the rapid expansion of internet usage, the swift growth of mobile phone connections, and the country's youthful population. With more than 60% of Cambodia's population under the age of 25 (UNDP, n.d), this tech-savvy and digitally connected demographic is playing a crucial role in the nation's digital advancement. In recent years, the government has implemented a range of policies and initiatives to promote digital development, such as improving digital infrastructure, promoting digital literacy, and encouraging the growth of digital industries.

Overall, whilst Cambodia's digital economy is still in its infancy, it is experiencing rapid growth and holds the potential to transform the country's economy and society in the years ahead. As both the government and private sector continue to invest in digital infrastructure, education, and innovation, Cambodia's digital economy is poised to become an increasingly important driver of growth and development.

2. Digital Economy Policies in Cambodia

The regulatory environment for Cambodia's digital economy has been steadily evolving to keep pace with the rapid advancements in digital technologies and their impact across various sectors. The government has taken steps to promote and regulate the digital economy. This section outlines key policies relevant to the digital economy in Cambodia.

2.1. Pentagon Strategy Phase 1

Following the general election in July 2023, the newly formed government launched the Pentagon Strategy Phase 1, marking the first phase of its socio-economic agenda aimed at achieving Cambodia Vision 2050. The strategy prioritises five key areas: people, roads, water, electricity, and technology. Additionally, it emphasises economic diversification and competitiveness, private sector and employment development, resilient and sustainable development, and governance reform. The strategy is projected to sustain an average annual growth rate of 7%, create quality jobs for the youth, reduce poverty to below 10%, improve public services and institutions, and enhance environmental protection and adaptation (Supreme National Economic Council, 2023).

One of the main features of the strategy is the promotion of science, technology, and innovation (STI) as catalysts for growth and development. The government has adopted the National Science, Technology and Innovation Policy 2020–2030 and established the Ministry of Industry, Science, Technology and Innovation to coordinate STI initiatives. The government also supports the development of technology-based startups across various sectors, such as agriculture, education, health, and climate change. The goal is to foster a dynamic innovation ecosystem through collaboration amongst universities, research institutes, the private sector, civil society, and development partners.

2.2. Cambodia Digital Economy and Society Policy Framework 2021–2035

In 2021, the government adopted the Cambodia Digital Economy and Society Policy Framework 2021–2035, a comprehensive roadmap outlining the country's vision and strategies for leveraging digital technologies to drive economic growth, social development, and inclusivity (Supreme National Economic Council, 2021). The framework focuses on key areas such as digital infrastructure, e-commerce, digital skills, data governance, cybersecurity, and e-government. It aims to foster a thriving digital economy and build a digitally empowered society.

The framework is guided by three key principles: 'Establishing Digital Fundamentals,' 'Encouraging Digital Adoption,' and 'Driving Digital Transformation.' These principles provide a cohesive blueprint for prioritising and implementing policy measures within appropriate timeframes, taking into account Cambodia's affordability and capabilities in the digital sector. Key focus areas include the development of human resources and infrastructure in both the public and private sectors.

The Digital Economy and Society Policy Framework established the National Digital Economy and Society Council, which functions as the highest political institution responsible for guiding and formulating policies related to the digital economy and society. This council acts as the central authority for leading and coordinating inter-agency efforts, ensuring a unified approach to achieving the framework's objectives.

2.3. Digital Government Policy

Cambodia's Digital Government Policy 2022–2035 is a strategic document that outlines the vision, goals, principles, and action plans for building a digital government that can improve the quality of life and confidence of the people through better public service. The policy is based on the Cambodia Digital Economy and Society Policy Framework 2021–2035.

The policy defines digital government as 'the use of digital technologies and data to transform the way the government operates and delivers public services to citizens and businesses, as well as to enhance transparency, accountability, participation, and collaboration among all stakeholders'. The policy targets four main outcomes by 2035 (Ministry of Post and Telecommunications, 2022):

- A digital government platform that provides seamless, secure, and user-centric access to public services across multiple channels and devices.
- A digital government ecosystem that fosters innovation, collaboration, and co-creation amongst public sector entities, private sector partners, civil society organisations, academia, and citizens.
- A digital government workforce equipped with the skills, competencies, and mindsets necessary to embrace digital transformation and deliver value to the public.
- A digital government governance structure that ensures effective leadership, coordination, oversight, and evaluation of digital government initiatives across all levels of government.

To achieve these outcomes, the policy identifies six strategic goals and 18 strategic objectives covering various aspects of digital government development, such as digital infrastructure, digital identity, data governance, cybersecurity, digital literacy, digital inclusion, digital service delivery, digital innovation, digital leadership, and digital performance management. Each strategic objective is supported by a set of key performance indicators and targets to monitor progress and assess the impact of policy implementation.

The policy also provides a road map for achieving these strategic goals and objectives, divided into three phases: short-term (2022–2025), medium-term (2026–2030), and long-term (2031–2035). The road map outlines the key actions, responsible entities, expected outputs, and indicative budget for each phase. The policy emphasises the importance of a whole-of-government approach and multi-stakeholder engagement to ensure the successful transformation of the digital government.

2.4. Financial Technology Development Policy

The financial sector is a key driver of Cambodia's economic growth and development, playing a crucial role in promoting financial inclusion and social welfare. However, the sector faces significant challenges, including low financial literacy, limited access to financial services, high operational costs, cyber risks, and regulatory gaps. To address these challenges and leverage the potential of digital technology within the financial sector, the government launched the Cambodia Financial Technology Development Policy 2023–2028 in October 2023.

The policy outlines a long-term vision for fintech development, centred on enhancing financial inclusion, maintaining financial sector stability, and promoting financial innovation. The goal is to maximise the benefits of digital transformation in the financial sector, providing opportunities for all stakeholders and contributing to the acceleration of Cambodia's vibrant digital economy and society.

The Cambodia Financial Technology Development Policy 2023–2028 aims to create a thriving fintech ecosystem by focusing on four key areas, metaphorically represented as parts of a fintech tree (Digital Economy and Business Committee, 2023).

- **Development of policy enablers ('soil').** This involves creating a conducive environment through the formulation of policy frameworks, legal and regulatory adjustments, and interoperability frameworks. It emphasises building trust, fostering collaboration, and introducing new fintech innovations. This foundational 'soil' supports the growth of digital enablers, enabling technologies, and fintech activities.
- **Development of digital enablers ('roots').** This part focuses on promoting and developing digital tools and resources that support both fintech and broader digital development. These digital enablers act like strong roots, absorbing nutrients from the 'soil' (policy environment) to ensure the stability and growth of the 'tree' (fintech ecosystem).
- **Promotion of the use and development of enabling technologies ('trunk').** This entails advancing research, promoting technological literacy, and providing training to encourage the adoption of technology in both the public and private sectors. This strong 'trunk' of technology is vital to support the development and innovation of fintech activities.
- **Promotion of the development and innovation of fintech activities ('branches').** This focuses on diversifying fintech activities within the banking and non-bank financial sectors in an innovative way. Like branches bearing fruits, a variety of fintech activities in the market enhances access to financial services, builds trust, and improves consumers' quality of life.

The policy seeks to boost financial inclusion, especially for rural and underserved populations, through digital solutions. It aims to enhance efficiency and reduce costs for consumers and businesses by leveraging technologies such as artificial intelligence (AI) and cloud computing. The policy encourages competition amongst financial service providers, which could lead to improved offerings, attract investment into Cambodia's fintech industry, create jobs, and drive economic growth. Finally, it aims to establish a regulatory framework that supports innovation whilst ensuring financial sector stability, utilising technologies such as regtech and suptech for compliance and risk management.

The implementation of the policy will be overseen by the Digital Economy and Business Committee (DEBC), chaired by the Minister of Economy and Finance. The DEBC will coordinate with relevant ministries and institutions, including the National Bank of Cambodia (NBC); the Non-Bank Financial Services Authority; the Ministry of Posts and Telecommunications; the Ministry of Commerce; the Ministry of Education, Youth and Sport; the Ministry of Industry, Science, Technology and Innovation; the Ministry of Interior; the Ministry of Justice; the Ministry of Labor and Vocational Training; and other stakeholders such as financial service providers, fintech companies, industry associations, academia, civil society, and development partners. The policy will be reviewed and updated periodically to reflect the evolving needs and circumstances of the fintech sector.

3. Digital Economy: Progress and Challenges

This section discusses the key progress and challenges in four main pillars of Cambodia's digital economy: digital infrastructure, digital skills, regulations, and innovation.

3.1. Digital Infrastructure

Cambodia's digital infrastructure is still in its early stages of development, but it has seen rapid improvement in recent years. The expansion of broadband and mobile internet availability has enabled more people to go online. Internet service providers offer a range of options, including fixed-line broadband, 4G/LTE mobile data, and fibre optic connections.

According to a 2023 report by DataReportal, internet penetration in Cambodia has increased from 16% in 2012 to over 67.5% in 2023, with approximately 11.4 million people now online (Digital 2023: Cambodia). There are over 22.16 million mobile connections in the country, resulting in a mobile penetration rate of 131.5%, indicating that many people own multiple mobile devices (Digital 2023: Cambodia).

The International Telecommunication Union reports that Cambodia has 100% mobile cellular network coverage and 96% 4G network coverage (ITU, 2022). Fixed broadband penetration rate increased from 0.12% in 2010 to 2.2% in 2020, whilst mobile broadband penetration rate increased from 0.04% in 2010 to 56% in 2020 ((ITU, 2022). The government has invested in expanding the country's fibre optic network and improving mobile network quality. As of February 2023, Cambodia has five land and submarine fibre infrastructure operators and a 640-kilometre submarine fibre optic cable network in waters (KhmerTimes, 2023).

However, digital infrastructure remains a challenge in some parts of the country, particularly in rural and remote areas. The International Telecommunication Union indicates that only 8.4% of rural households had access to fixed broadband in 2020, compared to 31.7% of urban households. Whilst mobile broadband penetration has increased significantly, there are still regions with limited or no coverage.

The digital divide in Cambodia is a major challenge, particularly in rural and remote areas. Urban areas, such as Phnom Penh and major cities, generally enjoy better access to reliable internet connections, higher speeds, and more advanced digital infrastructure. In contrast, rural areas, where a large portion of the population resides, face limited connectivity and infrastructure challenges, making it difficult for residents to access digital technologies and online services.

The digital divide is a significant barrier to the growth of Cambodia's digital economy, as it limits the ability of businesses and individuals to access digital technologies and platforms. It also exacerbates existing inequalities, as those without access to digital technologies are less able to participate in the digital economy and benefit from its opportunities. Improving digital infrastructure and access is essential for the growth of Cambodia's digital economy.

3.2. Digital Skills and Education

Digital skills and education play a vital role in the development and growth of Cambodia's digital economy. The demand for skills such as computer literacy, coding, data analysis, digital marketing, and cybersecurity is increasing across various sectors, including technology, e-commerce, finance, and entrepreneurship. Whilst progress has been made in recent years, challenges remain in terms of acquiring digital skills and ensuring accessible education.

Efforts have been made to integrate digital skills training into the formal education system. The Ministry of Education, Youth and Sport has introduced digital literacy programmes in schools and universities to equip students with basic computer skills and knowledge. Vocational training centres and institutions offer specialised courses and certifications in digital skills to enhance employability.

However, access to quality digital education and training remains a challenge, particularly in rural areas. Limited internet connectivity, lack of infrastructure, and unequal distribution of resources contribute to the digital divide in education. The affordability of devices and training programmes is a barrier for some individuals, especially those from lower-income backgrounds.

A 2020 UNICEF study, which surveyed more than 15,000 students, caregivers, educators, and local authorities across 15 provinces, highlighted significant challenges faced by teachers and educational institutions in accessing information and communication technology devices and reliable internet connectivity. The study found that whilst 58% of respondents had access to electricity, only 32% had internet access, and just 23% had access to computers or tablets (UNICEF, 2021).

Collaboration between the government, private sector, and non-profit organisations has been vital in addressing the digital skills gap. Initiatives such as Tech Academy Cambodia, funded by private sector companies, aim to provide free or affordable digital skills training to young Cambodians, improving their employment prospects in the digital sector.

The digital economy has also sparked entrepreneurial activities in Cambodia. Startups and innovation hubs offer training, mentorship, and networking opportunities to aspiring entrepreneurs, fostering a culture of innovation and digital skill development.

Efforts are underway to promote digital literacy amongst women and bridge the gender gap in digital skills. Organisations like SHE Investments and Sisters of Code provide training and support specifically tailored to empower women and girls in the digital space.

3.3. Regulatory Environment

Cambodia's regulatory environment for the digital economy remains relatively new and underdeveloped. Countries such as Singapore and Malaysia have well-established regulatory frameworks that include comprehensive data protection laws, cybercrime and cybersecurity laws, intellectual property rights enforcement, and consumer protection measures.

Whilst Cambodia has enacted some laws and regulations related to the digital economy, gaps and inconsistencies still need to be addressed. Firstly, businesses and individuals lack awareness about the existing laws and regulations governing the digital economy, which can lead to compliance issues. Secondly, resource constraints within the government hinder the effective enforcement of these laws and regulations, leading to a compliance gap. Lastly, the fragmentation of responsibilities amongst various government agencies overseeing different aspects of the digital economy creates confusion and a lack of consistency within the regulatory environment.

For example, the lack of strong regulations and enforcement has made Cambodia a hotspot for cyber scams and fraud operations. According to various sources, thousands of people from Taiwan, Viet Nam, Thailand, and other countries have been lured and trapped into slavery by criminal gangs, mostly from China, who operate online scam centres in Cambodia. These victims are forced to work long hours in compounds surrounded by barbed wire, where they deceive and extort money from unsuspecting people online. Some of the scams involve online gambling, cryptocurrency, love scams, and money laundering. The United States has downgraded Cambodia to the lowest tier in its annual report on human trafficking, citing the government's failure to address this issue effectively (United States State Department, 2023).

Ongoing efforts are necessary to ensure the effective implementation and enforcement of regulations, adapt to evolving technological trends, and strike a balance between promoting innovation and protecting the rights and interests of individuals and businesses in the digital sphere.

3.4. Innovation

Cambodia's digital economy faces a major hurdle due to its low level of innovation, stemming from various factors that impede the country's ability to effectively create, adopt, and integrate new technologies. Ranked 101st out of 132 economies in the 2023 Global Innovation Index (GII), Cambodia is identified as one of the least innovative economies globally (World Intellectual Property Organization, 2023). The GII evaluates innovation performance based on multiple indicators, including institutions, human capital, infrastructure, market sophistication, business sophistication, knowledge and technology outputs, and creative outputs. In all these areas, except for creative outputs, Cambodia falls below the average for both its income group (lower-middle income) and its region (Southeast Asia, East Asia, and Oceania).

The country faces significant challenges in education, particularly in science, technology, engineering, and math fields, with a very low number of tertiary students pursuing these subjects. The country also faces a shortage of qualified researchers and innovators. Furthermore, Cambodia invests very little in research and development, allocating only 0.12% of its GDP, far below the global average. The governance system for science, technology, and innovation is weak, marked by a lack of coordination amongst stakeholders. Additionally, there is a deficiency of effective policies and institutions to support innovation activities, including safeguards for intellectual property rights, tax incentives, grants, loans, incubators, accelerators, and networks.

Cambodia's small domestic market offers limited incentives for innovation. Low income levels and the purchasing power of consumers reduce the demand for innovative products and services. Moreover, Cambodia faces stiff competition from neighbouring countries with more advanced digital capabilities and economies of scale. The country's exports remain heavily concentrated in low-value-added sectors like garments, footwear, and agriculture.

4. Conclusion and Recommendations

Cambodia's digital economy has come a long way in recent years. In my research paper 5 years ago, I proposed several policy recommendations to support the transformation of the digital economy (Pheakdey Heng, 2018). These included (1) developing a national digital economy strategy, (2) improving digital infrastructure, (3) boosting digital literacy, (4) promoting entrepreneurship and innovation, (5) building trust and security in the use of information and communication technology, and (5) demonstrating digital leadership. Since then, Cambodia has made significant progress in all these areas.

Cambodia's digital economy strategy and priorities are largely aligned with the broader ASEAN digital economy goals. The country has expressed strong support for this vision and identified several priority areas for its digital transformation, such as improving digital infrastructure and connectivity, enhancing digital literacy and skills, fostering digital innovation and entrepreneurship, strengthening data governance and cybersecurity, and promoting digital inclusion and empowerment. However, there are

still areas of misalignment with the ASEAN Digital Community 2045, such as the absence of a common digital identity system, low levels of intra-regional data flows, and insufficient coordination of digital policies and initiatives. Cambodia must address these gaps and challenges to fully realise the benefits of the ASEAN Digital Community 2045.

To sustain the growth of the digital economy, the following policy recommendations should be considered:

- **Increase public and private investment in digital infrastructure.** Invest in broadband networks, data centres, cloud services, and cybersecurity systems to improve the connectivity, reliability, and affordability of digital services.
- **Enhance digital skills and literacy.** Focus on increasing digital skills and literacy amongst the population, especially the youth, women, and rural communities, through formal and informal education, training, and awareness programmes to ensure greater digital inclusion and participation.
- **Strengthen the legal and institutional environment.** Enact and enforce laws and regulations on data protection, privacy, consumer rights, intellectual property, e-commerce, and digital taxation to foster trust and confidence amongst digital users and providers.
- **Promote innovation and entrepreneurship in the digital sector.** Support digital start-ups and small and medium-sized enterprises, facilitate access to finance and markets, create innovation hubs and incubators, and encourage collaboration amongst stakeholders to stimulate growth and competitiveness in the digital economy.

Cambodia should consider leveraging the emergence of novel technologies such as AI, blockchain, and the Internet of Things (IoT) to sustain the expansion of its digital economy. These technologies hold significant potential to revolutionise various sectors, including agriculture, healthcare, and finance.

By embracing these emerging technologies, businesses can enhance their operational efficiency and productivity, enabling them to become more competitive in the global market. For instance, AI can automate repetitive tasks, while blockchain can ensure secure and transparent transactions, benefiting businesses across industries.

Blockchain and other emerging technologies can play a crucial role in promoting financial inclusion for underbanked and unbanked populations. Blockchain-based financial systems can facilitate secure and cost-effective transactions, reducing reliance on intermediaries and expanding access to financial services.

The adoption of emerging technologies also promises to improve healthcare accessibility and quality. AI can assist in early disease detection and diagnosis, whilst IoT can enhance patient monitoring and treatment, contributing to more effective healthcare delivery.

In the agricultural sector, emerging technologies have the potential to increase crop yields and reduce waste. IoT sensors can monitor soil moisture levels, optimising irrigation practices, while AI can detect and prevent crop diseases, improving agricultural productivity.

Emerging technologies can further accelerate the growth of e-commerce. AI can personalise e-commerce experiences, tailoring recommendations to individual preferences, whilst blockchain can ensure secure and transparent transactions, fostering trust and confidence in online transactions.

By embracing these emerging technologies, Cambodia can unlock new possibilities, drive innovation, and create a digitally advanced economy that benefits businesses, individuals, and society. However, realising the full potential of these technologies will require concerted efforts from both the government and the private sector.

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Chapter 3
Indonesia's Development of Digital Economy

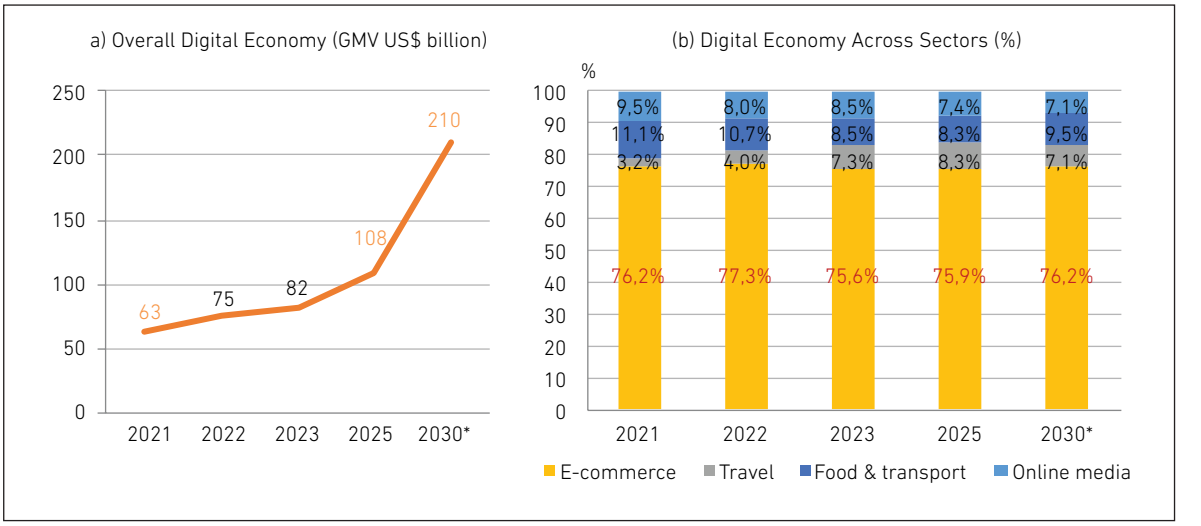
Chaikal Nuryakin

1. Introduction: Development of the Digital Economy in Indonesia

The digital sector's development has permeated numerous areas in Indonesia due to the extensive adoption of digitalisation. Digital development has entered multiple critical sectors, becoming a main driver of national progress. The Golden Indonesia Vision 2045 (Visi Indonesia Emas 2045), introduced by the Ministry of National Planning and Development, outlines four main goals, one of which is to cultivate a workforce proficient in science and technology. In alignment with the national development agenda outlined in the Golden Indonesia Vision 2045, the Ministry of Communication and Informatics has formulated the Digital Indonesia Vision 2045 (*Visi Indonesia Emas 2045*), which serves as a strategic framework for advancing the nation's digital transformation. This digital vision prioritises strengthening digital infrastructure to develop a robust digital ecosystem, focusing on data security and safety, human resources in digital sectors, digital research and development, and digital regulation and policy.

Recent years have seen a marked increase in the value of digital activities in Indonesia. According to statistics from Google, Temasek, and Bain & Company (2023), Indonesia's Gross Merchandise Value (GMV) in 2021 was US$63 billion, rising to US$82 billion in 2023 (Figure 3.1 [a]), reflecting a 30% increase over 2 years. As digital technology continues to integrate into broader sectors, projections estimate that this value will soar to US$210 billion by 2030. Within the digital sector, e-commerce has consistently commanded the largest share of Indonesia's GMV. Projections indicate that e-commerce will maintain a 76.2% share of total GMV in 2030, whilst the online media sector's share is expected to decline. Figure 3.1 (b) shows detailed information on the digital economy's GMV in Indonesia over recent years. In terms of its contribution to gross domestic product (GDP), the digital economy accounted for 6.12% (Rp1,490 trillion) in 2021 (Kementerian PPN/Bappenas, 2022). This contribution is expected to rise to 20.7% (Rp22,513 trillion) by 2045.

Figure 3.1. Digital Economy Gross Merchandise Value of Indonesia

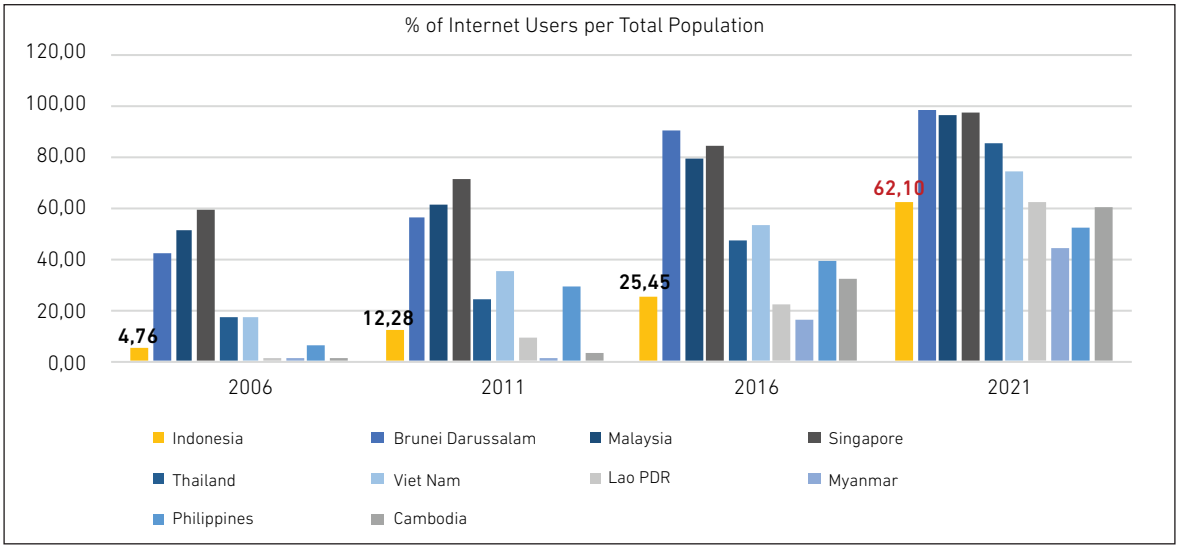


Source: Google, Temasek, and Bain & Company (2023).

2. Potential of the Digital Economy

Indonesia's digital economy holds considerable potential, particularly when compared with other ASEAN Member States. In 2022, Indonesia's population was approximately 274.86 million, and the country is expected to enjoy a demographic dividend until 2045 (Statista, 2022). The large population provides a substantial direct market for the digital economy in Southeast Asia. Figure 3.2 shows the increasing percentage of the population amongst ASEAN Member States from 2006 to 2021. Indonesia has seen a significant increase in the share of internet users, from 4.76% in 2006 to 62.10% in 2021. As the population continues to grow in the coming years, the number of active internet users is also expected to increase.

Figure 3.2. Share of Internet Users per Total Population (%)

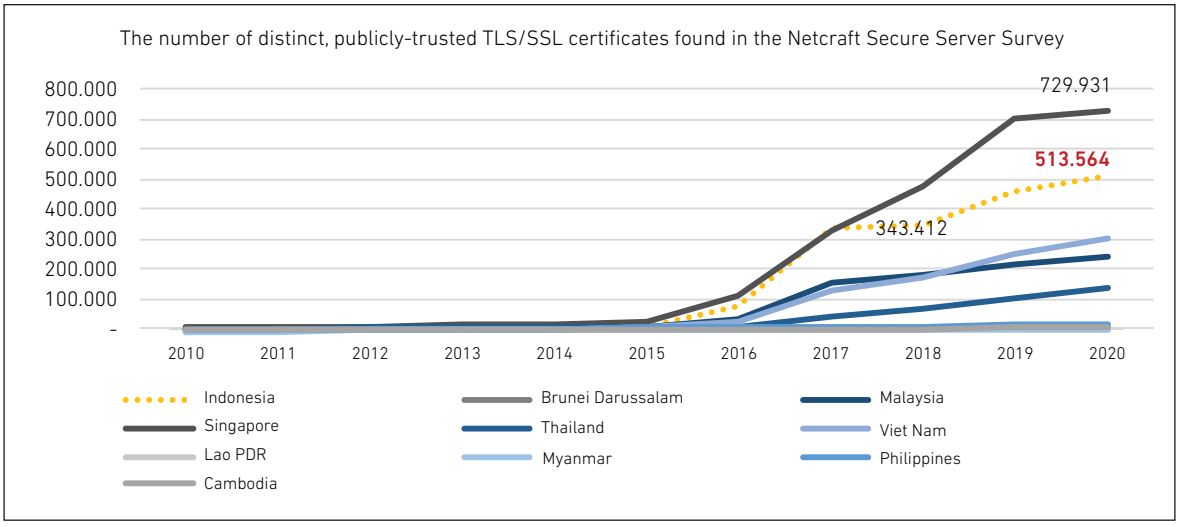


Lao PDR = Lao People's Democratic Republic.

Source: World Bank (2022a).

Beyond the direct potential provided by its population and active internet users, Indonesia also shows potential in terms of secure internet servers. These servers are measured by the number of distinct, publicly trusted secure sockets layer and transport layer security (SSL/TLS) certificates in the Netcraft Secure Server Survey. According to World Bank data (2022b), the number of secure internet servers in ASEAN Member States from 2010 to 2020 increased significantly. Whilst digital economies were still in their infancy in 2010, with limited servers available, the number of secure internet servers in these states began to grow rapidly from 2015 onwards. By the end of 2020, Indonesia ranked second amongst ASEAN Member States, behind only Singapore, in the number of secure internet servers.

Figure 3.3. Number of Secure Internet Servers

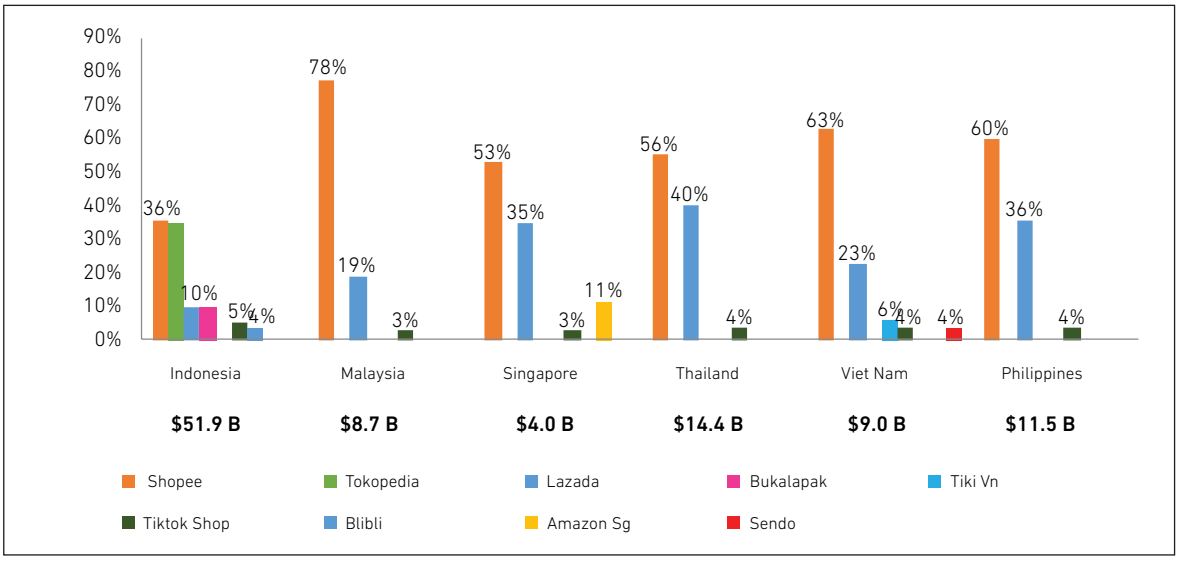


Lao PDR = Lao People's Democratic Republic, SSL/TLS = secure sockets layer and transport layer security.
Source: The World Bank (2020).

Another key aspect of Indonesia's digital economy is the active GMV in e-commerce and food delivery in 2022. Across Southeast Asia, numerous digital platforms have contributed to the convergence of the digital economy. E-commerce has been a major contributor, with platforms like Shopee, Lazada, Tokopedia, Bukalapak, TikTok Shop, BliBli, Tiki, Amazon, and Sendo leading the market. In 2022, Shopee dominated GMV across all Southeast Asian states, followed closely by Lazada in Malaysia, the Philippines, Singapore, Thailand, and Viet Nam. In Indonesia, Tokopedia's GMV stays close to that of Shopee (Figure 3.4).

Similarly, food-delivery service applications have witnessed a surge in demand due to the rapid adoption of technology and significant shifts in consumer behaviour. The total GMV of food-delivery platforms in Southeast Asia grew by a modest 5% year on year in 2022, reaching US$16.3 billion (Figure 3.5). Grab currently leads the market in most ASEAN Member States, although other food delivery platforms are beginning to expand their presence.

Figure 3.4. E-Commerce Gross Merchandise Value in Southeast Asia, 2022

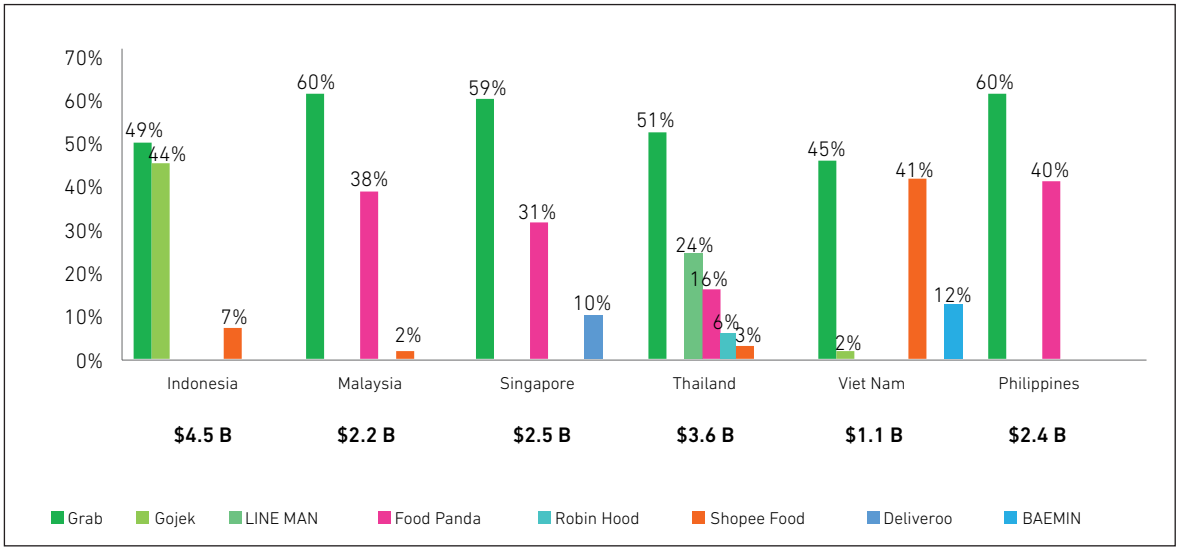


Notes: The 2022 GMV estimation by Momentum Works combines on-the-ground sources, including platforms, restaurants, delivery fleets, and other stakeholders. This estimate covers only food delivery orders from Grab, Foodpanda, Gojek, Deliveroo, LINE MAN, Baemin, ShopeeFood, and RobinHood. GMV includes all the orders made, including failed, canceled, and refunded orders. This estimate does not include food delivery orders not placed with any of the platforms, such as customers placing a phone / Whatsapp order directly with the restaurant, which in turn books Grab delivery / Lalamove to deliver the food.

$ = US dollar, B = billion.

Source: Momentum Works (2022).

Figure 3.5. Food Delivery Gross Merchandise Value in Southeast Asia, 2022



Notes: The 2022 GMV estimation by Momentum Works combines on-the-ground sources, including platforms, restaurants, delivery fleets, and other stakeholders. This estimate covers only food delivery orders from Grab, Foodpanda, Gojek, Deliveroo, LINE MAN, Baemin, ShopeeFood, and RobinHood. GMV includes all the orders made, including failed, canceled, and refunded orders. This estimate does not include food delivery orders not placed with any of the platforms, such as customers placing a phone / Whatsapp order directly with the restaurant, which in turn books Grab delivery / Lalamove to deliver the food.

$ = US dollar, B = billion.

Source: Momentum Works (2023).

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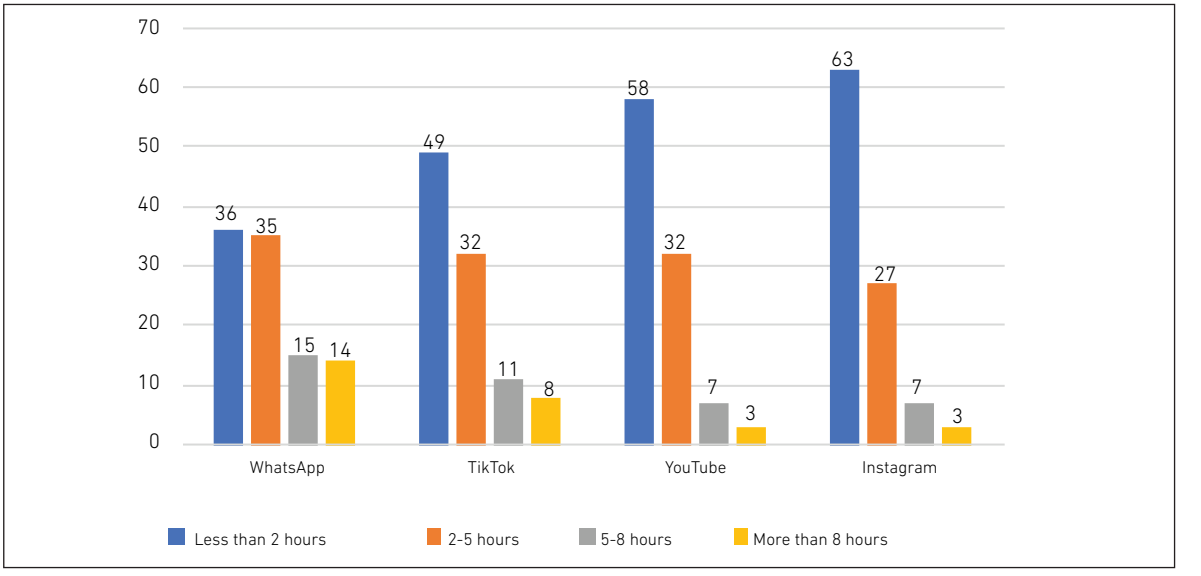
3. Challenges of Digitalisation

Indonesia faces challenges in its digital sector, primarily concerning human resources, network infrastructure, ecosystems, data management, and security. The use of the internet could be more productive and discerning. Many Indonesians use the internet primarily for socialising – such as communicating via messaging apps and social media – and for entertainment, including streaming video and music, browsing the internet, online shopping, and playing online games. According to the National Digital Literacy Index Report, 15% of respondents spend 5–8 hours daily on WhatsApp, followed by 11% on TikTok (Figure 3.6). Moreover, many respondents struggle to identify hoaxes, with 12% admitting to spreading false information (Kemenkominfo, 2023a). Indonesia must also improve its digital skills. In 2019, its ranking for digital skills dropped to 52nd out of 141 countries (Table 3.1).

Figure 3.6. Duration of Social Media Access, 2022 (%)



Source: Kemenkominfo (2023a).

Table 3.1. Ranking of Digital Skills in the Population 2017–2019

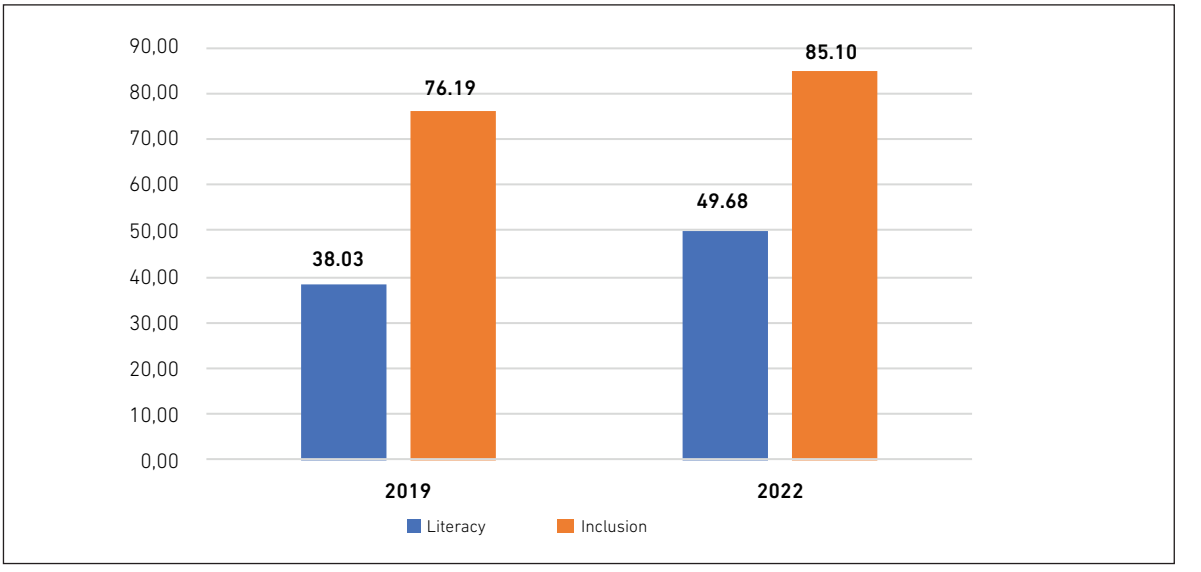
Countries	2017	2018	2019
Brunei Darussalam	47	46	35
Cambodia	109	107	112
Indonesia	34	39	52
Lao PDR	72	81	74
Malaysia	13	11	10
Philippines	48	24	22
Singapore	7	6	5
Thailand	57	61	66
Viet Nam	79	98	97
Number of Countries in the Ranking	131	139	141

Lao PDR = Lao People's Democratic Republic.

Source: World Economic Forum (2019).

Whilst Indonesia's financial inclusion reached 85.10% in 2022, it must be complemented by solid financial literacy to ensure safe and effective financial practices. Unfortunately, financial literacy lags behind financial inclusion (Figure 3.7), which has adverse effects on the economy, including low savings rates, a tendency to borrow from informal lenders, and excessive debt amongst low-income households (Askar, 2020).

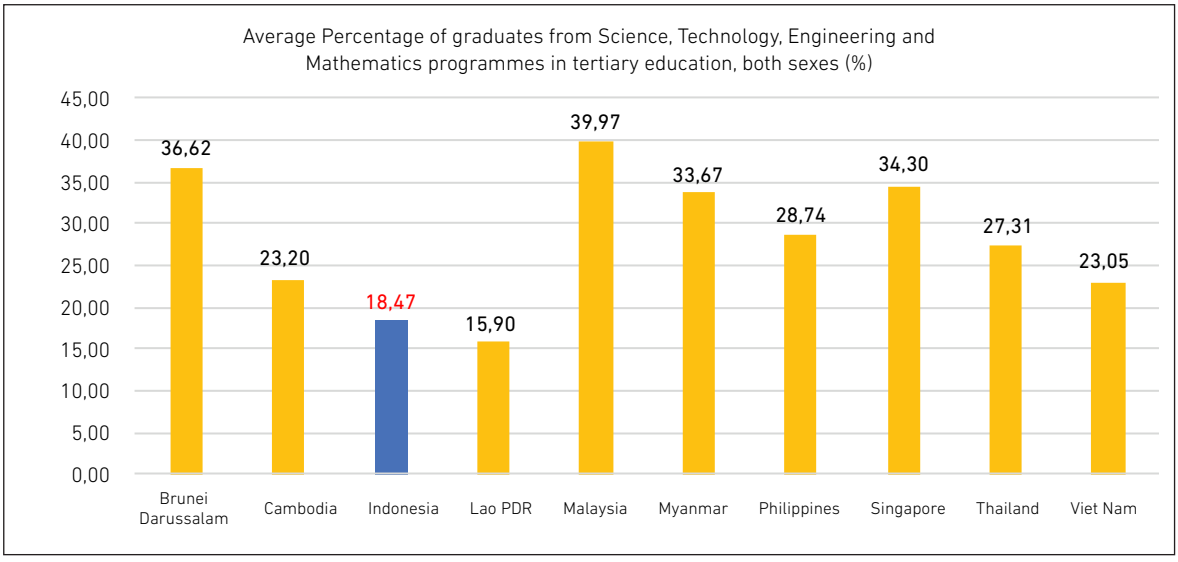
Figure 3.7. Financial Literacy and Inclusion Indexes (%)



Note: Financial Inclusion by OJK (Financial Services Authority) is based on using financial services, not owning an account. It differs from the World Bank Financial Index (Findex), which is based on account ownership.

Source: Otoritas Jasa Keuangan (2022).

Figure 3.8. Average Percentage of Graduates from STEM Programmes in Tertiary Education in ASEAN, 2015–2019



Lao PDR = Lao People's Democratic Republic.

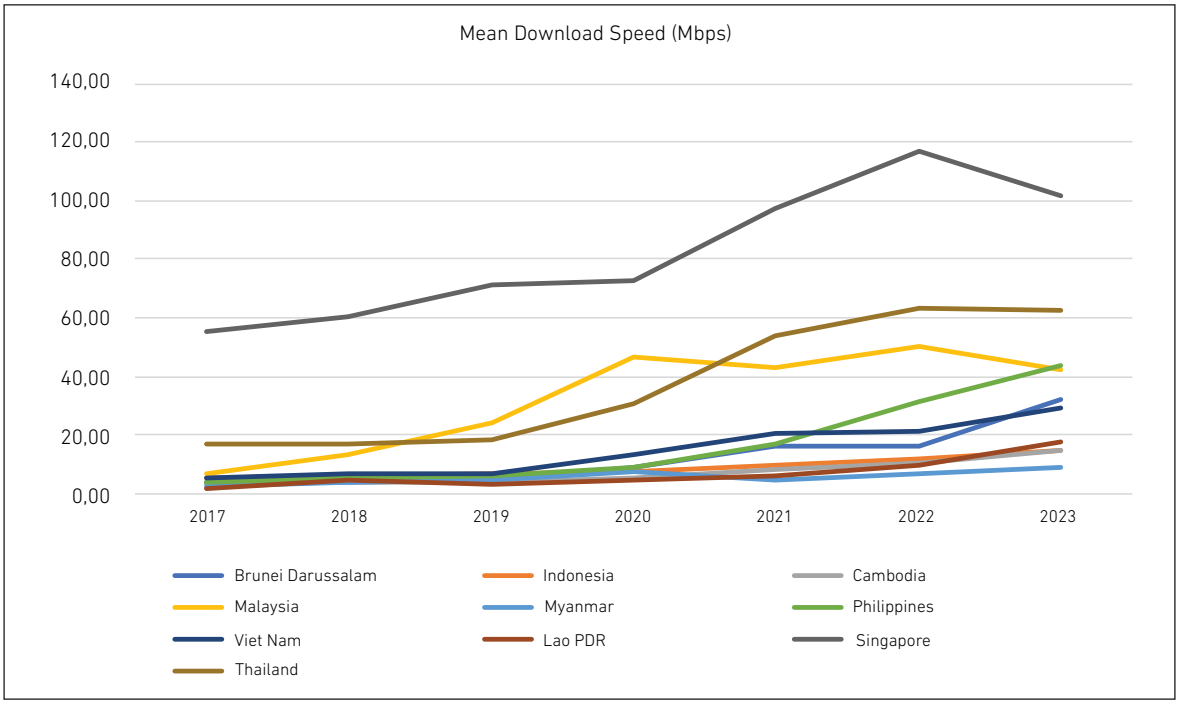
Source: World Bank (2023).

The World Bank (2018) projected that Indonesia would face a shortage of 9 million skilled and semi-skilled information and communication technology (ICT) workers in 2015–2030. However, in 2015–2019, Indonesia had the second-lowest number of STEM graduates in ASEAN (Figure 3.8). Despite the government's efforts over the past decades to create as many STEM jobs as possible (Chen, 2009, as cited in Shin et al., 2018), and even with increased financial incentives for STEM workers (Shin et al., 2018), the challenge persists.

Challenges related to the network infrastructure and ecosystems are exacerbated by Indonesia's archipelagic geography, which has led to a digital divide. The country requires more base transceiver stations (BTS) to provide widespread internet access. However, corruption cases related to the provision of 4G BTS in the 3T (frontier, outermost, underdeveloped) areas in 2022 have hindered the expansion of telecommunication infrastructure, thereby hampering equitable internet access. Indonesia's topography affects internet penetration; people living in hilly or mountainous areas are less likely to access the internet than those in lowland areas (Ardianti et al., 2023; Deng et al., 2019). This disparity is linked to the insufficient internet infrastructure in these challenging terrains (Deng et al., 2019, as cited in Ardianti et al., 2023).

The quality of telecommunication infrastructure needs improvement, as evidenced by internet speed. In 2023, Indonesia had the second-slowest average download speed in ASEAN (Figure 3.9). Although Indonesia's average download speed has increased nominally, it still lags the faster growth seen in other ASEAN countries.

Figure 3.9. Average Download Speed in ASEAN, 2017–2023

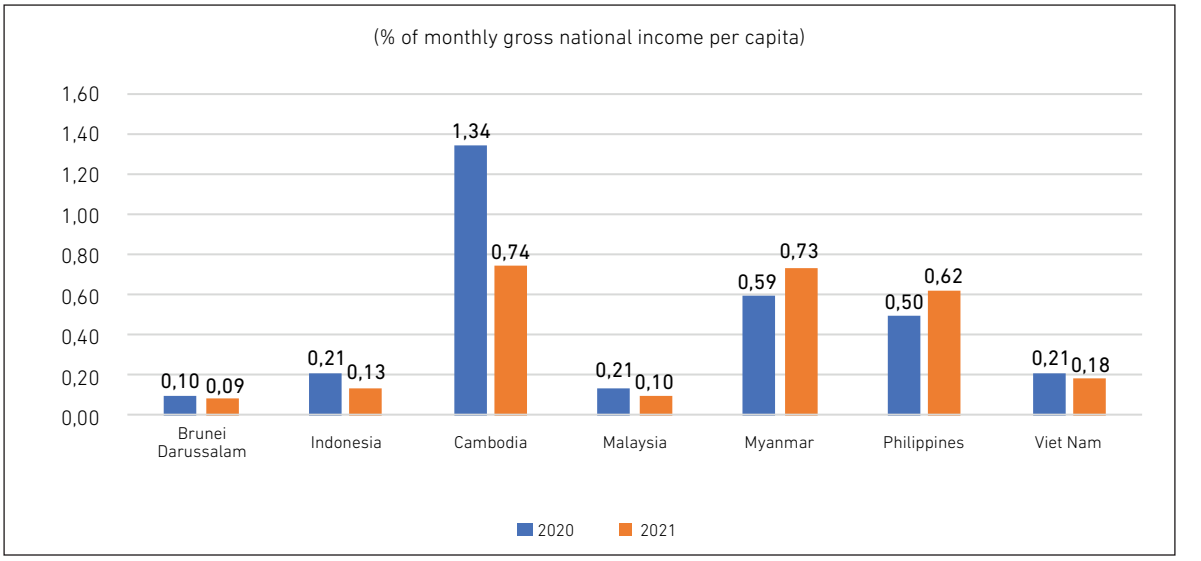


Lao PDR = Lao People's Democratic Republic.

Source: Cable (2023a).

This may be influenced by the low cost of internet services in Indonesia, which makes it challenging to improve the quality of telecommunication infrastructure. In 2021, Indonesia had the second most affordable internet tariff per 1 gigabyte amongst several ASEAN countries (Figure 3.10), and in 2020/2021, it had the fourth most affordable broadband cost in the region (Table 3.2).

Figure 3.10. Internet Tariffs per 1 Gigabyte in Several ASEAN Countries, 2019–2021



Sources: Cable (2023b), World Bank (2022b).

Table 3.2. Average Cost of Broadband per Month in Several ASEAN Countries, 2017–2021

(% of monthly gross national income per capita)

Countries	2017	2018	2019	2020/2021
Brunei Darussalam	12.70	5.44	6.04	5.40
Indonesia	24.42	9.08	9.55	9.35
Cambodia	51.33	30.48	28.50	29.49
Malaysia	5.31	3.56	3.48	3.69
Myanmar	63.06	18.87	28.86	22.89
Philippines	16.61	15.08	11.97	18.76
Viet Nam	27.13	4.53	4.33	4.21

Sources: Cable (2023c), World Bank (2022b).

Indonesia faces challenges related to data management and security, including national cybersecurity, data protection, and cross-border data flows. In terms of national cybersecurity, Indonesia has yet to secure patents for technological products. A Secure Code Warrior poll revealed that 86% of developers do not prioritise application security (Loviana, 2022). Despite the enactment of Law No. 27 of 2022 on Personal Data Protection, data breaches continued to occur in 2023, including the leakage of customer data from Sharia Bank (BSI) and the Directorate General of Population and Civil Registration (Dukcapil) under the Ministry of Home Affairs (DPR RI, 2023a; DPR RI, 2023b). From 1 January to 6 June 2023,

there were 19 reported cases of personal data protection failures (Kemenkominfo, 2023b). Cross-border data challenges are linked to a potential trilemma involving trade-offs between data mobility, personal privacy, security, and monetisation, with most countries able to achieve only two of these objectives (Rohman et al., 2022).

4. Digital Economy Policies and Regulations

The Ministry of Communication and Information, the Ministry of National Development Planning, and the Ministry of Industry are amongst the key institutions driving the core policies related to digitalisation. The Ministry of Communication and Informatics mainly aims to enhance digital connectivity and ensure universal access to high-quality networks and the Internet through efforts such as the development of telecommunication infrastructure. Specifically, the government, alongside the Ministry of Communication and Informatics, has implemented a strategic policy aimed at providing comprehensive internet coverage across Indonesia.

Table 3.3. Policies on Internet Access

Policy Issues	Regulations
Efforts to bridge the digital divide in areas lacking internet access have led to the implementation of various regulations.	• Presidential Regulation No. 96 of 2014 on Indonesian Broadband Plan 2014–2019 • Presidential Regulation No. 3 of 2016 on Accelerating the Implementation of National Strategic Projects • Presidential Regulation No. 56 of 2018 on Second Amendment to Presidential Regulation No. 3 of 2016 on Accelerating the Implementation of National Strategic Projects • Regulation of the Minister of Communication and Informatics No. 22 of 2015 on the Minister of Communication and Informatics Strategic Plan for 2015–2019 • Regulation of the Minister of Communication and Informatics No. 21 of 2016 on Amendment to Regulation of the Minister of Communication and Informatics No. 22 of 2015 on the Minister of Communication and Informatics Strategic Plan for 2015–2019
Amendment to Law No. 32 of 2002 concerning Broadcasting (Broadcasting Law) and Law No. 36 of 1999 concerning Telecommunications (Telecommunications Law) are expected to increase the availability of frequencies for internet access in rural areas and increase efficiency. Ultimately, these changes aim to make internet more affordable and improve its quality.	• Broadcasting Law • Telecommunications Law

Source: Bachtiar et al. (2020).

More specifically, digitalisation policies are supported by other ministries and institutions, including Bank Indonesia, the Financial Services Authority (OJK), the Agency for the Assessment and Application of Technology (BPPT), the National Cyber and Crypto Agency (BSSN), the Coordinating Ministry for Economic Affairs, the Ministry of Cooperatives and Small and Medium Enterprises, the Ministry of Industry, and the Ministry of Tourism and Creative Economy. Each institution has policies and regulations related to digitalisation tailored to its specific area of responsibility.

Table 3.4. Specific Policies Regarding Digitalisation

Policy Issues	Regulations
National Data Center construction	Ministry of Communication and Informatics
Increasing people's digital literacy	
Creation of digital start-ups	
Policy and standardisation of competence in ICT	
	Ministry of Communication and Informatics Ministry of Tourism and Creative Economy
BDE Incubation programme	Ministry of Tourism and Creative Economy
Development of innovation ecosystem, digital infrastructure, and industrial technology investment incentives 4.0	Ministry of Industry
Harmonisation of Regulations and Industrial Policies 4.0	Ministry of Industry
Formulation of Artificial Intelligence National Strategy	Agency for the Assessment and Application of Technology
Increasing digital literacy for micro, small, and medium-sized enterprises	Ministry of Tourism and Creative Economy, Ministry of Cooperatives and Small and Medium Enterprises
Digitising cooperatives and micro, small, and medium-sized enterprises	Ministry of Cooperatives and Small and Medium Enterprises
Development and strengthening of the cybersecurity response team	National Cyber and Crypto Agency
Strengthening infrastructure, human resources, and cybersecurity regulations	
Banking digitalisation	Bank Indonesia
Indonesian payment system regulatory reform	
Increasing the capacity of human resources and the role of research in the financial services sector	Financial Services Authority
Development of digital financial sector ecosystem regulations	
Business process reengineering licensing, regulation, and supervision	

Source: Rohman (2022).

However, the dispersion of these numerous policies and regulations across multiple institutions presents a significant challenge to the development of the digital economy. This issue is highlighted in Digital Indonesia Vision 2045, which underscores the need for greater integration and collaboration. Whilst Indonesia has developed various policies, regulations, road maps, and master plans in the digital sector initiated by multiple institutions, there has yet to be substantial progress in coordinating and synergising these efforts into a unified whole. For national digital development to succeed, the various pillars – digital infrastructure, digital economy, digital government, and digital society – must not be treated as separate entities with individual road maps.

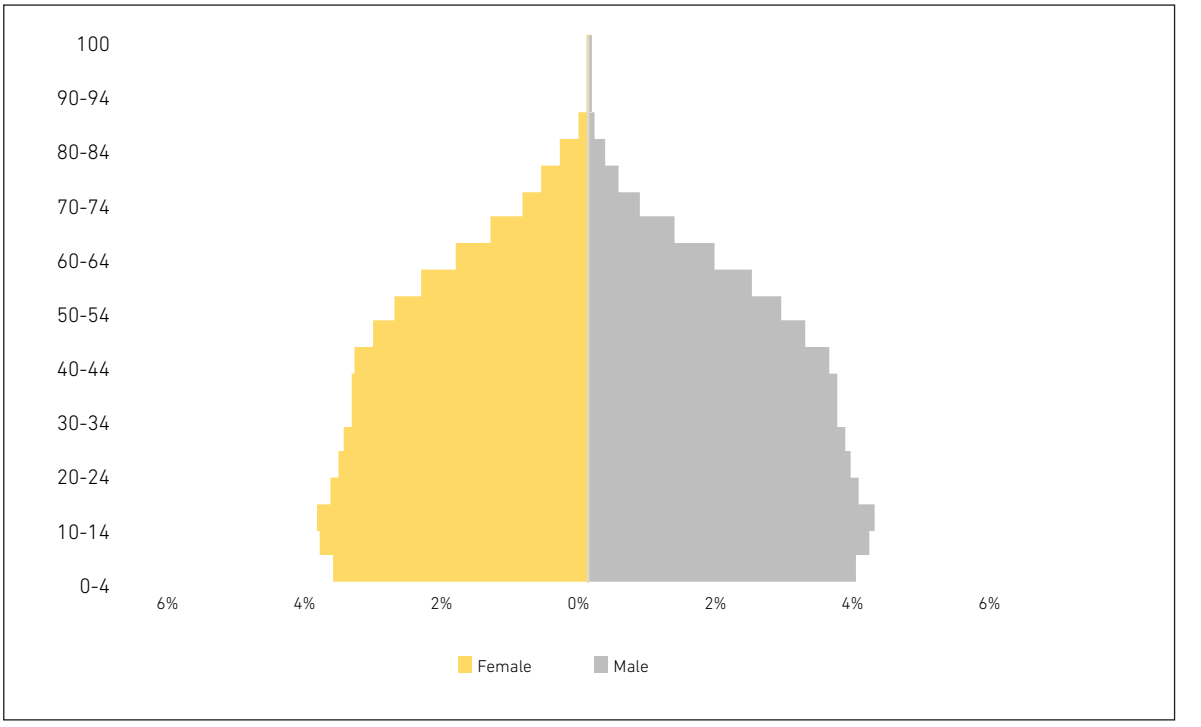
All ASEAN Member States, including Indonesia, may need to adopt regulations that strengthen the digital economy regionally. This could be achieved through initiatives such as the ASEAN Digital Community 2045, which would enable Member States to address regional challenges and fully realise their digital potential. Indonesia can play a key role in bringing ASEAN closer to a unified regional digital community by advocating for the ASEAN Digital Economy Framework Agreement. Singapore is the only ASEAN state to have implemented digital trade agreements, having signed the Digital Economic Partnership Agreement with Chile and New Zealand. Singapore has established several bilateral digital economy agreements with the Republic of Korea, Australia, and the United Kingdom.

5. Policy Recommendations

In 2022, Indonesia's population reached 275 million, with the demographic pyramid showing positive population growth (Figure 3.11). Younger people significantly outnumber the elderly, offering substantial potential. According to Ghoorah (2017), Gen Y is a highly digitally savvy group eager to adopt new technologies. It presents a valuable opportunity to enhance digital and financial literacy and increase the number of STEM graduates to bridge the digital talent gap. The government should prioritise training teachers in digital and financial literacy to ensure that these subjects are effectively taught. Improving critical thinking in teaching methods is essential to fostering innovation amongst students.

The vocational school curriculum could include a core area focused on several literacies, including tools and interfaces. This core area would cover computational basics, computer hardware, software and applications, networks, design, and augmentation. These skills involve understanding and using computer systems, hardware, applications, and elements of the created world. Such abilities relate to the fundamental principles of hardware and software in information technology, along with a basic understanding of computing design concepts and constraints.

Figure 3.11. Indonesian Population Pyramid



Source: Population Pyramid (2023).

Given Indonesia's archipelagic nature, satellite services offer a viable solution for improving network and internet access, providing an alternative for equitable telecommunication infrastructure deployment. The country has 17,508 islands, and satellite services are an efficient way to overcome geographical challenges and cover remote areas more effectively than fibre-based networks. However, the high costs associated with procuring satellites compared with land-based cellular networks cannot be overlooked. The Ministry of Communication and Information made a strategic move by launching the SATRIA-1 Satellite (Satelit Republik Indonesia) to bridge the digital divide. Opening the market for satellite internet services to foreign providers could prove more cost-effective than producing and launching state-owned satellites.

Indonesia must strengthen the enforcement of Law No. 27 of 2022 on Personal Data Protection. The government and developers should enhance the security of their applications, websites, and databases. Indonesians can improve personal protection measures by installing features such as Find My Device, anti-virus software, full disk encryption, data backups, and file shredding (Kemenkominfo, 2023a).

Finally, the various road maps, master plans, policies, and regulations governing the digital economy are spread across multiple institutions, underscoring a classic coordination issue. Establishing a single ministerial body, as Thailand has done, to orchestrate and synergise the digital economy could effectively address this challenge. Enhanced digital coordination in Indonesia could be achieved through the overarching vision of Digital Indonesia Vision 2045 under the supervision of the Ministry of Communication and Informatics. To further support the digital economy through international collaboration, the country could leverage the ASEAN Digital Community 2045, supervised by ASEAN. This programme would enable Indonesia to establish transparent coordination and traceability regarding the digital economy's status and development.

In addition to the ASEAN Digital Community 2045, Indonesia could strengthen international cooperation in the digital economy by adopting the Digital Economic Partnership Agreement framework. This framework aims to promote digital trade by regulating key aspects of the digital economy, including artificial intelligence, data flows and protection, and digital inclusion.

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Chapter 4
Digital Economy in Lao People's Democratic Republic

Phet Sengpunya

1. Introduction: Development of the Digital Economy in Lao People's Democratic Republic

Digital transformation holds the promise of economic growth for many countries and regions worldwide. Recognising this potential, Lao People's Democratic Republic (Lao PDR) has made the development of the digital economy a key priority in its 5-year national development agenda (Lao NA, 2021).

The digital economy encompasses all economic activities enabled by digital technologies, spanning industries such as e-commerce, digital media, fintech, and software as a service. According to Lao PDR's policy paper, the digital economy is defined as a new form of economy that leverages digital technologies to drive productivity and efficiency in both the public and private sectors, adding value to production, trade, and services and ultimately improving living standards (MTC, 2021).

As a landlocked country, Lao PDR views the emerging digital economy as a unique opportunity to integrate with regional and international economies, providing its people and businesses with access to larger foreign markets.

In 2019, the digital economy contributed 3% of gross domestic product (GDP), a figure comparable to the financial and insurance sectors, which contributed 4.4% and 3.0%, respectively (World Bank, 2022). The digital sector generated approximately LAK107.83 billion in revenue, marking a 6.6% increase from 2018. The information and communication technology (ICT) sector generated approximately LAK3,571 billion in revenue, a 7% increase from 2018. The digital economy's contribution to GDP is projected to rise to 10% by 2040 (World Bank, 2022).

Businesses are increasingly recognising the opportunities presented by digital transformation, adapting and creating new business models to develop ICT products. Digital start-ups are emerging and thriving (World Bank, 2022), with many domestic businesses developing ICT products that reach customers through mobile phones and the Internet. These include online lottery platforms, job search services, online financial services, transport booking, air ticket and accommodation booking apps, virtual tourism information, online education, and trading on social media platforms (MTC, 2021).

The government has been actively developing and adopting digital technology in its governance and public services. Over the past decade, the government has introduced several e-governance and public e-service programmes, including online tax, water, and electricity payments; electronic visa (e-Visa); online passport application; and intellectual property online application (IP e-Filing) (Mukherji et al., 2022). To support these initiatives, the country has continued to expand its telecommunications and high-speed internet infrastructure. In 2019, Lao PDR completed the installation of 90,258 kilometres of fibre optic cable, providing internet coverage to every district and province. Additionally, 7,882 cellular base stations were installed, covering 95% of the country's villages (Mukherjiet al., 2022). With these infrastructures in place, 3G and 4G networks now cover 82% of all districts and provinces and 55% of villages (Mukherji, P., Chatterjee, R., Sen, A., Kapoor, H., and Sambhar, A. 2022). In 2020, the country conducted a 5G network trial in select areas of its capital, Vientiane (Lao New Agency, 2020), and on 10 January 2024, during Lao Digital Week, it unveiled its first 5G internet service, operated by Lao Telecom (Laotian Times, 2024).

Despite these advancements, Lao PDR's digital economy lags behind other countries in the region. As of August 2022, the country ranked 9th out of 10 Association of Southeast Asian Nations (ASEAN) Member States in terms of digital access, quality, and affordability (World Bank, 2022). Lao PDR has the region's most expensive yet slow internet (Laotian Times, 2022). According to the ASEAN Digital Integration Index Report 2021, the country also scored low across various digital economy sectors (ASEAN Secretariat, 2021).

Table 4.1. ASEAN Digital Integration Index Scores

Country	Digital Trade and Logistics	Data Protection and Cybersecurity	Digital Payments and Identities	Digital Skills and Talent	Innovation and Entrepreneurship	Institutional and Infrastructural Readiness
Singapore	82.64	89.70	86.60	63.79	71.08	90.36
Thailand	83.34	87.91	69.73	43.76	56.09	62.61
Viet Nam	78.50	63.05	58.33	38.38	44.55	60.72
Malaysia	67.35	91.27	79.20	57.85	59.22	82.18
Indonesia	49.67	78.43	59.73	45.64	48.81	62.44
Philippines	60.61	72.49	31.89	53.13	46.93	58.89
Brunei	54.97	67.46	87.56	53.31	42.99	71.42
Cambodia	33.91	24.76	41.20	36.56	38.19	50.97
Lao PDR	23.22	32.58	44.53	43.89	36.91	38.27
Myanmar	18.51	20.41	32.93	19.58	44.65	44.60

Lao PDR = Lao People's Democratic Republic.

Source: ASEAN Secretariat (2021).

Several factors hinder the growth of Lao PDR's digital economy, including low levels of internet penetration, limited access to venture capital, poor digital infrastructure, and more. However, data from Data Reportal indicates that internet usage in Lao PDR is increasing rapidly. In 2023, the number of internet users rose from 2.70 million in 2019 (DataReportal, 2019) to 4.70 million (DataReportal, 2023). This surge suggests significant potential for the growth of the country's digital economy.

2. Potentials for the Development of the Digital Economy in the Lao People's Democratic Republic

Lao PDR possesses considerable potential for developing its digital economy. Strategically located in the heart of the region, the country has access to large and emerging markets for digital goods and services, with the potential to become the region's logistic hub. This strategic advantage supports Lao PDR's ambition to transform from a 'landlocked' to a 'land-linked' country (ITC, 2021). The official launch of the Laos–China Railway operation on 2 December 2021 exemplifies this transformation, enhancing logistics and connectivity within the country and linking Lao PDR with ASEAN and China. This development is an important step towards Lao PDR's goal of becoming a regional logistics distribution centre, which will also help accelerate the growth of its digital economy and contribute to national economic development (Vientiane Times, 2022).

The government is highly committed to advancing the digital economy and has implemented numerous policies and initiatives to promote the development of digital infrastructure, digital literacy, and e-commerce. The government recognises the opportunities that digitalisation presents for national development (see MTC [2021]). Lao PDR has established basic telecommunication and internet infrastructures across the country and has adopted most of the relevant laws and regulations to support the digital economy. Various initiatives have been introduced to drive digital transformation and the development of the digital economy, including the creation of favourable policy and regulatory environments, the development of human resources, and investment in telecommunications and internet infrastructure (MTC, 2021).

The private sector is embracing digitalisation to transform businesses and services. For instance, companies and vendors are increasingly adopting e-payment systems, restaurants are partnering with delivery service providers to feature on the apps, and taxi services are collaborating with online ride-hailing service platforms. In recent years, digital start-ups have emerged, contributing to innovations and growth within the digital economy. These start-ups are developing a range of innovative solutions in areas such as e-commerce, financial services, online ride-hailing services, and food delivery (World Bank, 2022).

Lao PDR has one of the youngest and fastest-growing populations in the ASEAN region, with nearly 60% under the age of 25 (UNFPA, 2023). This large young population presents substantial potential for the development of the digital economy as they are more likely to adopt digitalisation and new technologies. The middle class is driving increasing demand for new digital products and services (Chun, 2010).

The development of the digital economy could bring several positive benefits, including the following:

- **Improved government services**. Digitalisation will enable the government to enhance public service delivery. The government could use digital technologies to offer more online services at both central and local government levels, making it easier for citizens to access government services.
- **Increased economic growth and job creation.** The digital economy has the potential to drive economic growth and create new jobs. For example, the growth of e-commerce could offer new opportunities for businesses of all sizes to access new markets and sell their products and services online. The digital economy could create new jobs in fields such as digital marketing, software development, and web design.
- **Enhanced financial inclusion.** The adoption of new digital technologies could improve financial inclusion across the country. Mobile banking and e-wallet services, for instance, could provide financial services to people even in remote areas.
- **Improved access to education and healthcare.** Digitalisation could help people access better education and healthcare, regardless of location. For example, students in rural areas could use online learning platforms to receive high-quality education, and patients could consult with doctors remotely via e-health services. However, this would require the expansion of good-quality internet infrastructure throughout the country.
- **Increased productivity and efficiency.** Digitalisation could help businesses in the country boost their productivity and efficiency. For example, companies could use software systems such as enterprise resource planning to automate business processes and gain better visibility into their operations.

The digital economy could benefit from several emerging trends, such as the growth of the Internet of Things (IoT), artificial intelligence (AI), and blockchain. By embracing the digital economy, Lao PDR could transform into a more prosperous and modern nation, positioning itself as a leader in the regional digital sector and attracting foreign investment and talent.

3. Key Challenges in the Digital Economy of the Lao People's Democratic Republic

The digital economy in Lao PDR is still in its early stages. Like many countries, Lao PDR faces opportunities and challenges in this sector. The following are key challenges hindering the growth of the digital economy:

Unfavourable regulatory framework. Despite the adoption of numerous laws and regulations over the past decade to support digital economy development, the legal framework remains fragmented and incomplete. There is also a lack of effective implementation and enforcement mechanisms (World Bank, 2018). Obtaining licenses for investment in the ICT sector is particularly difficult and time-consuming, which creates uncertainty and risk for businesses and investors. This has led to low confidence and trust amongst investors, further discouraging investment in the country's digital economy.

Limited digital infrastructure and connectivity. The digital infrastructure is underdeveloped, with unreliable and slow internet access, especially in remote areas (World Bank, 2018). The country's mountainous terrain poses significant challenges to expanding the infrastructure network to rural areas, slowing the development of the digital businesses and services. Although basic telecommunication and internet infrastructure exist, internet penetration remains low, and broadband infrastructure is limited to major cities. The internet is slow and expensive. Internet users are required to pay a monthly cybersecurity maintenance fee to the government (MTC, 2024), which can further deter individuals and businesses from accessing and utilising digital technologies, thereby hindering the growth of the digital economy.

Shortage of skilled labour. Lao PDR faces a shortage of skilled labour in the digital sector (Mukherji et al., 2022). Although the government has been encouraging the development of human resources, and the number of ICT workers is increasing each year, their quality remains limited. This shortage of digitally skilled workers is a significant challenge for businesses seeking to develop and implement digital solutions, creating uncertainty and difficulty in finding talent.

Low digital literacy. A large portion of the population, particularly the elderly and those in remote areas, lacks the basic digital knowledge and skills required to participate in the digital economy (UNICEF, 2023). The country has some of the poorest education indicators in the region (UNICEF, 2018). In 2017, approximately 70% of 5-year-olds in remote areas and from poor families did not have access to early childhood education (UNICEF, 2017). Many children in these areas do not speak the official Lao language used for the instruction. The quality of primary education is another concern, with only 81.9% of children who enrol in primary education completing their studies. The learning outcomes of the students are low, leaving them without essential knowledge and skills (UNICEF, 2017). This can significantly handicap the ability of a substantial portion of the population to adopt and participate in the digital economy, thereby limiting their ability to benefit from its opportunities.

Cybersecurity risks. Despite having laws and regulations in place to regulate cybersecurity and ensure data protection, Lao PDR lacks advanced digital technologies to prevent cyber threats (ITC, 2020). As a result, the country is vulnerable to cybersecurity attacks, such as data breaches, malware infections, and phishing. This vulnerability creates uncertainty and potential harm for businesses and individuals participating in the digital economy.

Consumer protection and data privacy concerns. Although Lao PDR has enacted the Law on Electronic Data Protection and Law on Consumer Protection, the commitment to enforcing these laws is lacking. Most consumers lack confidence and trust in online shopping and services, and there is no effective consumer redress mechanism for online activities (Chun, 2010). This lack of protection and trust is a significant barrier to greater consumer participation in the digital economy.

External shocks. The digital economy is vulnerable to external uncertainties, such as global economic downturns and geopolitical tension between superpower nations. For example, the country could be excluded from digital economy initiatives led by the United States or the European Union and diverge from their standards and regulatory frameworks due to its heavy dependence on China for economic development and political alignment.

The government is aware of these challenges and has initiated various measures, such as investing in digital infrastructure, developing digital literacy programmes, and strengthening cybersecurity. However, more effort is needed to establish a favourable environment for the digital economy to thrive.

4. Socio-Cultural and Political-Security Impact from the Development of the Digital Economy

The development of the digital economy has profound effects across various sectors, including socio-cultural and political-security aspects in Lao PDR, similar to its impact in many other countries.

4.1. Impact on Socio-Cultural Aspects

The digital economy can significantly influence culture and society. It has the potential to promote education and innovation by providing students and teachers with enhanced access to online resources, enabling them to acquire new skills and knowledge. This can lead to improvements in the quality of education and overall human resource development in the country (Runde et al., 2022). Digital technologies can empower entrepreneurs to start new businesses, fostering economic growth and innovation.

However, the digital economy may also exacerbate societal disparities. Individuals without access to digital technologies or basic digital literacy, particularly those in remote areas, may find themselves at a disadvantage in the job market or in accessing other digital opportunities. For instance, during the coronavirus disease (COVID-19) school closures, only 29% of financially better-off households were able to engage their school-aged children in online learning activities in 2021, up from 25% in 2020. The rate of online learning engagement was significantly higher in urban areas compared with rural areas (World Bank, 2021). The widespread dissemination of foreign cultural content online may contribute to the erosion of traditional culture.

4.2. Impact on Political-Security Aspects

The digital economy presents new opportunities and challenges in the political-security realm. On the one hand, it can enhance the efficiency and transparency of government operations. Digital technologies can facilitate better engagement between the government and citizens, streamline complex regulatory processes, improve the delivery of public services, and simplify the collection of citizen feedback (Rundeet al., 2022).

On the other hand, the digital economy may become a platform for dissidents to spread misinformation and propaganda, potentially mobilising opposition against the government. As businesses and government services increasingly move online, they become more attractive targets for hackers. This shift can also make Lao PDR more vulnerable to cyberattacks, which could disrupt essential services, lead to the theft of important data, and undermine economic confidence.

Overall, the development of the digital economy is likely to have a mixed impact on the socio-cultural and political-security landscape. The government will need to implement measures to mitigate the associated risks whilst maximising the benefits of the digital economy.

5. Review of Policies, Regulations, and Responsible Authorities

5.1. Digital Policy

Lao PDR has been gradually progressing in its digital transformation since participating in the e-ASEAN framework in 2000, which marked the country's initial interest in digitalisation. Over the years, a series of policies have been adopted to drive the development of the digital economy, including the National Socio-Economic Development Plans (NSEDP), the 20-Year National Digital Economic Development Vision 2021–2040 (Digital Vision), the 10-Year National Digital Economic Development Strategy 2021–2030 (Digital Strategy), and the 5-Year National Digital Economic Development Plan 2021–2025 (Digital Plan) (Lao NA, 2021). The Digital Vision outlines broad targets for the digital economy over the next 20 years. The Digital Strategy provides a decade-long roadmap for achieving these targets, whilst the Digital Plan details specific work plans for each of the 5 years to implement the strategies.

The 9th NSEDP, the country's most recent policy, seeks to promote a new-normal lifestyle and digital economy development. It seeks to establish electronic markets, modernise payment and revenue collection systems through mobile banking to move towards a cashless society and promote warehouse and dry port services. It focuses on innovation, technology, scientific research, and knowledge as drivers of socio-economic development. Under the 9th NSEDP, Lao PDR plans to launch a series of ICT and digital initiatives, such as a free public wi-fi project, an online ICT licensing system, a digital camp project, and the development of a digital index (MPI, 2021).

In 2023, the president appointed a committee to be responsible for the country's digital transformation. The committee is tasked with setting plans, strategies, policies, work plans, and mechanisms for digitalisation at central and local government levels. It will be involved in reforming and developing digital government, the digital economy, and digital society whilst facilitating the country's overall digitalisation. In addition, the committee will monitor the implementation of the Digital Vision, Digital Strategy, and Digital Plan (Vientiane Times, 2023).

Notwithstanding these policies, the development of the digital economy in Lao PDR lags behind that of its neighbouring countries. Progress on implementing the strategies and work plans under the Digital Vision, Digital Strategy, and Digital Plan has been slow, hampered by factors such as economic risk and uncertainty, high inflation, and the depreciation of the kip.

5.2. Legislation

Lao PDR has established laws and regulations (MOJ, 2024) to govern and promote ICT, electronic payments, electronic transactions, electronic commerce, electronic data protection, and the fundamental protection of online consumers. These laws and regulations provide a solid foundation for the development of the digital economy.

However, to keep pace with the evolving economy domestically and globally, these laws and regulations must be regularly reviewed and updated. Regardless of how comprehensive the laws and regulations are, their effectiveness depends on the government's commitment to rigorous implementation.

5.3. Responsible Agencies

Several key government agencies are responsible for the development of the digital economy:

Ministry of Technology and Communications (MTC). The MTC is the lead agency responsible for national technologies, the internet, telecommunications, innovation, cybersecurity, and postal services (PMO, 2021). It regulates and develops the telecommunications sector, promotes ICT usage across all economic sectors, and oversees the development of digital infrastructure. The MTC is tasked with developing and implementing policies and regulations related to the digital economy and promoting investment in the digital sector (World Bank, 2022).

Ministry of Industry and Commerce. The ministry is primarily responsible for e-commerce and online consumer protection. It develops and implements policies and regulations governing e-commerce and online consumer protection and promotes the adoption of online trade and services amongst businesses and consumers across the country (World Bank, 2022).

Bank of Lao PDR. The bank regulates the financial sector and is responsible for developing and promoting electronic payment systems. It is developing digital currency, financial technology, and other digital financial services (World Bank, 2022).

Ministry of Education and Sport and Ministry of Labour and Social Welfare. The ministries are jointly responsible for promoting digital literacy and the development of digital skills amongst the workforce (World Bank, 2022).

Numerous development partners and international organisations, including the International Telecommunication Union, the United Nations Development Programme, the World Bank, and the Asian Development Bank, also support the development of the digital economy.

6. Policy Recommendations

To promote the development of the digital economy, Lao PDR will require robust policy and legal frameworks, progressive digital transformation of government services, and strong digital infrastructures. Below are the author's policy recommendations for the future development of the digital economy in Lao PDR:

Establish a supportive legal environment for the digital economy. The government should regularly review and update existing laws and regulations to ensure that they remain relevant and supportive of the digital economy, particularly those concerning data privacy, cybersecurity, consumer protection, and fair competition. Where necessary, laws and regulations should be introduced to enable the development of emerging digital products and services. Creating a favourable licensing environment will attract more foreign investment. Effective implementation and enforcement of these laws and regulations are crucial, including the development of comprehensive training programmes for government officials, the establishment of a dedicated hotline or website for reporting violations, the creation of clear implementation guidelines for businesses, and raising of awareness and understanding of the laws amongst businesses and consumers.

Invest in digital infrastructure. Continued investing in digital infrastructure is essential. This includes improving mobile networks, expanding broadband internet access to all parts of the country, developing digital payment systems, establishing data centres, and providing cloud computing services.

Support digital innovation. Lao PDR should fund research, provide mentorship, and support the growth of digital start-ups. Establishing start-up ecosystem and innovation hubs where local and foreign entrepreneurs can collaborate will foster innovation and drive the development of new ideas.

Support human resource development. Developing a skilled workforce is critical to supporting the digital economy. The government can facilitate this through various programmes and initiatives, such as digital training for businesses, encouraging schools and universities to integrate digital courses into their curricula, launching public awareness campaigns about the benefits of the digital economy, and promoting digital literacy nationwide.

Promote digital technology adoption. The government should incentivise businesses to adopt digital technologies by introducing tax breaks and other incentives for those investing in the digital sector. Upgrading the e-government system to offer more online services will encourage citizen engagement. Collaboration with the private sector to develop and implement digital solutions for public services should be a priority.

Build confidence and trust amongst consumers and businesses. It is important to build confidence and trust amongst consumers and businesses to encourage their participation in online activities. Lao PDR must ensure the protection of personal privacy and basic consumer rights and establish an effective redress mechanism to handle disputes arising from online transactions. This requires a strong commitment to enforcing existing laws and regulations.

Establish an agency to promote the digital economy. The government could consider establishing a dedicated agency to promote the digital economy. This agency would coordinate efforts between businesses and the government, support the growth of digital businesses, and lead initiatives to advance the digital economy.

Support e-commerce and promote digital payment. The country should support e-commerce by establishing a favourable legal environment and investing in e-commerce infrastructure. Developing a robust and safe digital payment system is equally important. The government should encourage the adoption of digital wallets and other payment methods, work with financial institutions to develop new digital financial services and products and promote the use of digital payments amongst consumers and businesses.

By implementing these policy recommendations, Lao PDR can establish a supportive environment for its digital economy, accelerating economic growth, creating jobs, enhancing quality of life, and fostering a more vibrant and inclusive digital economy that benefits everyone across the country.

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Chapter 5
Malaysia's Digital Economy: Policies and Challenges for the ASEAN Economic Community 2045

Sufian Jusoh and Muhammad Faliq Abd Razak

1. Introduction

The digital economy is one of the fastest growing and most critical sectors in Malaysia, particularly as the country strives to escape the middle-income trap and achieve high-income status. In 2021, the digital economy contributed 22.6% to Malaysia's gross domestic product (GDP), with projections indicating this will rise to 25.5% by 2025 (Economic Planning Unit, 2021), Malaysia recognises the digital economy as a key driver of economic growth, enhancing the country's competitiveness and empowering micro, small, and medium-sized enterprises to participate in higher value-added economic activities.

The paper explores the importance of the digital economy in Malaysia, with a focus on e-commerce. Malaysia has long regarded information and communication technology (ICT) and, more recently, the digital economy as integral components of its economic development plan. The launch of the Multimedia Super Corridor (MSC) and related initiatives in 1996 marked the beginning of this journey. This ambition is further reflected in subsequent policies relating to the Fourth Industrial Revolution, the digital economy, e-commerce, and the national investment policy. Malaysia's digital economy initiatives are bolstered by the country's participation in regional arrangements such as the Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations (ASEAN), the Regional Comprehensive Economic Partnership (RCEP), and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

However, for Malaysia to emerge as a leading regional and global player in the digital economy, it must address a main weakness: the country is a technology adopter rather than a technology frontrunner. Additional areas for improvement include developing more talent, increasing research and development (R&D) efforts, attracting greater investment, and identifying niche areas where Malaysia can assume a leadership role.

2. The Importance of the Digital Economy

The digital economy is a key driver in Malaysia's pursuit of high-income nation status. The Malaysian Digital Economy Corporation (MDEC) predicts that by 2025, the digital economy will contribute approximately 25.5% to the GDP (MDEC, 2023). MDEC reported a significant growth in digital economy investments, with US$6 billion invested in the first half of 2023, compared with 2022.

The advancement of the digital economy in Malaysia involves the adoption of various digital technologies, particularly those related to the Fourth Industrial Revolution. This includes the integration of digital technologies, automation, and data analytics, leading to innovations such as smart manufacturing, the use of artificial intelligence (AI), and industrial Internet of Things (IoT) (OECD, 2023).

The World Bank emphasises that as Malaysia progresses towards becoming a high-income nation, it is essential to establish the digital economy as a key growth engine within a knowledge-based, innovation-led economy (World Bank, 2018) According to the World Bank, digital technologies can drive Malaysia's economic growth through three main channels: promoting the inclusion of underserved markets, increasing competitiveness, and fostering innovation by enabling new forms of businesses and entrepreneurships to emerge (World Bank, 2018).

3. Early Initiative: Multimedia Super Corridor

Malaysia's adoption of digital and information technology started with the launch of the MSC in 1996, modelled after Silicon Valley. This initiative formed part of the Seventh Malaysia Plan 1996–2000 (7MP), covering Kuala Lumpur and Putrajaya (Economic Planning Unit, 1996). The 7MP identified information technology as an important driver of economic growth, covering various hardware and services (Economic Planning Unit, 1996).

Businesses established and operating within the MSC were granted MSC status, enabling them to enjoy several benefits under the Bill of Guarantees.[1] These benefits included freedom of ownership, unrestricted employment of foreign knowledge workers, global access to capital, and tax holiday incentives.

However, as stated in the Ninth Malaysia Plan (9MP) 2006–2010, the MSC did not fully meet its original goals in content development, talent growth, and the creation of cutting-edge products and services (Economic Planning Unit, 2006). Consequently, the 9MP initiated MSC Phase II, expanding the reach of MSC Multimedia Applications into several other regions. Under the 10th Malaysia Plan (10MP) (Economic Planning Unit, 2011), Malaysia shifted its focus to niche areas in software and e-solutions, creative multimedia, shared services and outsourcing, and e-business (Economic Planning Unit, 2011).

[1] The Bill of Guarantees is replaced with the My Digital Status.

4. Strengths and Weaknesses of Malaysia's Digital Economy

In 2020, Malaysia was ranked as the second most digitally advanced country in ASEAN by Huawei's Global Connectivity Index (Hua Wei, 2022). Malaysia also ranked 31st overall and 2nd in ASEAN, just behind Singapore (4th overall), in the IMD World Digital Competitiveness Ranking 2022 (IMD, 2022). In this ranking, Malaysia was 25th in the knowledge indicator, 29th in technology, and 31st in future readiness. Malaysia ranked 32nd in the United Nations Trade and Development (UNCTAD) Frontier Technologies Readiness Index 2022 (with a score of 0.76), again behind Singapore, which held the 3rd overall position (with a score of 0.96).

Table 5.1. Malaysia's Strengths and Weaknesses in the Digital Economy

Three Malaysia's Strengths	Three Malaysia's weaknesses
• Training and Education • Technological Framework • Industry	• Talent and skills • Digital User and adopter and not a frontrunner • Digital divide

Source: IMD World Digital Competitiveness Ranking 2022; UNCTAD Frontier Technologies Readiness Index 2022; National Investment Policy 2022; 12th Malaysia Plan 2021-25.

Based on the IMD's ranking, Malaysia's main strengths in the digital economy lie in training and education (10th out of 64) and its technological framework (16th out of 64). The UNCTAD Frontier Technologies Index highlights Malaysia's strengths in industry and finance, as well as access to capital (IMD, 2022). Conversely, Malaysia's main weaknesses are in talents and skills, scientific concentration, business agility, and its regulatory framework.

The UNCTAD Technology and Innovation Report 2023 classifies Malaysia as a digital technology user rather than as an emerging frontrunner or producer of digital technology (UNCTAD, 2023). This classification aligns with the finding of the World Bank's Digital Adoption Index in 2016, which classified Malaysia as an 'adopter' country. This classification puts Malaysia behind frontrunner countries such as Singapore, the United States, Estonia, the Republic of Korea, and Japan in terms of digital progress (World Bank, 2016).

A digital divide persists in Malaysia. It is evident between states, urban and rural areas (Economic Planning Unit, 2021), younger and older generations in adapting to the internet and digital economy, and across income groups (Soh, et al., 2020). A study by Devisakti, Muftahu, and Hu (2023) highlights a digital divide in higher education, particularly amongst students from different income levels. According to this study, this divide leads to varying levels of technological readiness and limited technological skills.

5. Malaysia's Policy Responses

In response to identified weaknesses, Malaysia has introduced several new policies, with a particular focus on e-commerce and the role of digital services in manufacturing, emphasising the development of service-oriented pathways (Baldwin and Forslid, 2020). Following the MSC initiative, Malaysia shifted its focus towards specific domains such as IoT (MOSTI, 2015), e-commerce (MDEC, 2916), and technologies related to the Fourth Industrial Revolution (Economic Planning Unit, 2019). Amongst focus technologies are AI, big data analytics, augmented reality, additive manufacturing, cybersecurity, simulation, system integration, IoT, advanced materials, autonomous robots, and cloud computing.

The most recent policy on the digital economy is the Malaysia Digital Economy Blueprint 2021 (My Digital). MyDigital is designed to enhance Malaysia's value proposition to attract digital investments and establish the country as a regional leader in the digital economy (Economic Planning Unit, 2021). MyDigital has three primary objectives: encourage industry players to become creators, users, and adopters of innovative business models; harness human capital capable of thriving in the digital economy; and nurture an integrated ecosystem that enables society to embrace the digital economy. These objectives are supported by three pillars: facilitating digitalisation in the public and private sectors, building Malaysia's digital talent pool, and promoting digital trade opportunities. The National Strategic Initiatives focuses on trade, agriculture, services, smart cities, healthcare, finance, content, tourism, and the Islamic digital economy.

Investment in the digital economy is further supported by the New Investment Policy 2022 (NIP) (MITI, 2023). Under the NIP, Malaysia seeks to accelerate the creation of high-value digital jobs supported by a local digital talent pool that is both agile and competent. To attract and facilitate investments in the digital economy, MyDigital has introduced the Digital Investment Office, a collaborative platform between the Malaysian Investment Development Authority (MIDA) and the MDEC.

From the perspective of the digital economy, the NIP focuses on the following:

a. Addressing the needs of communities with a focus on consumption.
b. Building on applications and services, emphasising digital solutions and services across various service sectors.
c. Facilitating investments in digital platforms, including digital identification, authentical and digital signing, unified and interoperable data, cloud computing, big data and AI, content management, IoT, blockchain, security and encryption, digital procurement, billing and payment, open government and industry.
d. Enhancing digital connectivity and infrastructure.

The 12th Malaysia Plan 2021–2025 (12MP), launched in 2021, encompasses three dimensions: economic empowerment, environmental sustainability, and social re-engineering (Economic Planning Unit, 2021). Within the digital economy, the 12MP addresses challenges such as insufficient digital infrastructure and services, fragmented governance, the digital divide, low levels of R&D, and the slow adoption of technologies. The 12MP aims to enhance the talents and skills required to drive the digital economy, intensify R&D, and aggressively attract investments. The 12MP identifies two game changers: enhancing digital connectivity for inclusive development and aligning R&D with commercialisation and wealth generation.

The National Industrial Master Plan 2030 (NIMP 2030), launched in September 2023 (MITI, 2023), sets out an integrated plan for Malaysia's industrial development by 2030. NIMP 2030 predicts that Malaysia's internet economy will generate an annual economic value of RM257.2 billion (US$61.3 billion) by 2030. Consequently, Malaysia will focus on facilitating digitalisation in both public and private sectors, fostering digital talent, and promoting digital trade opportunities.

6. Digital Economy and Regional Trade Agreements

Malaysia's quest to position digital economy as an important driver of its economic performance is bolstered by its international commitments, including those under RCEP, CPTPP, ASEAN, and APEC.

RCEP supports the digital economy through chapters on electronic commerce, trade in services, and investment (Kelsey, 2022). It adopts a pragmatic approach to the digital economy by implementing ICT-driven trade facilitation measures, enabling the free cross-border flow of data, and adopting less stringent data localisation requirements (Park et al., 2023). CPTPP contains provisions on e-commerce that could drive the uptake of digital economy amongst its parties, including protections for data movement and the elimination of tariffs on digital goods and services.

Regionally, Malaysia stands to benefit from the ASEAN Digital Masterplan 2025 (ASEAN, 2021), which envisions ASEAN as a leading digital community and economic bloc powered by secure and transformative digital services, technologies, and ecosystems. As a member economy of APEC (APEC, 2020), Malaysia is aligned with pillar 2 of the Putrajaya Vision 2040. Under this pillar, member economies will take steps to create an enabling environment through policies that encourage innovation and digitalisation, adopt new and emerging technologies, share best practices, and promote approaches for a digital economy (APEC, 2021).

7. Case Study: E-commerce in Malaysia

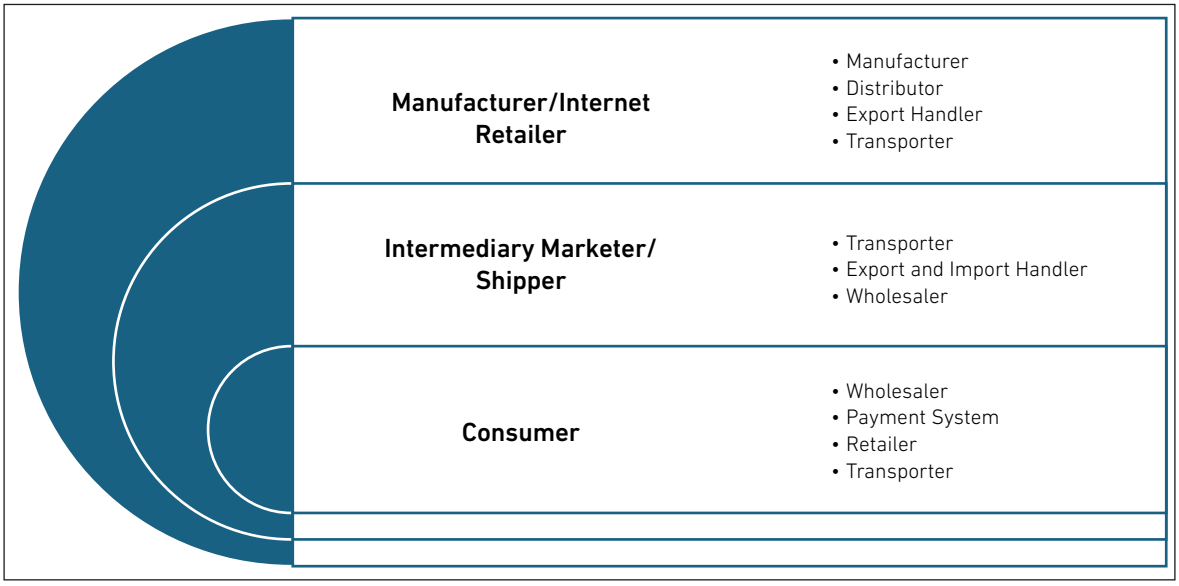
7.1. E-commerce Market in Malaysia

According to the Department of Statistics of Malaysia (DOSM) (2023), the income generated by Malaysia's e-commerce sector reached nearly RM1.1trillion in 2022 and saw a year-on-year increase of 10.4%, totalling RM291.7 billion in the first quarter of 2023 (DOSM, 2023). UNCTAD's Business-to-Consumer E-Commerce Index 2020 ranked Malaysia 30th overall, placing it in the 4th highest place amongst developing economies, behind Singapore, Hong Kong, and the Republic of Korea (UNCTAD, 2021).

The National E-Commerce Strategic Roadmaps 2016 and 2021 (NECSR) aim to future-proof existing businesses and expand market access. NECSR intends to integrate small and medium-sized enterprises (SMEs) into the world of e-commerce, equipping them with the capabilities to keep pace with an online market poised to grow much faster than offline sales. The NECSR is driven by six thrust areas: accelerating seller adoption of e-commerce, increasing e-procurement adoption by businesses, removing non-tariff barriers to e-commerce, realigning existing economic incentives, making strategic investments in select e-commerce player(s), and promoting national brand to boost cross-border e-commerce.

The modern e-commerce value chain involves various activities and players (Figure 5.1).

Figure 5.1. E-commerce Value Chain



Source: Author's modification from World Customs Organisation, Facilitating E-Commerce, https://mag.wcoomd.org/magazine/wco-news-78/facilitating-e-commerce/ (last accessed 18.8.2023).

Based on Figure 5.1, the e-commerce value chain in Malaysia consists of the following:

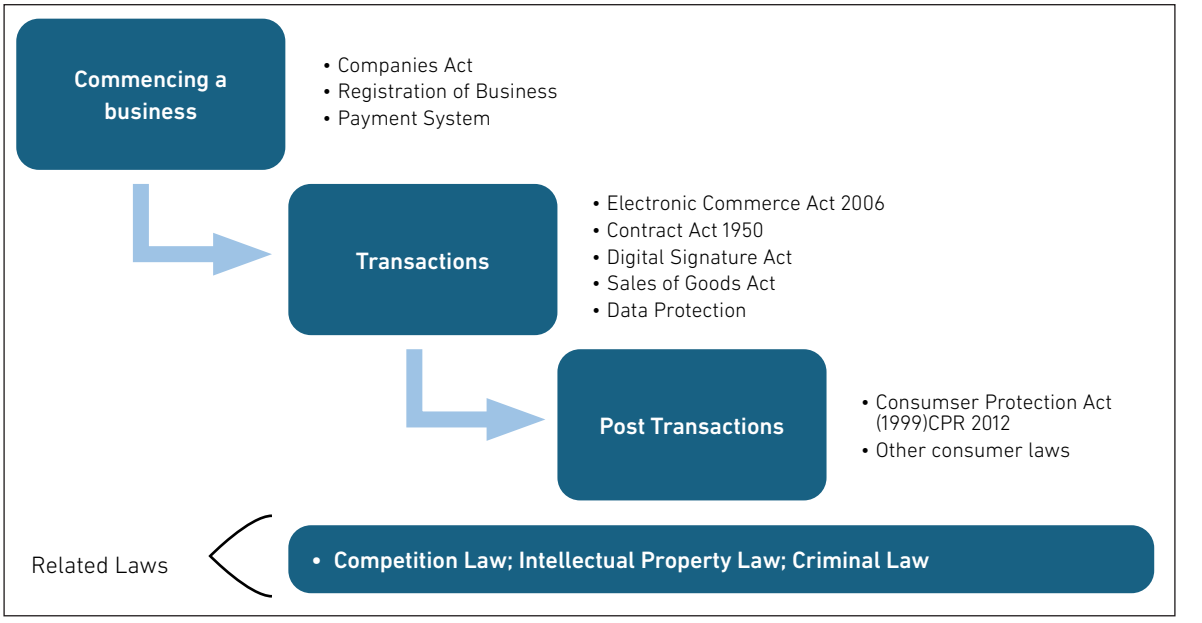
a. **First group**. Manufacturers and internet-enabled retailers (e.g. Amazon, AirAsia Digital, and, gradually, Grab). This group is supported by manufacturers, distributors (e.g. courier companies), and export handlers.
b. **Second group.** Intermediary marketers and shippers (e.g. Grab, AirAsia Digital, Lazada, and Shopee). This group is supported by transport companies, import and export handlers, and wholesalers and distributors.
c. **Third group.** Consumers who interact with either wholesalers or retailers.

Separate studies by the World Bank (2018) and Tham and Kam (2023) reveal that business-to-business (B2B) transactions dominate Malaysia's e-commerce sector, particularly in manufacturing, and are primarily driven by big businesses. A major issue in the Malaysian e-commerce market, especially in the business-to-consumer (B2C) segment, is the emergence of Superapp operators. These operators seek market dominance by acting as internet enablers and market intermediaries whilst offering distribution, handling, or payment gateway services (Gao and Jusoh, 2023).

7.2. Malaysia's E-commerce Regulations

According to Jaller, Gaillard, and Molinuevo (2020), e-commerce regulations provide the legal tools necessary for remote contracts, clarify the rights and obligations of the multiple actors involved in digital transactions, and establish a framework that promotes consumer trust in digital markets. Malaysia's legal framework for e-commerce is based on the laws designed and approved during the early stages of e-government and the MSC initiatives in the late 1990s and early 2000s (Figure 5.2).

Figure 5.2. Situating the Law in the E-commerce Value-Chain



Source: Authors' analysis based on the Malaysian e-commerce related legal framework.

The legal framework mainly addresses B2C markets, whilst B2B transactions and other activities, such as those of the intermediaries and last-mile service providers, are governed by general laws. This framework does not address issues like buyer fraud, where the customer receives goods but fails to make payment (Gao and Jusoh, 2023). . To address these concerns, MyDigital seeks to streamline regulatory requirements to better support the digital economy and encourage sustainable business models (Economic Planning Unit, 2021).

MyDigital aims to address innovations, enhance consumer protections, establish fairer contractual and commercial arrangements between SMEs and e-commerce platform providers, and ensure seamless connectivity and delivery of e-commerce products and services (Economic Planning Unit, 2021). One initiative is to nurture a dynamic intellectual property (IP) system for the digital economy to encourage innovations. This involves reviewing and updating laws, implementing a digital IP enforcement strategy, and raising awareness about digital and online branding protection using a Malaysian domain (.MY).

The second initiative is to adopt an agile regulatory approach to meet the needs of digital economy businesses. This includes identifying priority regulations for review and updating, developing a code of conduct for regulators to encourage industry involvement in the regulatory design for the digital economy, expanding regulatory sandboxes, and addressing social security for those involved in the gig economy (Economic Planning Unit, 2021). The third initiative is to align pro-competition measures with digital economy policies to promote fair competition and create a level playing field in the digital economy. This involves reviewing existing policies and competition laws to support responsible digital economy growth (Economic Planning Unit, 2021).

7.3. Infrastructure and Facilities

To support e-commerce and digital trade, Malaysia has established the Digital Free Trade Zone (DFTZ). The objectives of the DTFZ include facilitating seamless cross-border trade via virtual and physical facilities, increasing SME goods exports to US$38 billion, creating over 60,000 jobs, and supporting US$65 billion worth of goods moving through DFTZ by 2025. Other objectives include positioning Malaysia as Asia's leading transhipment hub by 2025, enabling global marketplaces to source from Malaysian manufacturers and sellers, establishing Malaysia as the regional fulfilment hub for global brands to reach ASEAN buyers, and creating an ecosystem to drive innovation in e-commerce and the internet economy (Tham, 2018).

The main components of the DTFZ are the eFulfilment Hub, the Satellite Services Hub, and the eServices Platform (Tham, 2018). The eFulfilment Hub assists SMEs and other businesses in exporting their goods efficiently, with the support of leading fulfilment service providers. The Satellite Services Hub connects SMEs with leading players, offering services such as financing, last mile fulfilment, insurance, and other essential services for cross-border trade. Through the eServices Platform, businesses can efficiently manage cargo clearance and other processes required for cross-border trade.

Alibaba, a Chinese company, hosts its regional eFulfillment hub at KLIA Air Cargo Terminal 1 (KACT1), developed by POS Aviation, serving Alibaba Lazada e-commerce operations. As of March 2019, the government, through MIDA, had approved eight e-fulfilment projects, with more in the pipeline (Jusoh, 2021). In the second phase, a logistics centre spanning over a 60-acre plot at KLIA is operational to support the DFTZ.

8. Conclusions and Policy Proposals

Malaysia has demonstrated a clear intent to be a main player in the digital economy, as evidenced by the various measures taken to build on its strengths and address its weaknesses. However, to fully unlock the economic benefits of digital economy, Malaysia must aspire to be a frontrunner, not just an adopter, of digital-related economic activities and technologies. As the Chair of ASEAN in 2025, Malaysia will need to guide ASEAN digital economy towards achieving its ambitions by 2045.

Malaysia must immediately address several pertinent issues. First, the shortage of talent in new digital technologies needs to be tackled. Addressing this talent gap will alleviate concerns amongst businesses and investors and will, in turn, help the country contribute more effectively to the growth of the digital economy and its associated technologies. ASEAN could encourage the free movement of digital talent amongst its Member States, particularly through the recognition of digital-related qualifications.

Second, Malaysia must address the digital divide within its digital economy. This includes building more digital physical infrastructure, especially in rural and underdeveloped regions. ASEAN must adopt a strategic plan to reduce the digital divide within the region, which involves addressing ASEAN Connectivity and relevant digital economy plans under the ASEAN Economic Community.

Third, Malaysia and ASEAN Member States must address the legal frameworks relating to the digital economy. A holistic review of laws concerning digital activities is needed, aligning this reform with Malaysia's obligations under the CPTPP and the RCEP agreements, which are also applicable to all ASEAN Member States. Finally, Malaysia and ASEAN could explore new areas within the digital economy. For example, Malaysia could investigate the servicification of manufacturing or manufacturing-related services through digital technology as a potential driver of the digital economy.

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Chapter 6
Digital Economy of Myanmar

Kaung Myat Htut

1. Introduction

Over the past decade, Myanmar's digital economy has rapidly evolved, driven by technological advancements and increased internet access. However, significant obstacles remain in creating a fully inclusive and secure digital ecosystem. This chapter provides an overview of the status of Myanmar's digital economy and discusses challenges such as the digital divide, privacy issues, cybersecurity threats, and market competition.

Whilst Association of Southeast Asian Nations (ASEAN) countries faced the challenges of the coronavirus disease (COVID-19) pandemic, they successfully adopted digital technologies to overcome these difficulties and implement the goals according to Bandar Seri Begawan Roadmap. Specifically, ASEAN countries aim to enhance public safety and ensure the efficient movement of resources, including cross-border trade, through technological advancements. Achieving these goals requires promoting access to and trusting digital applications and transactions as well as strengthening intellectual property rights protection through coordinated efforts by ASEAN bodies.

The implementation of the road map involves three key stages: Recovery (2021–2022), Acceleration (2022–2024), and Transformation (2025). To successfully implement the ASEAN Digital Economy Strategy, it is essential to address challenges in areas such as (i) digital connectivity, cybersecurity, and digital divide; (ii) interoperability and harmonisation of laws, regulations, and standards; (iii) digital talent innovation and research and development; and (iv) the impact of technology on free and fair market competition.

This chapter is intended to facilitate coordination with the Economic Research Institute for ASEAN and East Asia (ERIA) team and to support ASEAN chairmanships in advancing the ASEAN Digital Community (ADC) by 2045 through ASEAN or East Asian Minister Meetings and Business Summits.

2. Current Digital Status

Over the last decade, Myanmar has had the best opportunities to develop its digital economy. Although the COVID-19 pandemic severely impacted the country, it also accelerated the adoption of digital technologies, pushing many sectors towards digital transformation. The country quickly recognised the benefits of digital adoption across various industries, leading to an accelerated digital transformation process post-pandemic.

As reported in the Digital 2023 Myanmar Report (We Are Social & Meltwater, 2023), by January 2023, Myanmar had a population of 54.38 million, 44% or 23.93 million of whom had access to the internet. Social media usage stood at 27.6%, representing 15 million users, whilst the total number of mobile phone connections was 64.60 million or 118.8% of the population.

As of May 2024, Myanmar continued to face armed clashes between the State Administration Council (SAC) government and ethnic armed organisations. Some of these organisations control border areas, disrupting border trade. The hot season and dwindling water resources have further strained energy supplies, leading to widespread electricity rationing for households and businesses. After nearly 3 years of ongoing conflict, the SAC has struggled to focus on economic growth amidst the civil war.

3. Digital Economy Development Committee

To spearhead the implementation of the digital economy, the government established the Digital Economy Development Committee (DEDC) in June 2017. Initially, the committee was chaired by Vice President Henry Van Thio, with the Union Minister of Industry, Planning and Finance also playing a key leadership role[1]. From then until 3 August 2023, the committee was overseen by Admiral Tin Aung San, Deputy Prime Minister and Union Minister for Transport and Communications. Leadership was subsequently transferred to General Mya Tun Oo, who now heads the Ministry of Transport and Administration (The Irrawaddy, 2023).

The committee is designed to incorporate a broad range of stakeholders. Membership is extensive and includes deputy ministers, permanent secretaries, and directors-general from the ministries of industry, planning, and finance; transport and communications; education; commerce; labour; and immigration and population. Representatives from the Myanmar Investment Commission, the Central Bank of Myanmar; Micro, Small and Medium-sized Enterprises (MSMEs) Development Committee; the private sector; and academia are also involved.

[1] In 2021, the ministry was separated as the Ministry of Industry and the Ministry of Planning and Finance under the SAC.

DEDC developed three versions of the Digital Economy Roadmap: the first was drafted on 25 August 2017, the second on 30 January 2018, and the third and most recent version on 20 September 2018. The road map draws heavily on international examples, including the European Digital Economy and Society, the United Kingdom's Digital Strategy, Sweden's Digital Strategy, Singapore's Digital Strategy, Thailand's Digital Economy and Community Strategy, and the ASEAN Economic Community Blueprint 2025. The committee has aligned the strategy with the United Nations Sustainable Development Goals, particularly 9 (Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation) and 12 (Ensure sustainable consumption and production patterns). The strategy adheres to the State Economic Policy, focusing on Policy No. 4 (Prioritising the rapid development of fundamental economic infrastructure such as electricity generation, roads and ports, and establishing a data ID card system, a digital government strategy, and an e-government system.) and Policy No. 11 (Establishing technical systems and procedures to support intellectual property rights that encourage innovation and the development of advanced technology).

The digital economy strategy is a key component of the Myanmar Sustainable Development Plan (MSDP), which was drafted in August 2018 by the government, with the Ministry of Planning and Finance serving as the focal ministry. The MSDP aims to provide an overarching framework for coordination and cooperation across all ministries, states, and regions to collectively steer Myanmar towards a prosperous, peaceful and democratic future.

The strategy supports the establishment of Pillar 2: (Prosperity and Partnership), Goal 3: (Job creation and private sector-led growth), and Strategy 3.7 (Encouraging greater creativity and innovation to contribute to the development of a modern economy).

The mission statement of DEDC is 'Enabling digital transformation, digital government, digital trade and innovation to develop a digital economy across all sectors for inclusive and sustainable socioeconomic development'.

Under this plan, nine sectors have been prioritised: education; healthcare; agriculture, fishery, and livestock; tourism and hospitality; manufacturing and MSMEs; financial services; technology and start-up ecosystem; digital trade; and transport and logistics.

4. Goals and Action Plans

This section outlines the six focus areas identified for development under the digital economy strategy: digital transformation and digital trade, digital government, digital connectivity, digital skills and inclusion, digital security, and digital innovation.

The following table, derived from DEDC Action Plans, outlines both the planned initiatives and the progress made in implementing the digital economy.

Table 6.1. Planned Targets and Progress for Implementing the Digital Economy Strategy

	2020	2025
Digital Transformation and Digital Trade		
Digital transformation across business sectors	10%	30%
Effective utilisation of digital technology by MSMEs	20%	50%
Digital financial service transactions	15%	30%
Improvement in WEF Network Readiness Index ranking	130	120
Digital Government		
Improvement in UN E-Government Development ranking	155	145
Digital Connectivity		
Unique mobile subscription	50%	55%
Mobile network coverage as a percentage of the population	93%	98%
Improvement in ITU ICT Development Index ranking	130	120
Digital Skills and Inclusion		
Internet users as a percentage of the population	45%	50%
Qualified tech-related graduates per year	5,000	10,000
Number of people employed in the digital economy	100,000	300,000
Digital Security		
Improvement in ITU Global Cybersecurity Index ranking	97	90
Digital Innovation		
Foreign direct investment in the digital industry	8 billion	12 billion
Improvement in Global Innovation Index ranking	125	120

ITU = International Telecommunication Union, MSMEs = micro, small, and medium-sized enterprises; UN = United Nations; WEF = World Economic Forum.

Source: Ministry of Planning, Finance and Industry (2019), *"Myanmar Digital Economy Roadmap"*, Slide no. 7-12, Nay Pyi Taw, https://myanmar.gov.mm/documents/20143/9096339/2019-02-07+DEDC+RoadMap+ for+Websites.pdf/ [Accessed on 01 October, 2024]

5. Focus Areas and Recommended Action Plans

This section outlines the difficulties and recommended action plans for implementing Myanmar's digital economy.

5.1. Digital Transformation and Digital Trade

To advance digital transformation and digital trade, the action plan is divided into short-term and long-term strategies. In the short term, the focus is on establishing robust policies to promote digital trade and e-commerce, as well as ensuring the interoperability of digital payment systems. The Ministry of Commerce recently classified e-commerce as an essential service under Section 4(c) of the Essential Supplies and Services Law, as per Notification No. 50/2023, and issued an e-commerce registration order via Notification No. 51/2023 on 21 July 2023. This order requires individuals, companies, and business organisations engaged in e-commerce to obtain a registration certificate from the Department of Trade. Online registration for e-commerce is successfully launched by 2nd October 2023 and accessible at https://www.ecomreg.gov.mm/.

This process will be integrated into other relevant ministries, such as the taxation department. Although payment solutions were hindered by the political climate during 2021–2022, they have since returned to a more normal state. The Ministry of Industry continues to support MSMEs and is now focused on enabling them to access international markets through digital channels. The ministry has organised local talent professionals and entrepreneurs into a group of consultants, mentors, and coaches to assist MSMEs. They work together to conduct local surveys and mini-research projects aimed at promoting MSMEs on digital platforms. The ministry is collaborating with non-governmental organisations to implement a digital platform for MSMEs to facilitate personal and professional development. As part of the action plan, it is necessary to provide tax incentives for MSMEs to adopt digital technologies.

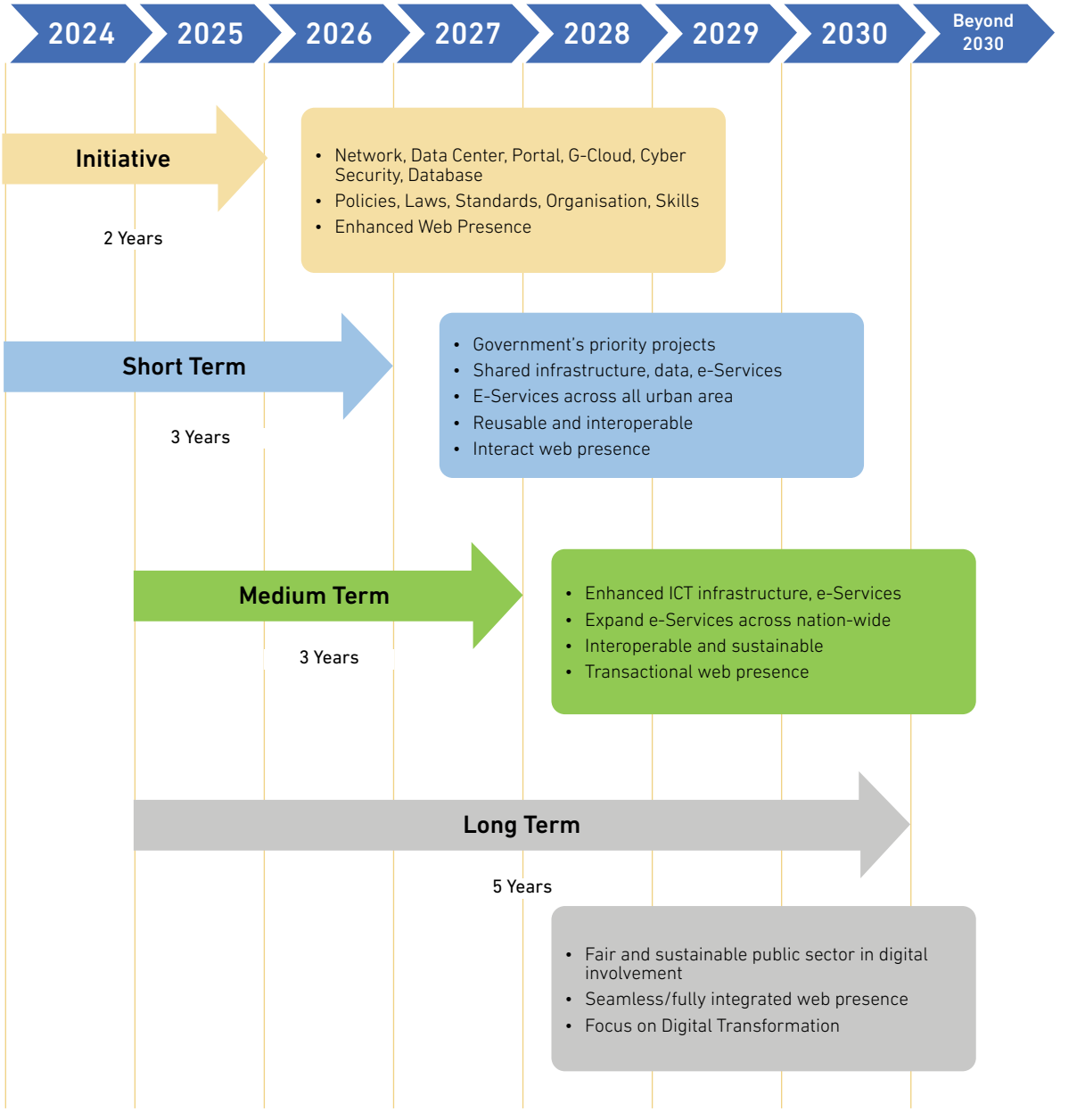
In the long term, the focus will be on promoting the digital transformation of MSMEs and large enterprises across all sectors, as well as promoting a cashless society and financial inclusion through digital technology. The Central Bank of Myanmar is working on Myanmar Quick Response (MMQR) standardisation as part of the National Payment System Strategy (2022–2025), expected to launch a beta version by January 2025 and a final version after April 2025. The long-term goal is for the government to establish the necessary legislation and policies to support digital economy transformation.

5.2. Digital Government

The government is drafting steps for the e-Government Master Plan (2030) with a citizen-centric approach. The action plans up to 2030 are based on the existing plan, which has been analysed, amended, and updated in response to current internal and external conditions. The new draft aligns with the ASEAN Digital Master Plan 2025, which aims to transition from the concept of e-government to digital government.

The concept of the digital ID was introduced in 2013 and was part of the e-Government Master Plan (2016–2020). In 2017, the Ministry of Labor, Immigration and Population launched pilot projects in selected regions to replace traditional ID cards with digital versions. The new digital ID system will collect individuals' personal information, including photos, addresses, employment details, blood type, and fingerprints. Prior to this, the SAC mandated the registration of all mobile subscriber identity module (SIM) cards. Both initiatives are part of the digital government plan, but they have not been well communicated to the public, sometimes creating fear amongst citizens.

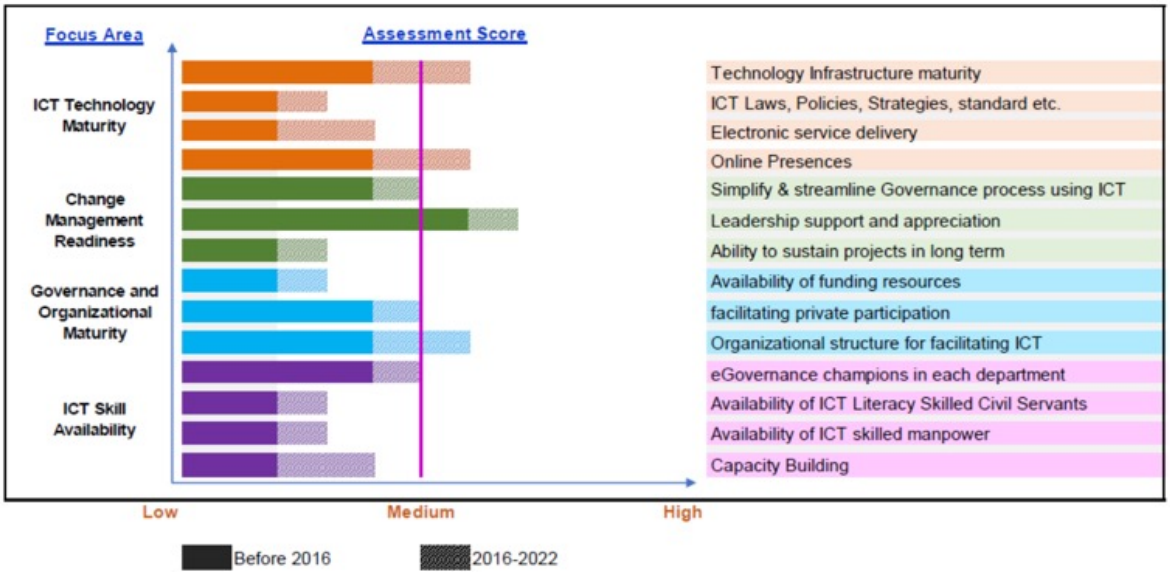
Figure 6.1. Digital Government Roadmap 2030



ICT = information and communication technology.

Source: Myanmar e-Government Master Plan 2030.

Figure 6.2. Digital Government Readiness Assessment



ICT= information and communication technology.

Source: Myanmar e-Government Master Plan 2030.

In the short term, the government plans to improve digital citizen engagement by creating citizen engagement apps and platforms. Establishing one-stop service centres is crucial, as is developing a common and shared database of citizens whilst ensuring data privacy standards. E-government services should facilitate two-way communication between government agencies and citizens and be extended to rural areas. In the long term, it is important to raise awareness of digital government services amongst businesses and the public. The digital divide between rural and urban areas must also be addressed, and the government must make significant efforts to bridge this gap. According to the e-Government Master Plan (2030), all government agencies' web presence should achieve 'transactional presence' as defined by the Five-Stage Model for e-Government.

5.3. Digital Connectivity

Addressing the digital divide is essential when discussing Myanmar's digital transformation. Despite increasing internet penetration, the country still lags behind other Southeast Asian nations in terms of connectivity. According to the International Telecommunication Union, as of 2021, only around 39% of the population had access to the internet. The digital divide is primarily due to infrastructural limitations, high internet service costs, and low digital literacy rates in rural and remote areas. Although mobile and internet penetration remarkably increased in 2015–2022, usage was temporarily stalled due to political instability in 2021 but recovered after a year.

The government has already drafted a national broadband strategy aimed at expanding affordable broadband services across the country. This strategy supports the implementation of a fibre optic network in government agencies and universities, a metro fibre optic network in cities, and a nationwide fibre optic network. As part of the action plan to implement the national broadband strategy, spectrum utilisation will be promoted to improve access to wireless broadband networks and IoT networks. This will not be limited to urban areas but will also extend to villages and remote areas to improve digital connectivity. In the long term, it is important to establish high-speed internet access at affordable prices for education, healthcare, and MSMEs. The improvement of digital connectivity is also addressed in the newly revised e-Government Master Plan (2030).

5.4. Digital Skills and Inclusion

Digital literacy remains an issue in Myanmar, but collaboration between the government, educational institutions, and civil society organisations can play a vital role in providing training and awareness programmes. Due to COVID-19, mobile and internet penetration increased significantly, prompting people to adopt technologies to sustain their businesses. This trend also applies to education and other sectors, particularly in the growth of digital currency, mobile payment solutions, and decentralised finance services, as well as government services.

It is encouraging to see people helping each other with digital knowledge; peer education seems to be very effective. Over time, such training could lead to community-led education platforms that drive and enable digital economy services. Connectivity declined in 2021–2022 due to internet censorship and social media restrictions but recovered after 2023, returning to a new normal.

Whilst the digital divide was once a big issue, the millennial generation and beyond are increasingly familiar with digital devices. What were once considered luxury items are now viewed as necessities, meaning that the digital divide may soon become less significant. However, the issue of digital dividends still needs to be addressed.

Political instability has led many citizens to migrate to neighbouring countries, particularly Thailand and other ASEAN countries, creating a digital skills gap, brain drain, and talent retention issues. Whilst neighbouring countries seek skilled foreign workers, they often receive unskilled migrants. To address this issue, host countries are encouraged to run capacity and skills development programmes for Myanmar citizens, a strategy that could be applied in similar contexts.

5.5. Digital Security

Cybersecurity is a pressing concern for Myanmar's digital economy. As reliance on digital technologies grows, the country becomes more vulnerable to cyber threats such as hacking, data breaches, and malware attacks. Myanmar lacks a comprehensive legal framework to effectively address cybersecurity challenges and has a shortage of skilled cybersecurity professionals and limited public–private collaboration.

To strengthen cybersecurity, Myanmar needs to develop robust legal frameworks and establish dedicated institutions responsible for cybersecurity governance and incident response. Collaboration between the public and private sectors is essential to enhance cybersecurity awareness and capacity-building programmes. Investing in education and training will help cultivate a skilled workforce capable of addressing evolving cyber threats. Critical infrastructure sectors, such as energy, telecommunications, and finance, are prime targets for cyber-attacks. It is crucial to implement robust security measures and frameworks specific to these sectors to protect against potential disruptions and breaches. Regular assessments, audits, and penetration testing can help identify vulnerabilities and strengthen the security posture of critical infrastructure.

Myanmar faces various cyber threats, including hacking, malware attacks, phishing, and ransomware. These threats can target government institutions, critical infrastructure, businesses, and individuals. Recent incidents have highlighted the need for robust cybersecurity measures to mitigate these risks.

As part of the short-term action plan, it is necessary to develop measurable cybersecurity awareness programmes for government agencies, businesses and the public. The government should establish a national cybersecurity operation centre and enhance the capacity and authority of Myanmar Computer Emergency Response Team (MMCERT). The government is setting up national frameworks for technology risk management, cyber incident response, and cybercrime prevention.

In the long term, the government should provide a competency model for cybersecurity workforce development and enhance international cybersecurity collaboration, supported by training programmes. Myanmar faces a shortage of skilled cybersecurity professionals capable of proactively identifying and responding to cyber threats. This lack of a trained workforce hampers the country's ability to establish strong cybersecurity practices and incident response capabilities. Enhancing cybersecurity education and training programmes will help bridge the skills gap.

Collaboration between the government, private sector, and civil society organisations is essential for effective cybersecurity. However, public–private partnerships need to be strengthened, and platforms for information sharing, threat intelligence, and coordinated response efforts must be created. Encouraging collaboration and knowledge exchange can enhance the collective ability to address cyber threats.

Current privacy issues in Myanmar stem from the absence of comprehensive data protection laws and regulations, a lack of enforcement mechanisms, and limited public awareness of privacy rights. These challenges leave individuals vulnerable to privacy breaches and the unauthorised use of personal information, making immediate action necessary.

5.6. Digital Innovation

Market competition is another critical aspect of Myanmar's digital economy that requires attention. Whilst e-commerce has grown significantly, there are concerns about fair competition and monopolistic practices. The lack of clear regulations and competition policies allows dominant players to exert undue influence, stifling innovation and limiting opportunities for smaller businesses.

To promote healthy competition, Myanmar must develop and enforce robust competition laws that prevent anti-competitive practices and ensure a level playing field. By creating an environment conducive to innovation and entrepreneurship, the country can support the growth of start-ups and smaller businesses, thereby driving economic development and diversification. For the past 3 to 4 decades, Myanmar has grappled with reliability and integrity issues regarding data, which are crucial for making accurate and precise decisions. Businesses are often compelled to align with the government's immediate interests, resulting in a market that favours those closely connected to the government rather than those who are genuinely competitive.

Although infrastructure development is progressing at a steady pace, much remains to be done in rural areas. The government has a vital role in creating an enabling environment that bridges the digital divide. Implementing policies and regulations that promote competition, innovation, and affordability in the telecommunication sector will help expand internet access. The introduction of data protection and privacy laws will build trust and confidence in the digital ecosystem, encouraging individuals to embrace digital technologies. The laws and regulations concerning digital and technologies, last amended in the early 2000s, are based on outdated concepts and require updates to reflect the latest technological advancements. This is particularly true in discussions about the digital economy, where many new laws are expected. Facebook serves as the primary e-commerce platform. However, due to political instability, social media platforms, including Facebook, have faced stringent censorship. The government should reconsider this censorship policy to promote a thriving digital economy.

6. Recommendations

Table 6.2. Summary of Issues and Recommendation

No.	Policy Issues	Regulations
1	Digital transformation and digital Trade	• Promote MSMEs • Implement national payment system
2	Digital government	• Enhance citizen participation • Promote public–private-partnerships
3	Digital connectivity	• Implement national broadband strategy and communication system across the country
4	Digital skills and inclusion	• Promote digital education and literacy
5	Digital security	• Educate citizens on cybersecurity and implement secure infrastructures
6	Digital innovation	• Narrow down the digital divide • Promote and guide digital unicorns

MSMEs = micro, small, and medium-sized enterprises.

Source: Ministry of Planning, Finance and Industry (2019), *"Myanmar Digital Economy Roadmap"*, Slide no. 13-20, Nay Pyi Taw, https://myanmar.gov.mm/documents/20143/9096339/2019-02-07+DEDC+RoadMap+ for+Websites.pdf/ [Accessed on 01 October, 2024]

7. Conclusion

Since 2017, the government has been advancing its Digital Economy Roadmap, led by the Digital Economy Development Committee. This road map aligns with the United Nation's Sustainable Development Goals 9 and 12, which focus on resilient infrastructure and promote inclusive, sustainable industrialisation, innovation, and sustainable consumption and production patterns.

The recommendations above are not new. They have been previously discussed and drafted by various ministries, with additional insights incorporated to adapt to current needs. Myanmar's policymakers are heavily focused on national security and sensitive to social media and freedom of speech. There is a noticeable deficiency in digital literacy. Their conservative approach to development focuses excessively on technological efficiency in human tasks.

Policymakers must embrace business process re-engineering to harness technology's benefits fully and align people, processes, and technology in digital transformation initiatives. They should reassess policies that hinder digital economic growth and consider supportive alternatives. Although Myanmar is recovering from COVID-19, ongoing political instability poses significant challenges to economic development.

Myanmar's digital economy offers immense potential for growth and development. Addressing key challenges such as bridging the digital divide, protecting privacy, enhancing cybersecurity, and promoting fair market competition is vital. Through committed collaboration amongst stakeholders and the implementation of effective regulations, Myanmar can capitalise on the digital economy to significantly benefit its citizens and the nation.

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Chapter 7
Understanding the Issues of the Digital Economy in the Philippines

Francis Mark Quimba

1. The Growth of the Philippine Digital Economy

The Philippine Statistics Authority (PSA) defines the digital economy as the activities that leverage knowledge, information, and information and communication technology (ICT) to spur economic growth. This encompasses digital-enabling infrastructure, digital transactions (e-commerce), and digital media (PSA, 2022). In 2022, the digital economy reached P2.08 trillion, contributing 9.4% to the country's gross domestic product (GDP) (Table 7.1). Despite a downturn in 2020 due to the coronavirus disease (COVID-19) pandemic, the digital economy rebounded in 2021 and 2022. In 2022, the digital economy employed 6.05 million people, marking a slight recovery in its share of total employment compared with the pandemic period (Table 7.2).[1]

Whilst the PSA definition aligns closely with the framework of Bukht and Heeks (2017), which has been used in various studies (Dacuycuy and Serafica, 2023; CPBRD, 2022; Albert, 2020) to describe the digital economy, other components such as the platform economy, gig economy, Industry 4.0, sharing economy, and algorithmic economy are not specifically discussed. The following sections provide a brief overview of the current state of these components.

1.1. High adoption of digital platforms in industry and services

Due to limited data available from official statistics regarding the adoption of digital platforms, this study relies on the Survey of Innovation Activities 2021 (PSIA2021) conducted by the Philippine Institute for Development Studies (PIDS). According to PSIA2021, 27.7% of firms used digital platforms in 2021. Digital platforms serve as intermediaries and infrastructures that connect various parties through the internet in a multi-sided market.

Foreign-owned platforms, with Facebook leading at 24.3%, are the most often used, whilst GCash (2.3%) is the only domestically owned platform identified by the firms. Other platforms identified by the establishments include social messaging platforms and digital marketplaces.

[1] Google, Temasek, and Bain (2020) observed that despite the pandemic, Filipinos continued to purchase goods and services, largely relying on e-commerce and digital platforms. Consequently, the digital economy grew slightly, from US$7.1 billion in 2019 to US$7.5 billion in 2020, a trend inconsistent with official PSA figures.

In terms of income, platform owners within the industry sector reported having average revenues of P535 million, which is five times higher than those in services and around seven times that of agriculture. Digital platforms contribute to employment. In 2021, approximately 1.26 million people were employed through digital platforms.

Table 7.1. Gross Value Added of Digital Economy at Current Prices, 2018–2022
(P trillion)

Sub-components	2018	2019	2020	2021	2022
E-commerce	0.41	0.44	0.30	0.33	0.42
		(8.9)	(-31.4)	(8.0)	(26.5)
Digital media/content	0.05	0.05	0.05	0.05	0.06
		(5.7)	(-10.8)	(10.1)	(11.8)
Digital-enabling infrastructure	1.39	1.46	1.38	1.49	1.60
		(5.3)	(-5.2)	(7.8)	(7.5)
Computer, electronic and optical products	0.39	0.39	0.32	0.35	0.35
		(-0.8)	(-18.4)	(9.6)	(1.1)
Wholesale trade, except of motor vehicles and motorcycles	0.04	0.04	0.04	0.04	0.04
		(11.3)	(-6.7)	(0.1)	(8.7)
Telecommunication services	0.46	0.51	0.55	0.59	0.64
		(9.9)	(7.0)	(7.7)	(8.4)
Professional and business services	0.48	0.51	0.47	0.51	0.56
		(5.3)	(-6.7)	(7.5)	(10.6)
Repair of computers and communication equipment	0.01	0.01	0.01	0.01	0.01
		(7.0)	(-22.8)	(-0.6)	(19.6)
DIGITAL ECONOMY	1.84	1.96	1.73	1.87	2.08
		(6.1)	(-11.3)	(7.9)	(11.0)
Gross domestic product (GDP)	18.27	19.52	17.952	19.41	22.02
Share of digital economy to GDP (%)	10.1	10.0	9.7	9.6	9.4

Note: 1. Values at constant 2018 prices are available from the author upon request. However, these are not official statistics released by the Philippine Statistics Authority. 2. Numbers in parentheses represent growth rates from the previous year.

Source: Philippine Statistics Authority.

Table 7.2. Employment in the Digital Economy
('000 people)

Sub-components	2018	2019	2020	2021	2022
E-commerce	1,082	1,103	1,036	1,157	1,233
Digital media/content	123	133	107	135	148
Digital-enabling infrastructure	4,337	4,410	3,868	4,300	4,672
Computer, electronic and optical products	3,419	3,443	3,002	3,257	3,541
Wholesale trade, except of motor vehicles and motorcycles	433	454	438	527	563
Telecommunication services	280	301	243	307	336
Professional and business services	103	116	97	111	129
Repair of computers and communication equipment	102	97	88	98	104
DIGITAL ECONOMY	5,542	5,645	5,010	5,592	6,053
Gross domestic product (GDP)	41,157	41,938	39,378	43,989	46,890
Share of digital economy to GDP (%)	13.47	13.46	12.72	12.71	12.91

* Data from ADB Key Indicators.

Source: Philippine Statistics Authority.

2. Industry 4.0 Technologies and High Acquisition Cost

As the world transitions to Industry 4.0, it is crucial to understand its implementation across various sectors within the country. According to PSIA2021, the most widely adopted Industry 4.0 technologies are the Internet of Things (IoT) and 5G networks. IoT is utilised by more than half of all establishments across most industry groups, except non-manufacturing, whilst 5G networks are used by 3–5 out of 10 establishments. Genomics, Blockchains, and SMART manufacturing are the least adopted Fourth Industrial Revolution (FIRe) technologies whilst automation and artificial intelligence (AI) are amongst the most commonly used FIRe technologies, particularly in agriculture, food manufacturing, and other manufacturing sectors.

The findings of PSIA2021 are consistent with Aldaba (2020), which observed high awareness of FIRe technologies amongst firms but limited usage. The most significant barrier to adoption, as identified in the 2021 PSIA report, is the high cost of technology, cited by 47.5% of respondents.

3. The Gig Economy in the Philippines[2]

The Philippines is one of the most active participants in online platform work globally. Seifreid et al. (2020) found that the Philippines ranks third in market size on Upwork, following India and the United States. According to the Payoneer and GCash (2022) Philippines Freelance Market Report, the country boasts one of the fastest-growing freelance markets, currently ranking sixth worldwide. Interviews conducted by Serafica and Oren (2023) with users of digital platforms reveal that Filipinos are highly competent and offer competitive pricing. Research by Bayudan-Dacuycuy et al. (2020a, 2020b) shows that platform work has expanded income opportunities for workers, particularly women and youth. Platform work offers flexibility, which benefits women with commitments such as childcare or household responsibilities (Serafica and Oren, 2023). However, despite these income opportunities, Filipino freelancers express concerns about the lack of benefits, income uncertainty, and isolation (Payoneer and Gcash, 2022).

4. The Sharing Economy

Despite its complexity (Albert, 2020), the sharing economy in the Philippines remains unmeasured in official statistics. However, Balbieran and Mabbagu (2022) attempted to quantify it, defining the sharing economy as a subset of the digital economy involving the sharing of tangible or intangible assets without transferring ownership or full consumption facilitated through internet networks or digital platforms.

Using this methodology, Balbieran and Mabbagu (2022) estimated the value of the sharing economy at US$2.58 billion in 2019, which declined to US$1.878 billion in 2020, likely due to the pandemic. By 2021, the sharing economy bounced back to US$6.47 billion, representing 38% of the digital economy. The significant contribution of the sharing economy under this methodology is attributed to the inclusion of e-commerce services such as transport, food delivery, and online travel, as well as services not digitally delivered, such as hiring legal advisors via digital platforms. This approach is consistent with the definition used by Vaughan and Davario (2016), which includes household and professional services within the sharing economy.

[2] The gig economy pertains to labour platforms (Schmidt, 2017; Dacuycuy and Baje, 2023); Serafica and Oren, 2023).

5. The Algorithmic Economy

The United Nations Conference on Trade and Development Information Economy Report 2017 describes the algorithmic economy as the segment of the digital economy driven mainly by automation and artificial intelligence (AI). The Philippines stands to benefit from AI, with an estimated US$90 billion impact over the next 7 years (Ochave, 2023). A report on AI's impact on the economy indicates that ChatGPT alone is expected to contribute about 20% of the country's GDP through applications in content generation, summarisation, code generation, and semantic research (Ochave, 2023).

However, Rosales (2023), citing a study by the International Data Corporation (IDC), reported that the Philippines ranks 12th amongst 14 Asia-Pacific economies in AI platform investment. China leads, followed by Japan, Australia, the Republic of Korea, Singapore, India, and Taiwan. The Philippines trails Malaysia and Thailand, with Viet Nam and Indonesia ranking lower in AI spending. The IDC report also noted that AI platform usage in the Asia-Pacific region continues to grow, with the AI adoption rate soaring from 39% in 2021 to 76% in 2022.

6. Policy Environment for the Digital Economy

6.1. Evolution of Digital Economy Policies by Administration

The development plans of the administrations of Benigno Aquino III, Rodrigo Duterte, and Ferdinand Marcos Jr. have each outlined strategies for advancing the digital economy. Although the Aquino III administration's Philippine Development Plan (2011–2016) did not explicitly mention the digital economy, it recognised the importance of digital technology. The strategies during this administration focused on improving access for last-mile customers and improving the country's digital infrastructure. The National Broadband Deployment Plan was launched to address the current gaps and recommend initiatives for optimising broadband services. The government aimed to expedite the delivery of services such as education and health through the full implementation of the e-commerce law.

During the Duterte administration (2017–2022), the midterm update of the Philippine Development Plan (2020–2022) identified a comprehensive set of strategies targeting the digital economy. Table 7.3 summarises the scope of these strategies, which cover various sectors, including digital goods and services production, government, and ICT service companies.

Table 7.3.Strategies Related to the Digital Economy of the Duterte Administration (2017–2022)

Aspect of the Digital Economy	Sector	Strategy
Production of digital goods	Industry (Manufacturing)	Strengthen the implementation of the Inclusive Innovation Industrialization Strategy (i^3s) prioritising e-commerce and the digital economy
Production of digital services	Services (IT-BPM)	Facilitate IT-BPM industry growth through improved ICT infrastructure, affordable utilities, and an enabling regulatory environment
	Digital finance	Promote the development of fintech and innovative financing strategies (see next section)
Production of digital goods/services	Creative sector	Promote a resilient and inclusive creative economy by developing (1) a creative economy roadmap, (2) programmes for enterprise resilience, (3) upskilling initiatives, (4) a nation brand, and (5) specialised arts education
Digital skills	Industry and services	Reskill and upskill workers based on job transformations and future skills needs
Consumer protection	Government services	Accelerate the implementation of the PhilSys for secure transactions; Amend the Consumer Act of the Philippines (RA 7394) to protect against fraudulent schemes.
ICT access	ICT infrastructure	Accelerate the government's digital connectivity programme
Measurement of the digital economy	Government services	Develop statistics on the digital economy, creative industries, digital platforms, and online work
Digital economy incentives	Government services	Enforce the CREATE Act, offering investment incentives for digital transformation; establish a digital taxation framework to support the digital economy

CREATE = Corporate Recovery and Tax Incentives for Enterprises, ICT = information and communication technology, IT-BPM = information technology and business process management, RA = Republic Act.

Source: Midterm Update of the Philippine Development Plan 2017–2022.

Building on the policies and achievements of the Duterte administration, the Marcos Jr administration (2023–2028) is advancing the digital transformation of government and fully digitalising sectors that have yet to adapt. Maximising the potential of digitalisation is a guiding principle for the administration. The Marcos Jr administration continues to implement several policies from the previous administration, such as the Corporate Recovery and Tax Incentives for Enterprises (CREATE) law and the National Broadband Plan, whilst also introducing additional strategies and upgrades (Table 7.4).

Beyond the Philippine Development Plan 2023–2028, other roadmaps and plans, such as the E-Commerce Roadmap 2016–2020, the national innovation agenda, and the Philippine Digital Workforce Act, directly or indirectly influence the development of the digital economy. These strategies align with those outlined in the Philippine Development Plan.

6.2. The Philippine E-commerce Roadmap 2016–2020

The Philippine E-commerce Roadmap (2016–2020) emphasises the pivotal role of e-commerce in economic development, highlighting trends in global, Asia-Pacific, and Association of Southeast Asian Nations (ASEAN) e-commerce and the Philippines' positioning within these markets. Recognising that the Philippines has yet to fully capitalise on e-commerce opportunities, the roadmap advocates the following:

1. **Infrastructure.** Improved infrastructure to support e-commerce growth, including enhanced internet services in rural areas and the development of e-commerce support systems (e.g. e-payment, logistics, and online dispute resolution).
2. **Investment.** Encouragement of diverse investment.
3. **Innovation**. Promotion of innovation and support for digital start-ups.
4. **Intellectual capital**. Cultivation of skills in technology, languages, and entrepreneurship.
5. **Information flows.** Ensuring the free flow of information is crucial for the digital economy whilst safeguarding privacy and trust online.
6. **Integration**. Integration of domestic industries with the global economy enables businesses, especially micro, small, and medium-sized enterprises (MSMEs), to access international markets and integrate into global value chains.

The E-commerce Roadmap is part of broader government initiatives, including the National Broadband Plan[3] and the National Retail Payment System (see next section), and supports others such as iGovPhilippines and the Philippine Roadmap for Digital Startups. It aligns with the APEC Boracay Action Agenda to globalise MSMEs, showcasing a holistic approach to integrating the Philippines into the digital global economy.

[3] The plan's focus on improving broadband infrastructure, enhancing digital literacy, supporting local content and innovation, and integrating with national development goals demonstrates a comprehensive approach to fostering the digital economy in the Philippines. See Department of Information and Communications Technology (2017).

Table 7.4. Strategies Related to the Digital Economy of the Marcos Jr Administration (2022–2028)

Aspect of Digital Economy	Sector	Strategy
Production/Export of digital goods	Industrial, manufacturing, and transport cluster[a] (Manufacturing)	Participate in trade negotiations to formulate disciplines on the digital economy and e-commerce; position the Philippines as a hub for knowledge and technology-intensive export industries. Assist firms and industries transitioning to new technologies with tailored support and incentives.
Upgrading of digital services	Technology, media, and telecommunication cluster (IT-BPM)	Support the transition to value-adding activities, such as AI-based cloud analytics and enterprise resource planning.
	Data analytics	Promote the participation of colleges and universities in service sector data collection and analysis.
	Health and life sciences	Support the development and production of healthcare and medical devices; push for self-sufficiency in digital health products such as telemedicine solutions and AI-assisted diagnoses.
E-commerce adoption	Industry and services	Accelerate e-commerce adoption by MSMEs through awareness and advocacy campaigns.
Digital skills	Industry and services	Implement the Digital Workforce Competitiveness Act to establish facilities for enhancing the digital skills and competencies of entrepreneurs and the future workforce.
Consumer protection	Government services	Adopt a new legal framework to strengthen cybersecurity and policies and information security standards for e-commerce transactions; establish secure e-payment systems; ensure online consumer and supplier protection to promote trust and confidence.
ICT regulation and competition	ICT service providers/ Tech giants	Promote competition and improve regulatory efficiency in and through the internet and digital technologies; explore opportunities and risks in adopting ex-ante regulation whilst continuing ex-post enforcement approach to address competition issues in the digital economy.
ICT access	ICT infrastructure	Expand access to broadband internet and digital technologies to enhance consumer choice and facilitate digitalisation and innovation amongst MSMEs.
Measurement of the digital economy	Government services	Develop subnational satellite accounts for key services, including the digital economy, creative industries, and logistics.

AI = artificial intelligence; ICT = information and communication technology; IT-BPM = information technology and business process management, MSMEs = micro, small, and medium-sized enterprises.

[a] The Marcos Jr administration has implemented a cluster-based approach to industrial development: IMT (industrial, manufacturing, and transport), TMT (technology, media, and telecommunication), HLS (health and life sciences), and MBN (modern basic needs).

Source: Philippine Development Plan 2023–2028.

6.3. Strategies to Enhance Skills Development

The Digital Skills Competitiveness Act and its Implementing Rules and Regulations (IRR) are designed to enhance the digital skills of the workforce, thereby boosting the digital economy. This legislation focuses on improving digital literacy, technical competencies, and the effective use of technology across key sectors such as information technology, business process outsourcing, e-commerce, and digital marketing, ensuring the development of a technologically proficient workforce. It promotes innovation and entrepreneurship through targeted training, the cultivation of an innovative culture, and support for start-ups and small businesses. The IRR aims to democratise access to digital education, bridging the digital divide and broadening the talent pool. By enhancing digital infrastructure and skills, the act seeks to attract investments and reinforce the Philippines' position as a digital business hub.

7. Establishment of Digital Payments System and Financial Policies

The Bangko Sentral ng Pilipinas (BSP) has contributed to the digital economy through the development of a robust digital payments system. The National Retail Payment System (NRPS), launched in 2017, established a secure, efficient, and reliable electronic retail payment system, leading to the creation of interoperable systems like PESONet and InstaPay. By 2021, these systems had facilitated the digitalisation of a third of retail payments, significantly contributing to the growth of the digital economy during the pandemic.

In 2020, the Digital Payments Transformation Roadmap was introduced to create a cash-lite economy whilst promoting financial inclusivity. This roadmap outlines strategies to accelerate the adoption of digital payments, enhance regulatory frameworks, encourage new market entrants, improve transaction connectivity, and raise public awareness of the benefits of digital payments, including their application in government transactions.

The QR Ph initiative, launched in 2019, standardised the national QR code system, simplifying electronic fund transfers and payments. This initiative supports various e-wallets and banks, enabling seamless scan-and-pay transactions that benefit small businesses and street vendors by extending financial services to unbanked and underserved sectors. Other BSP policies include the financial consumer protection framework, regulations on virtual currency exchanges, and the fintech regulatory sandbox, all of which support the digital economy.

8. Expanding Government Initiatives in the Digital Economy

The government recognises the need to address various aspects of the digital economy beyond e-commerce, including the platform economy, Industry 4.0, and other emerging areas. The following plans and strategies have been identified.

8.1. Digital Platforms

The government is promoting the use of digital platforms for handling consumer complaints and dispute resolutions to boost confidence in digital transactions. To expedite the delivery of government-to-business services, interoperable digital platforms are being adopted. There is a recognised need for better statistics on digital platforms and online work, such as the gig economy, which is currently underrepresented in official classifications.

To support MSMEs and start-ups, digital platforms are used to map value and supply chains, linking farmers, producers, suppliers, distributors, and retailers with consumers. These platforms help reduce information asymmetry and search costs, thereby enhancing the resilience of domestic value and supply chains.

8.2. Industry 4.0

The Marcos Jr administration has crafted a strategy for embracing Industry 4.0, particularly for technology-mature firms. Recognising the disruptions and opportunities Industry 4.0 presents, the government aims to do the following:

a. Implement Industry 4.0 roadmaps, formulated by the Department of Trade and Industry (DTI) and the Department of Science and Technology (DOST), which outline overall strategies, required facilities, and policies.
b. Build Industry 4.0 facilities, such as pilot factories, to serve as collaborative learning environments for demonstrating industry management and production technologies.
c. Provide soft loans or technical assistance to help firms adapt to production shocks, supply chain changes, and advanced technology and automated processes.
d. Create the Industry 4.0 sandbox equipped with advanced manufacturing modules and technology for research and development (R&D) and prototyping activities. The sandbox will enable firms to experiment with Industry 4.0 solutions in settings that mimic a fully supported production environment.

8.3. Gig Economy

In response to the growth of the gig economy, accelerated by the pandemic and increased reliance on gig workers, the government is working to extend social protection to freelancers, contractors, and independent professionals in this sector. Plans include developing technology parks, centres of creative excellence, and talent hubs to support creative freelancers by providing training, mentoring, legal services, and repositories for creative works.

8.4. Algorithm Economy

The government is developing strategies to enhance AI utilisation across various sectors, thereby strengthening participation in the algorithm economy. The Center for Artificial Intelligence Research will collaborate with regional inclusive innovation centres to support MSMEs, whilst industry hubs will aid in digital transformation and AI adoption. Collaborative efforts between academia and industry will focus on skills development and training in science and technology, ensuring a workforce capable of thriving in the algorithm economy.

The government aims to enhance its role in international and regional discussions, particularly in space and satellite technology, health, and AI, to support the algorithm economy by acquiring both new and existing foreign technologies through partnerships.

The BSP is exploring its role in the algorithm economy by promoting regulatory technology (regtech) and AI to combat cybercrimes and improve measures against fraud, money laundering, and terrorist financing. Regtech and AI are expected to enhance the design and delivery of innovative financial products and services.

9. Incentives for Engaging in the Digital Economy

The CREATE Act, enacted in 2021, represents a significant tax reform with notable implications for the digital economy. The act offers several incentives, particularly benefitting firms in the digital economy. Key incentives include fiscal incentives for registered projects and activities, such as an income tax holiday of 4–7 years and a special corporate income tax of 5% on gross income after the income tax holiday period, which is especially advantageous for export-oriented businesses (Republic of the Philippines, 2021).

Enhanced deductions are available for registered projects, including deductions for labour, training, R&D, and infrastructure, thereby encouraging innovation within digital economy firms. The CREATE Act provides for a longer net operating loss carry-over, offering financial relief to digital start-ups during their initial non-profitability phase (Republic of the Philippines, 2021).

Only registered activities or businesses approved by investment promotion agencies such as the Board of Investments or the Philippine Economic Zone Authority are eligible for these incentives. The Strategic Investments Priorities Plan lists the preferred sectors or activities that qualify for incentives (Republic of the Philippines, 2021). The CREATE Act's emphasis on R&D, innovation, and reduced tax burdens is particularly beneficial to tech start-ups, e-commerce, and other digital businesses in the Philippines.

10. Critical Issues of the Digital Economy

Dacuycuy and Serafica (2023) identify several factors contributing to the Philippines' lackluster digital economy performance compared with its neighbours.

10.1. The country suffers from a significant shortage of internet service providers

According to the Department of Information and Communications Technology (DICT) 2019 national ICT and household survey, only 54% of the 2,617 surveyed barangays were covered by telecommunication companies, 36% had telecommunication towers, and around 20% lacked internet service providers altogether. There are also sub-national disparities in the types of services available. For example, households in the National Capital Region (NCR) predominantly subscribe to fixed broadband, whereas those in the Autonomous Region in Muslim Mindanao (ARMM) mainly rely on mobile broadband (DICT, 2019).

10.2. The cost of ICT services in the country remains prohibitively high, with poor internet quality exacerbating the issue

Earlier assessments of the digital economy noted deficiencies in ICT infrastructure (Quimba and Calizo, 2020; DICT, 2019). Despite pandemic-driven measures to improve internet access, these measures have had a limited impact on the price and quality of internet services. In 2022, the average cost of 1 gigabyte (GB) of data was around US$1.77, higher than most ASEAN countries, where costs ranged from US$0.49 to US$1.09. In 2021, the Philippines ranked third in ASEAN for the most expensive ICT services.

The 2022 Digital Quality of Life Index by Surfshark indicates that internet services remain unaffordable despite some improvements. A 1 GB mobile internet package requires 4 minutes and 51 seconds of work per month, 26 times longer than Singapore's 11 seconds. Whilst the affordability of mobile internet has improved since 2021, requiring 27 minutes and 3 seconds less work, the Philippines improved its global ranking only from 104th to 60th (Surfshark, 2022).

For fixed broadband, users must work around 11 hours and 5 minutes per month to afford the cheapest package, with costs rising since 2022. Although download speeds for both fixed broadband and mobile internet have improved, they remain mediocre (Piad, 2022), with mobile speeds at 38.7 megabit per second (Mbps) and fixed broadband at 75.1 Mbps, significantly lower than Singapore's 104 Mbps and 261 Mbps, respectively.

10.3. The country struggles with a scarcity of secure internet servers

In 2010, the Philippines, alongside several other ASEAN countries, had fewer than five secure internet servers per million people. By 2020, whilst all ASEAN states experienced growth, the Philippines had the lowest increase, with secure servers rising from 5 in 2010 to just 13 in 2020. In contrast, Indonesia saw an increase from 1.6 to 1,877 secure servers, and Viet Nam from 2.3 to 105 over the same period.

10.4. Trust and data privacy concerns also stymie the adoption of digital platforms and services

In the fintech industry, a persistent issue is the lack of trust in using digital technologies due to unreliable access points, connectivity issues, and the high cost of internet services (Quimba et al., 2021). Despite laws aimed at preventing cybercrime, online fraud remains prevalent (PIDS, 2023).

Whilst the government has enacted laws and regulations to promote trust in the digital economy, many need updating and stronger enforcement to effectively protect consumers online (World Bank, 2022).

10.5. The job market struggles to meet the rapidly growing demand for digital skills

A lack of skills and low digital adaptability are primary concerns in the digital economy. In 2021, the Philippines ranked 54th in digital and technological skills and 58th in the World Digital Competitiveness ranking, down from 46th in 2017, indicating a decline in talent, education, and training (World Bank, 2022).

Despite the increasing demand for digital skills, the job market fails to meet manpower needs. High-demand digital jobs include cybersecurity experts, data development engineers, database managers, and game developers (DOLE, 2021). However, most Filipinos engaged in online work perform lower-value tasks like marketing, sales, and clerical or data entry jobs (PIDS, 2023).

Skill disparities also result in a gendered income gap in online marketplaces (Bayudan-Dacuycuy and Sinsay, 2023).

10.6. Policy bottlenecks continue to hinder the digital economy despite the implementation of various plans and programmes

Although enabling policies[4] and programmes have been introduced, inadequate digital infrastructure impedes the development of smart cities, contributing to the country's lag in digital transformation (Ballesteros and Ancheta, 2023). Outdated policies and regulatory barriers hinder infrastructure development, whilst bureaucratic inefficiencies drive up expansion costs for enterprises.

10.7. Inconsistent application and delayed implementation of laws create uncertainty in the business environment

E-commerce and digital platforms face barriers to entry and investment due to blanket prohibitions, leading them to participate instead via cross-border digital services (PIDS, 2023). Serzo (2023) notes the slow implementation of policies aimed at streamlining government transactions, which reduces the efficiency of digital services. Notable delays include the national ID system and the Ease of Doing Business Act, which mandates the automation of business permitting and licensing (PIDS, 2023). Despite some effective government–private sector partnerships, coordination issues persist at both national and local levels (PIDS, 2023).

10.8. Access to financing and other support programmes is important, yet awareness of digital economy initiatives remains low

Enterprises are vulnerable to shocks, and timely information can help them adjust their business models accordingly. The costs associated with joining e-commerce platforms also reduce the profitability and sustainability of small businesses. Information on training and funding support is crucial, yet studies by Serafica and Dacuycuy (2023) and Peña and Yao (2022) have documented a general lack of awareness amongst stakeholders regarding government efforts.

[4] Recent policies in support of the digital economy in the Philippines include E-commerce Act 2000, Philippine Identification System Act (Republic Act [RA] 11055), Personal Property Security Act (RA 11057), Innovative Startup Act (RA 11337), Ease of Doing Business and Efficient Government Service Delivery Act (RA 11032), Revised Corporation Code of the Philippines (RA 11232), Free Internet Access in Public Places Act (RA 10929), recent liberalisation measures in public services, telecommunications (RA 11659), retail trade covering the e-commerce subsector (RA 11595), and businesses involved in advanced technology and start-up or start-up enablers (RA 11647). See Serzo (2023) and Serafica and Oren (2023) for a detailed discussion of these policies.

11. Conclusion and Recommendations

This study illustrates the development of the digital economy. Data from the PSA shows the digital economy's growing contributions in terms of value-added and employment. The Philippines possesses significant opportunities in the platform economy, Industry 4.0, the gig economy, the sharing economy, and the algorithm economy.

Recognising the digital economy's potential, the Duterte administration implemented comprehensive plans and policies addressing the production of goods and services, digital skills development, consumer protection, digital infrastructure enhancement, and incentives. The Marcos Jr administration is building on these policies, pushing for digitalisation and transformation, especially in industries that have yet to fully embrace digitalisation.

The BSP catalysed the growth of the digital economy through the promotion of digital payments and financial inclusion policies. The NRPS and QR Ph strategies have notably increased digital retail transactions. However, despite these efforts, challenges remain, including a limited number of service providers, high ICT costs, poor internet quality, trust issues in digital transactions, a scarcity of secure servers, policy bottlenecks, and low awareness of digital economy-supporting services and programmes.

The following recommendations are presented to enhance the already rich policy environment.

11.1. Strengthen the core of the digital economy

The government must continue to pursue policy and regulatory reforms whilst investing in specific network segments to improve internet connectivity, especially in areas outside urban centres (Mirandilla-Santos, 2021; Serafica and Oren, 2022). At the same time, it is crucial to ensure that these initiatives and programmes do not exacerbate existing inequalities. State-led initiatives should be reinforced, evaluated, monitored, and effectively promoted by agencies, including the DICT, the Technical Education and Skills Development Authority (TESDA), the Department of Public Works and Highways, the Department of Education, and the Commission on Higher Education, amongst others.

11.2. Address the fragmented policy support of the digital economy

The identification of strategies and the assessment of regulators indicate a fragmented approach to digital economy policies. The digital economy blurs regulatory lines, complicating the roles of various regulators. Quimba et al. (2023) noted the best practice within the fintech industry, where multiple agencies regulate whilst allowing for growth. This approach could be replicated in other areas of the digital economy. It is recommended that the various strategies from different government roadmaps be consolidated into a single official policy framework.

11.3. Collect data on unmeasured aspects of the digital economy

As the economy digitalises, relying on outdated definitions of the economy and industry is no longer viable. Companies are increasingly adopting servicification and digital transactions, necessitating a rethinking of industry classifications. Measuring the platform economy is particularly challenging due to its complexity, cross-sector and cross-border nature and the rapid changes in digital products. The government must collaborate with the private sector to collect data on unmeasured aspects of the digital economy and establish consistent measurement standards. Developing a comprehensive indicator is crucial for harnessing the digital economy to promote inclusiveness, growth, and sustainable development.

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Chapter 8
The Digital Economy in Singapore

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1. Introduction

In this essay, we discuss how best to balance the growth of Singapore's digital economy with environmental concerns, with a focus on two areas: the physical-digital infrastructure of data centres and the growth of e-commerce.

These elements of the digital economy are important and of general concern to many countries. For Singapore, they are essential. The country's digital economy has already experienced rapid growth, with considerable future demand. At the same time, Singapore has undertaken obligations to help address climate change by stepping up its nationally determined contribution (NDC) under the Paris Agreement, even as the country is acknowledged to have limited resources for renewable energy. The growth of the digital economy holds much potential as it can be integral towards successfully implementing sustainability standards and incorporating sustainability through various frameworks.

In undertaking this work, we rely on policy analyses from our earlier digital-green report (Kong and Wau, 2023) and from interviews with stakeholders. The essay will put forward several policy suggestions that aim to enable Singapore to grow its digital economy whilst limiting carbon emissions and improving its environmental record. These recommendations include upgrading grid infrastructure and capacity, investing in technologies to reduce carbon footprints, improving waste management, and prioritising the development of green and digital skills.

2. Context for a Green and Digital Economy

Singapore is one of the most advanced economies in the region and has been consistently recognised as a leader in the digital economy. Looking ahead, the digital economy is expected to grow to US$30 billion by 2025 (EDB, 2022; Tech for Good Institute, 2023), further enhancing Singapore's overall competitiveness.[1] According to a 2024 study by the Capgemini Research Institute, investments in digital transformation are projected to yield the highest returns for organisations in Singapore over the next 5 years, with the estimated annual return on investment expected to grow from 6% in 2023 to 17% by 2028. This is significantly higher than the current global average return of 4% and the projected 14% yield in 2028 (SBR, 2024b).

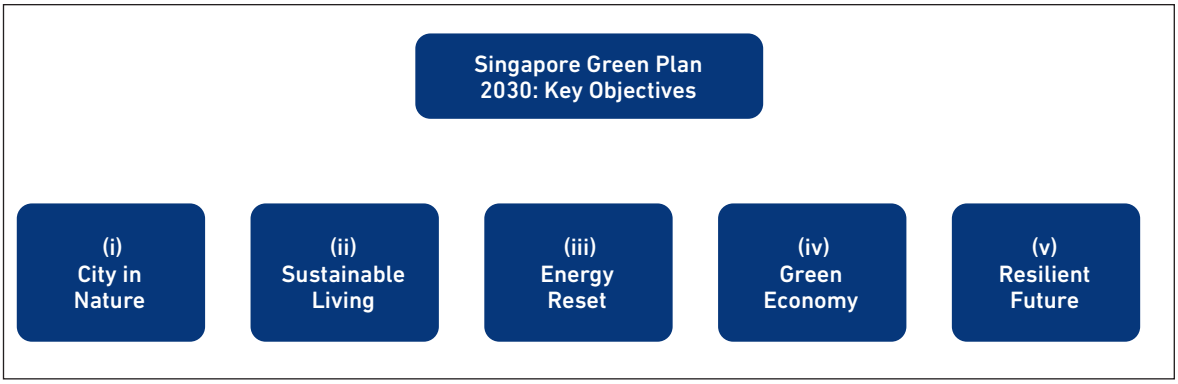
The country's well-developed digital infrastructure and extensive island-wide internet connectivity underpin its growth in the digital domain (IMDA, 2023c). Since the 1980s, the government has proactively invested in the infrastructure required for digital technology adoption through policy initiatives such as the National Computerisation Programme (1981) and the National IT Plan (1986). To date, the country boasts the highest median fixed broadband download speed in the world (Low, 2022), well-developed digital infrastructure, and high levels of digital education and training (Yip, 2019). Approximately 99% of households have internet access, 90% of individuals have computer access, and the mobile penetration rate stands at 170% (IMDA, 2023c). In 2023, the country ranked third globally in digital competitiveness (Chia, 2023). It is evident that the government's initiatives have positioned the country to effectively leverage and grow its digital economy.

Additional initiatives are planned. The Infocomm Media Development Authority (IMDA), the lead government agency in this sector, has released several frameworks to further promote the country's digital growth, such as the Digital Economy Framework for Action and the Digital Connectivity Blueprint (DCB). The DCB outlines the government's plans to strengthen and future-proof digital infrastructure, focusing on soft, hard, and physical-digital infrastructure (IMDA, 2023a). Of relevance to our essay, the DCB identifies 'designing for sustainability' as a key priority. Notably, the government has actively considered the impact of digital infrastructure on carbon emissions, ensuring that the growth of digital economy does not impede progress in the country's long-term climate commitments.

[1] For example, the country performs well on International Institute for Management Development (IMD's) world competitiveness ranking, in particular receiving fourth place on the 2022 IMD World Digital Competitiveness Ranking, IMD, 'World Digital Competitiveness Ranking – IMD', www.imd.org, 2022, https://www.imd.org/centers/wcc/world-competitiveness-center/rankings/world-digital-competitiveness-ranking/.

Singapore has set specific guidelines for its vision of sustainable development, many of which are elaborated in the Singapore Green Plan 2030 (Singapore Green Plan 2030, n.d.). Unveiled in 2021, the plan looks broadly at the following five objectives, including goals for an 'energy reset' and hopes to grow a 'green economy'.

Figure 8.1. Singapore Green Plan 2030



Source: Singapore Green Plan 2030 (n.d.), https://www.greenplan.gov.sg/

3. Overview of Data Centre Landscape in Singapore

Data centres (DCs) are a cornerstone of the digital economy. As centralised facilities that store, process, and disseminate large amounts of data, DCs provide the essential digital infrastructure required to support digital services and platforms. Today, most businesses increasingly rely on data centres for their day-to-day operations. The rising demand for digital goods and services has intensified the need for more efficient data processing and storage solutions. With the increasing adoption of emerging technologies such as 5G, artificial intelligence (AI), machine learning (ML), and blockchain, data storage needs will increase, leading to increased demand for DCs.

Accounting for 60% of DC demand in Asia-Pacific, Singapore is a top location for DCs in the region (Cushman and Wakefield, 2023). According to the annual Global Data Centre Market Comparison report by Cushman & Wakefield, Singapore's attractiveness stems from its strong ecosystem, fibre connectivity, growing demand, and availability of major cloud services. As of January 2022, Singapore was hosting more than 70 operational DCs (Abdullah, 2023), which collectively consume approximately 7% of the country's total electricity. Driven by the digital economy growth in the region, Singapore's DC market is expected to exceed 1 gigawatt (GW) by 2024 (Rad, 2023), making it the biggest DC market in Southeast Asia and the fourth biggest in the world (SBR, 2024a).

Recognising the substantial amount of energy required to power DCs, the government has imposed stricter standards for DC providers. Whilst existing frameworks like the Green Data Centre Standard (SS564) (2013) IMDA, 2023b) and Green Mark for Data Centres (2012) (BCA and IMDA, 2012) set benchmarks for energy efficiency and outline best practices for the industry, greater intervention was required to align the growth of DCs with Singapore's climate commitments.

In 2019, the government imposed a 3-year moratorium on new DCs to reassess its long-term sustainability strategy. This led to the introduction of new criteria for DCs, including a minimum power usage effectiveness of at least 1.3, the harnessing of renewable energy sources, or investment in energy-efficient and decarbonisation technologies, strengthening Singapore's international connectivity and contributing to the country's broader economic objectives (IMDA, 2022). A pilot exercise led by the IMDA and Economic Development Board called the 'Data Centre-Call for Application (DC-CFA)' (IMDA, 2022) was announced in July 2022 after extensive consultation with the DC industry to define new parameters for new DC construction. The pilot awarded 80 megawatts (MW) of additional capacity to four DC operators—Equinix, GDS, Microsoft, and an AirTrunk-ByteDance consortium (IMDA, 2023e) —all of which obtained platinum certification under the Building Construction Authority (BCA)-IMDA Green Mark for New Data Centres (BCA and IMDA, 2019), amongst other criteria.

Concurrently, IMDA has been exploring policy initiatives to support sustainability efforts amongst DC providers and their respective ecosystems. Most recently, IMDA announced a new sustainability standard for DCs operating in tropical climates, allowing them to increase their operating temperatures to 26 degrees Celsius and above. The agency is also working with the BCA to update the Green Mark Scheme for DCs (IMDA, 2023d). This new standard was established under the DCB on 5 June 2023 (IMDA, 2023a), which identified developing a 'Roadmap for Growth of new Green Data Centres' as a priority.

The government's approach has relied on consulting industry partners and other stakeholders in the ecosystem. In developing the new sustainability standard, a working group comprising domain and technical experts from industry, academia, and government agencies was formed, and a pilot trial was conducted with DC operators in Singapore to ensure that this standard is achievable (IMDA, 2023a). Frequent consultations with stakeholders have ensured that new standards and regulations remain feasible, whilst pilot exercises, trials, and test-bedding of new technologies with industry partners during pilots have enabled the government to adopt policies and explore new solutions for increasing DC operational efficiency. These solutions include AI and ML computing, green software, and low-carbon technology.

4. Challenges in Pursuing Sustainable Data Centre Growth

Singapore faces a significant challenge in balancing the rising demand for DCs with its commitment to achieving net-zero emissions by 2050. According to a Keppel DC representative, Singapore's aggregate capacity demand will exceed 3,000 MW by 2030 (Suruga, 2023), far above the current 60 MW of capacity officially allocated per year (Chong, 2022). Although the government is trying to increase generation capacity (C. Tan, 2023c), the key challenge lies in achieving this whilst fulfilling the country's net-zero commitment (NCCS, 2022). Thus, in addition to adopting solutions such as liquid cooling and using AI and ML to reduce energy consumption, DC providers will require access to renewable sources of energy and carbon offsets to ensure the industry's sustainable growth. However, Singapore faces a limited supply of renewable energy within the country and lacks certified carbon credits and established carbon markets in the region.

4.1. Limited Supply of Renewable Energy

Power generation accounts for 40% of Singapore's carbon emissions, making decarbonisation in this sector considerably difficult. Given Singapore's size and resource constraints, renewable sources of energy account for only 2.9% of total electricity generated (Andres, 2023). Alternative energy sources such as wind, tidal, and biomass are not scalable, given the country's natural limitations. The government has identified 'four switches' to decarbonise the power sector: solar, regional power grids, low-carbon alternatives, and natural gas (EMA, n.d.-a). Whilst progress has been made in each switch, current projects remain inadequate to meet Singapore's projected energy demand, estimated at 10.1–11.7 GW, by 2028 (C. Tan, 2023b).

The current target for solar energy is to achieve a 2 GW-peak by 2030, which would meet only around 3% of the country's projected total electricity demand (Andres, 2023). Solar, albeit the most viable energy alternative, is not land-efficient and will not drastically change Singapore's energy mix without unprecedented technological advancements.

Singapore has set targets to increase low-carbon electricity import capacity to 4 GW by 2035 (EMA, n.d.-b). Projects such as the Lao People's Democratic Republic (Lao PDR)–Thailand–Malaysia–Singapore Power Integration Project (LTMS-PIP) (EMA, 2022), which currently pipes 100 MW of hydroelectric energy from Lao PDR to Singapore, serve as a proof-of-concept for multilateral cross-border electricity trade and set out Singapore's intentions to develop the Association of Southeast Asian Nations (ASEAN) Power Grid (APG). Whilst such trials strengthen regional grid architecture and test the viability of cross-border power trade, the long-term implementation of these contracts remains tenuous without a commitment to indefinite collaboration. The involvement of multiple stakeholder groups with differing interests across member states adds further complexity to the approval process.

Singapore's ambitious National Hydrogen Strategy aims to complement and diversify the power mix of available solar, imported green energy, and other low-carbon energy sources. Hydrogen could potentially supply up to half of Singapore's power needs by 2050 and will be pivotal in shifting away from natural gas (MTI, n.d.). However, this depends on how quickly hydrogen technology develops and whether undisrupted supply chains for hydrogen can be established to meet demand.

4.2. Availability of Certified Carbon Credits

Due to the limited supply of renewable energy in Singapore, most DC providers typically purchase international renewable energy certificates (RECs) or carbon credits to offset their emissions. However, the long-term feasibility of purchasing RECs is questionable, as they do not contribute to Singapore's NDC (EPA, 2018). There is a global shortage of carbon credits that qualify as internationally traded mitigation options under Article 6 of the Paris Agreement.[2] This scarcity of high-quality carbon credits is one of the reasons why companies in carbon-intensive industries focus on deploying energy-saving and efficiency technologies to reduce their carbon footprint, with carbon credits deemed a last-mile tool to achieve their decarbonisation targets.

Voluntary carbon markets (VCMs) will be pivotal in offsetting emissions generated in the region. However, VCMs are nascent and bolstered by companies at the forefront of decarbonisation efforts, as most countries in the region do not have a stated carbon price or a carbon tax. Whilst it is unlikely that a uniform carbon price will be applied across ASEAN, several countries are looking to implement some form of carbon tax in the coming years as they develop and revise national roadmaps to meet their Paris commitments. Recognising ASEAN's potential as a carbon credit production powerhouse, four VCMs have either been either opened or announced in the region: Climate Impact X (CIX) in Singapore (Fogarty, 2023), Bursa Carbon Exchange (BCX) in Malaysia (A. L. Tan, 2022), FTIX in Thailand (Tanakasempipat, 2022), and IDXCarbon Exchange in Indonesia (ST, 2023). As nature-based solution projects gain momentum in the region, increased investment in resources to develop robust auditing and verification systems will be needed to ensure the legitimacy and quality of carbon credits.

5. E-commerce and Delivery Services

5.1. Growth of E-commerce

E-commerce is a rapidly growing component of Singapore's digital economy. In 2021, e-commerce sales reached US$8 billion (Choo, 2022), with gross merchandise volume expected to rise to US$9.8 billion by 2025 (ITA, n.d.). Over 3 million Singaporeans are now active e-commerce users, with the average shopper registering the largest basket size in the region (ITA, 2022).

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[2] Article 6 of the Paris Agreement recognises that some parties choose to pursue voluntary cooperation in the implementation of their NDCs to allow for higher mitigation ambition and to promote sustainable development.

The coronavirus disease (COVID-19) pandemic contributed to the uptick in e-commerce, compelling many retailers to move their businesses online. Popular online platforms saw a surge in the number of monthly web visits as consumers shopped online more frequently (Kriwangko, 2021). Shopee, an online retail giant, saw an increase of nearly 10 million platform visits in 2019–2022 (Statista, 2023). Given its current trajectory, it is expected that e-commerce sales will reach US$14 billion by 2027 (Choo, 2022).

Alongside the growth in e-commerce, food delivery platforms and services grew significantly. Well-known food delivery platforms such as FoodPanda and Deliveroo have seen sustained increases in user numbers long after the pandemic, with the convenience and accessibility of such platforms sustaining this trend (Heng, 2022). Singapore's online food delivery market is currently valued at approximately US$1.5 billion, with analysts predicting that the number of users will reach 3.69 million by 2027 (Ting, 2023).

6. Challenges in Pursuing Sustainability in E-commerce

Due to increasing sales in e-commerce and food delivery services, the amount of packaging used has skyrocketed, exacerbating Singapore's waste and greenhouse gas emissions.

6.1. Increase in Packaging Waste

The ease of online ordering and doorstep deliveries has led to an explosion in consumption and, consequently, in excessive packaging waste. Packaging used for delivery accounts for 45% of carbon emissions in the e-commerce supply chain (Diego Fernandez et al., 2021) and dominates the amount of plastic waste generated in Singapore (Fidelity International, 2021).

Beyond the sheer number of packages used for delivery, retailers often overpackage their goods for two reasons. First, consumers perceive that well-packaged items are secure, which is indicative of the quality of goods. Many buyers express approval of using foam and bubble wrap, even though these materials contribute to excessive and wasteful packaging (Giri, 2021). Second, sellers overpackage items to prevent damage during shipping. On average, a delivery box is dropped approximately 17 times throughout the delivery process (Mungcal et al., 2019). As up to 80% of returned items are due to damage or breakage (Harilela, 2021), adding extra layers of packaging is considered necessary to offset the costs incurred from returns.

As retailers increasingly adopt 'free return' policies to incentivise purchase, waste generation is likely to increase. The pandemic has exacerbated this, with the average return rate of 10% pre-COVID-19 rising to approximately 30% in 2020 (Deloitte, 2020). Given the increasing volume of domestic e-commerce sales, this return rate will likely be reflected in Singapore as well.

Similarly, with the popularity of food delivery in recent years, wastage from packaging and disposable cutlery has surged, a trend especially observed during the COVID-19 lockdowns in 2020. An online survey by National University of Singapore alumni revealed an estimated 20% weekly rise in takeaway orders and a 73% increase in delivered meals (BT, 2020), contributing to an additional 1,334 tonnes of waste from disposable cutlery and containers. Major ride-hailing and food delivery company Grab has acknowledged that food packaging waste is an inherent by-product of its services. In 2021, Grab reported a plastic footprint of nearly 70,000 tonnes, with approximately 166,660 tonnes of packaging waste attributed to the GrabFood delivery platform (Grab, 2022).

6.2. Higher Carbon Emissions Due to Increased Deliveries

The increase in the number of vehicles needed to fulfil last-mile deliveries has also compounded carbon emissions (Fidelity International, 2021). The World Economic Forum estimates that given the current trajectory of growth, the number of delivery vehicles in the world's largest cities will increase by 36% over this decade, resulting in a 32% rise in carbon dioxide emissions (Fidelity International, 2021). Whilst online retail theoretically consumes less energy in shipping compared with physical shopping due to economies of scale, this advantage declines precipitously when customers check out and ship items separately (Mungcal et al., 2019). With delivery routes often unoptimised for efficiency, unnecessary fuel emissions with each delivery increase.

Current Measures

In recent years, the government and industry players have acknowledged the need to adopt more sustainable practices and have developed respective plans to reduce waste and vehicle emissions.

- The National Environment Agency of Singapore (NEA) has implemented strategies under the Zero Waste Masterplan (MEWR, 2019). Since 2020, the Mandatory Packaging Reporting scheme has required suppliers to submit packaging data and its 3R (reduce, reuse, and recycle) plans to the NEA, including details on packaging materials and their corresponding weight (NEA, n.d.). NEA has implemented an e-waste management system to regulate and reduce electronic waste (NEA, 2023).

- A pilot project by the Worldwide Fund for Nature Singapore, United Overseas Bank, Singapore Post, and Better Packaging in 2022 highlighted consumer willingness to opt for reusable e-commerce packaging when given the option (Ramaniharan, 2023).

- To address vehicle emissions, Grab has introduced the 2030 Transport Sustainability Goal, which aims for all its vehicles to run on cleaner energy by 2030 (Grab Singapore, 2021). Grab has also attempted to pivot to zero-emission modes of transport, including walking and cycling, and employing more low-emission vehicles (hybrid and electric) in its rental fleet. Delivery has also become more fuel-efficient with batch delivery (Goh, 2023). GrabShare, the platform's carpooling service, pairs passengers travelling in the same direction to reduce total fuel emissions per trip. Grab has set new targets for 2023 to achieve zero packaging waste by 2040, focusing on reducing overpackaging, replacing single-use plastics with compostables, and developing long-term scalable waste collection solutions and reusable packaging (Grab, 2023).

6.3. Supply Chain Sustainability

Beyond last-mile delivery, the government has announced plans to reduce its Scope 3 emissions, which often form the bulk of companies' greenhouse gas (GHG) emissions (C. Tan, 2023b). Scope 3 emissions refer to indirect GHGs that are produced within a company's value chain. Globally, Scope 3 emissions account for about 75% of companies' emissions (C. Tan, 2023b). Despite attempts to address these emissions, companies continue to face difficulties in accurately quantifying them due to the complexity of tracking every component in a supply chain, the lack of comprehensive data, and the absence of an internationally recognised measurement system (A. Tan, 2021). Even with standardised measurement methods, the consensus is lacking on viable green transition pathways and how companies can achieve their decarbonisation goals.

Aside from emissions, most supply chains continue to rely on physical paperwork for receiving, tracking, and fulfilling orders, resulting in operational inefficiencies. It is estimated that trade documentation for a single shipment can require up to 50 sheets of paper (Casanova et al., 2022), markedly compounding waste at landfills (UKISUG, 2023). Encouraging paperless trade and digitising the entire supply chain will streamline current processes, reduce paper-related costs, and minimise the ecological footprint.

Current Measures

- The government has launched initiatives to support small and medium-sized enterprises (SMEs) in digitising their operations and participating in the digital economy. In addition to collaborating with larger companies to provide technical assistance through initiatives like IMDA's Chief Technology Officer (CTO)-as-a-service with Accenture and Stone Forest Group, the government also offers grants to encourage firms to digitise their supply chains. Examples include the Productivity Solutions Grant by Enterprise Singapore, which funds projects that improve operational productivity and efficiency (ESG, n.d.-c), and the Enterprise Development Grant, which funds new projects, with sustainability-related projects receiving up to 70% funding (ESG, n.d.-a). Other key government initiatives include the National Sustainable Procurement Roundtable (NSPR), which promotes sustainable procurement within supply chains (NSPR, n.d.), and the Enterprise Sustainability Programme, which supports SMEs in driving sustainability across value chains (ESG, n.d.-b).

- The government has expanded its efforts to track its own emissions. Building on its momentum to disclose its Scope 1 and 2 emissions, recent commitments include adopting sustainability-related considerations into tender evaluation points for construction and information and communication projects, which make up more than 60% of the government's procurement contracts (C. Tan, 2023b). These measures could assist the government in disclosing its Scope 3 emissions. The government has announced the implementation of mandatory climate-related reporting for large companies according to International Sustainability Standards Board standards. Some of these requirements may come into effect in early 2025, with others being gradually phased in (Segal, 2024).

7. Policy Recommendations

This section highlights our recommendations to encourage digital-green growth in Singapore. Broadly, we recommend that the government invest in technologies to upgrade grid capacity, push for regional mechanisms like the APG, invest in waste management education and technologies, and reassess the digital talent pipeline.

7.1. Upgrading Grid Infrastructure and Capacity

Electricity grid infrastructure will need to be imported as Singapore looks to import 30% of energy from low-carbon sources by 2035 (C. Tan, 2023a). The government has commissioned studies to explore the potential of higher transmission voltage levels from power generation plants for long-distance electricity transmission and to increase low-voltage electricity networks for households and smaller businesses (C. Tan, 2023a). Supporting this transition will require increased investment in smart grids.[3] Digitalising the grid will be crucial to balancing energy loads and detecting leakages. This comprises upgrading various grid components such as power transformers, substation automation, flexible alternating-current transmission systems, and advanced sensors.

Singapore should focus on efforts to facilitate cross-border energy trade. Whilst Singapore maintains bilateral agreements with neighbours such as Malaysia and Indonesia, it should continue building on ASEAN mechanisms such as the APG to facilitate sustained long-term energy cooperation. The APG represents an ambitious plan to connect ASEAN's grids to distribute loads and maximise where energy is generated and subsequently used. Cross-border electricity trade will require significant investment to connect grid infrastructure and develop large-scale renewable energy storage to cope with intermittent supply and consumption needs (Tham, 2023).

[3] According to the International Energy Agency, smart grids are electricity networks that use digital technologies, sensors, and software to better match the supply and demand of electricity in real time whilst minimising costs and maintaining the stability and reliability of the grid.

Ongoing efforts to explore the use of low-carbon alternatives should be expanded. Hydrogen has been identified as a major decarbonisation pathway under the National Hydrogen Strategy, and Singapore has since signed various memorandums of understanding (MOUs) for low-carbon hydrogen technologies (MTI, 2021; MTI, 2023) and hydrogen supply chains (Keppel Infrastructure and ExxonMobil Asia Pacific Pte. Ltd., 2023) with other governments and companies. The government is researching less conventional technologies, such as small modular reactors and floating nuclear power plants (Yeoh, 2022), and exploring the feasibility of harnessing geothermal energy (Begum, 2022).

7.2. Investing in Technology to Reduce the Carbon Footprint

Investments should be made in green computing, and its adoption should be encouraged across industries. Green computing refers to hardware–software co-optimisation to maximise energy efficiency and minimise environmental impact (IMDA, 2024a). Green coding, a subset of green computing that strives to minimise the amount of energy used to process code, should be leveraged by organisations to support their sustainability initiatives. In addition to reducing overall energy consumption, green coding is fundamental to green software, where functions are designed by default to limit energy consumption and emit less carbon. Even as both the public and private sectors continue embracing code-intensive technologies such as AI, green coding can increase efficiencies in various business operations and reduce energy consumption, thereby reducing an organisation's carbon footprint.

Green coding will be an especially useful tool for DC providers, given the industry's substantial carbon footprint (Knowles, 2021). It can complement other tech-enabled solutions to lower energy consumption in DC facilities. The government should continue investing in expanding green coding capabilities to further digital sustainability, in line with its goal to chart a more sustainable pathway for DC growth in Singapore under IMDA's Green Data Centre Roadmap launched in mid-2024 (IMDA, 2024b).

The Green Computing Funding Initiative and Green Software Trials launched in early 2024 underscore the government's commitment to digital sustainability. These initiatives fund research and trials of green computing solutions with industry leaders (Puthucheary, 2024). Building on this, the government can work towards developing regulatory frameworks for green computing and consider providing financial incentives to help smaller businesses overcome the initial costs of adopting the technology.

To address the issue of supply chain sustainability, Singapore will eventually need to confront the large carbon footprint from Scope 3 emissions. Whilst Scope 3 emissions comprise a huge percentage of overall emissions, most firms lack the tools and impetus to track or measure them. These challenges

are exacerbated by the persistent reliance on physical documentation for trade transactions (Suominen, 2023), making it difficult for firms to effectively collect and consolidate data for reporting purposes.

End-to-end supply chain digitisation is thus crucial to track and monitor Scope 3 emissions. In addition to reducing friction in trade, it will enable firms to measure their Scope 3 emissions through data consolidation. This will allow larger firms to identify and select suppliers aligned with their long-term decarbonisation targets, incentivising them to reduce their emissions. A corollary effect is a reduction of paper waste from trade; the United Nations Economic and Social Commission for Asia and the Pacific estimates that digitalising supply chains could save up to 13 million metric tonnes of paper (ESCAP, 2021).

To further support companies in quantifying and subsequently reporting Scope 3 emissions, the government could develop standardised reporting frameworks to ensure that emissions data is comparable and ubiquitously understood amongst stakeholders. The main hurdle larger firms experience when voluntarily reporting their Scope 3 emissions is the reliability of data (Kong and Wau, 2023). Hence, most firms default to using proxies or estimates from third-party providers, which may not accurately reflect the emissions produced in their value chain.

7.3. Waste Management

Waste management infrastructure must be enhanced, and a paradigm shift in businesses and consumers towards adopting greener habits is encouraged. The government's Zero Waste Masterplan includes initiatives to convert waste into energy, implement a circular economy, and promote resource efficiency in the consumption and production of goods.

The government can improve waste management using a two-pronged approach. First, it can collaborate with stakeholders to upgrade waste management infrastructure by investing in innovation and technology. As Singapore adopts advanced technologies that can treat food waste and convert it to other useful products and energy (MEWR, 2019), the government can expand collaboration with industry leaders to conduct pilot programmes evaluating technology that converts waste to energy. Second, to facilitate a paradigm shift in businesses and consumer preferences towards greener practices, the government can launch public awareness campaigns and school curriculum programmes to emphasise the negative environmental impacts of overconsumption and the long-term implications for business operations and consumers' lifestyles. Collaboration with businesses can further support these initiatives by providing consumers with the ability to choose more sustainable options.

7.4. Prioritising Green and Digital Skills Development

Finally, the development of a sustainable digital economy will need to be accompanied by the upskilling of workers at all levels. Whilst advanced digital skills in AI and ML, cloud computing, and the Internet of Things have generally been acknowledged and valued by employers in Singapore, green skills continue to lack recognition despite their increasing significance in the job market (Economist Impact, 2023). Globally, it is expected that the demand for green skills will outpace the increase in supply of workers equipped with these skills, according to LinkedIn's 2023 Global Green Skills Report (LinkedIn Economic Graph, n.d.).

A long-term plan should be developed to facilitate a talent pipeline for the digital and green economies. Most government initiatives have focused on upskilling the workforce through programmes such as Skills Future SG and SG: Digital. More focus can be given to students who form the prospective workforce, familiarising them with in-demand technology and green skills at an early age.

At the primary and secondary levels, the Ministry of Education (MOE) can build on the EdTech Masterplan 2030, which includes developing students' digital literacy and use of technological skills as one of its aims (MOE, 2023). MOE can provide schools with resources and course material to ensure the consistency of content whilst incorporating the use of emerging technologies. For example, teachers can educate students on the ethical use of AI, such as ChatGPT, and discuss its promises and pitfalls, thereby starting a conversation on the safe use of AI. Familiarising students with these new technologies early on will hone their interest in the digital economy, which will likely increase the ease of picking up in-demand skills. An annual review of digital competencies and technological skills taught should be implemented to ensure that the curriculum remains relevant, considering the rapid pace of development. Considering the overlap of skills needed in the digital and green economy, MOE could consider including content that highlights the importance of digital tools in helping Singapore achieve its sustainability goals.

The emphasis on skills promoting digital sustainability should be considered more broadly. The green transition has driven an increase in demand for skills traversing the digital-green nexus, particularly in carbon-intensive industries such as energy production, utilities, and transport. As a result, digital-green skills such as sustainability reporting, carbon emissions accounting, impact assessment, and energy management are increasingly in demand. This trend is likely to continue as more companies will need to comply with new sustainability reporting standards.

8. Conclusion

Singapore's well-developed infrastructure, strong connectivity, and embrace of technology position it to capture opportunities in the digital economy. However, the country's steadfast commitment to achieving net-zero emissions by 2050 amid extant natural constraints reveals the difficulties it continues to face in its green transition. With the burgeoning digital economy contributing significantly to carbon emissions, a multi-pronged approach that leverages technology to ensure sustainable growth is necessary. The government has already committed funding and support for these new priority areas. Greater investments in innovation and human capital development must be complemented by continued collaboration between the public and private sectors to ensure that policies remain fit for purpose. Successful pathfinding in these areas will augment Singapore's current efforts in fostering a digital-first economy, ultimately enabling the country to overcome its resource limitations and achieve its net-zero targets.

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Chapter 9
The Digital Economy in Thailand: Potential and Policies

Juthathip Jongwanich

1. Introduction

The importance of the digital economy in Thailand has become increasingly evident over the past 5 years. According to a broad definition by the Organisation for Economic Co-operation and Development (OECD) (2020), the digital economy in Thailand grew substantially in 2017–2021, expanding from US$41 billion in 2017 to US$66 billion in 2021, representing an annual growth rate of around 12%. During this period, its contribution to GDP increased from 9.0% in 2017 to 13% in 2021 (Table 9.1). The digital industry – particularly in areas such as hardware, communications, software, digital services, digital contents, and smart devices – has been a major driver of this growth, followed by digital trade, digital finance, and digital tourism (Figure 9.1). Thus far, digital technology has been more concentrated in the service sector, with its utilisation in the manufacturing and agriculture sectors remaining relatively limited.

From an expenditure perspective, trade in digital goods and services has played a crucial role in the development of the digital economy in Thailand, in line with the trade of traditional products, where the shares of exports and imports in GDP are around 60% and 50%, respectively.

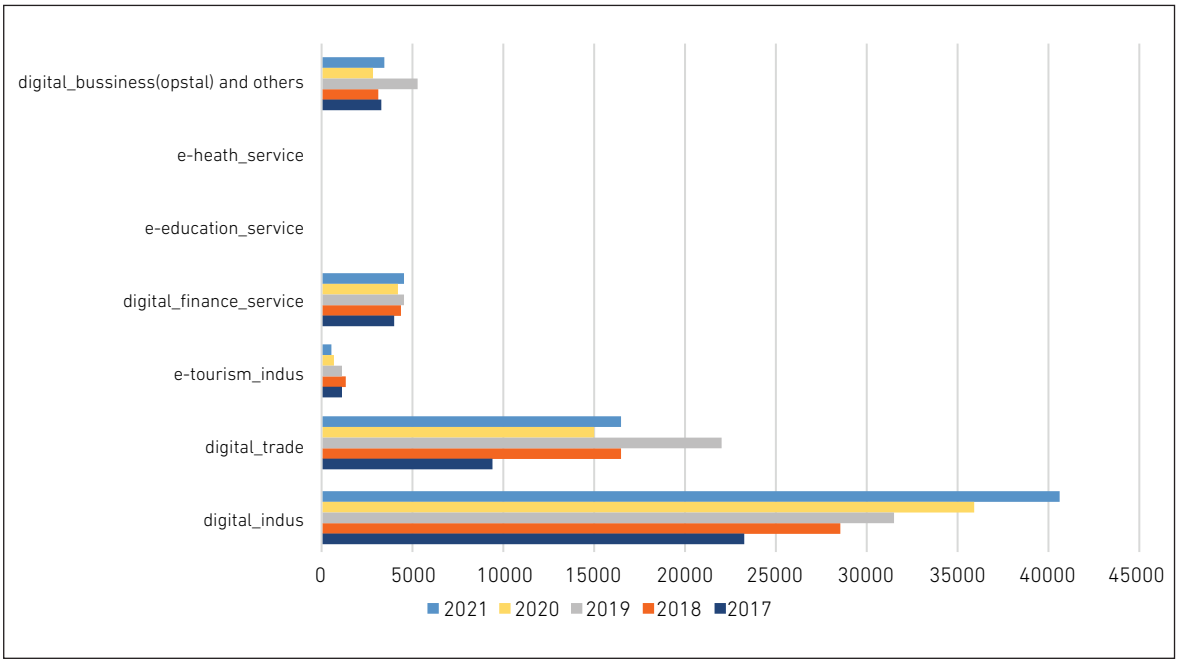
Table 9.1. Digital Contributions to Gross Domestic

Years	Value* (Million US$)		Exchange rate (bath/ US$)	Growth		Contribution of digital to GDP
	Digital related activities	GDP		Digital industries	GDP	
2017	41,107	302,310	33.9		4.2	9.0
2018	54,097	330,847	32.3	25.3	4.2	10.7
2019	64,655	351,831	31.0	14.8	2.3	11.9
2020	59,023	327,412	31.3	-8.0	-4.2	11.8
2021	66,051	325,416	32.0	14.4	1.6	13.0

GDP = gross domestic product.

Source: Office of the National Digital Economy and Society Commission.

Figure 9.1. Digital Economy, by Product in Thailand (constant prices in 2017) Sub-category



GDP = gross domestic product.

Source: Office of the National Digital Economy and Society Commission.

Like many other countries, Thailand has placed significant policy emphasis on harnessing the new and emerging opportunities brought about by the digital economy. Policy responses have been adopted at the national level and through action plans for all government agencies. For example, the Thailand 4.0 Policy was launched in 2018 to transform the economy into a value-based digital economy. The Ministry of Digital Economy and Society (MDES) launched the 20-year National Master Plan for Digital Development (2018–2037) and the Thailand Strategic Digital Plan for Economic and Social Development (2020–2024), whilst organisations such as the Digital Economy Promotion Agency (DEPA) announced the Thailand Digital Plan, DEPA for 2018–2022. Beyond policies directly related to digital economy, such as investment strategies, digital infrastructure, and regulations, strategic investment plans and various decrees have been introduced to drive economic transformation.

Given the importance of the digital economy and the various policy shifts, this research project aims to examine the potential of the digital economy and review the key policies that have been introduced or altered to steer the country towards a digital future. Section 2 of the chapter presents the potential for the development of the digital economy, whilst section 3 discusses four policy aspects. The final section provides conclusions and policy recommendations.

2. Potential for Developing the Digital Economy

Two official sources provide data on the digital economy: (1) The Digital Contribution to GDP, compiled by the Office of the National Digital Economy and Society Commission (ONDE); and (2) the Digital Market Survey and Forecast, conducted by the Digital Economy Promotion Agency (DEPA) under MDES, in partnership with the IMC Institute (Jongwanich, 2023). The former uses a broad definition of the digital economy as outlined by the Organisation for Economic Co-operation and Development (OECD) (2020), whilst the latter applies a narrower definition, closer to those proposed by the OECD (2020) and the United Nations Trade and Development (UNCTAD) (2019) focusing on the supply side of the digital market.

Thailand's digital economy experienced substantial growth, outpacing GDP growth in 2018–2021. From the expenditure perspective, consumption grew faster than other components in 2017–2020. However, in 2021, following the easing of the coronavirus disease (COVID-19) pandemic, investments and exports grew markedly, indicating a positive outlook for the digital economy in the medium to long term (Table 9.2).

When considering subcategories, high growth was concentrated in digital hardware, such as electronics and computer parts, medical electronic equipment, and sonar and control equipment, whilst investment in software slightly declined by 0.82% in 2021 (Figure 9.3). The proportion of smart devices remained relatively low at around 20%, with traditional hardware investment accounting for more than 70% of total investment (Figure 9.4). Stimulating more investment in software and smart devices could help balance the digital development path.

Digital technology has been concentrated more in services, followed by manufacturing. Its application in agriculture has been limited. Prioritising the use of technology in agriculture and manufacturing should be a key focus moving forward.

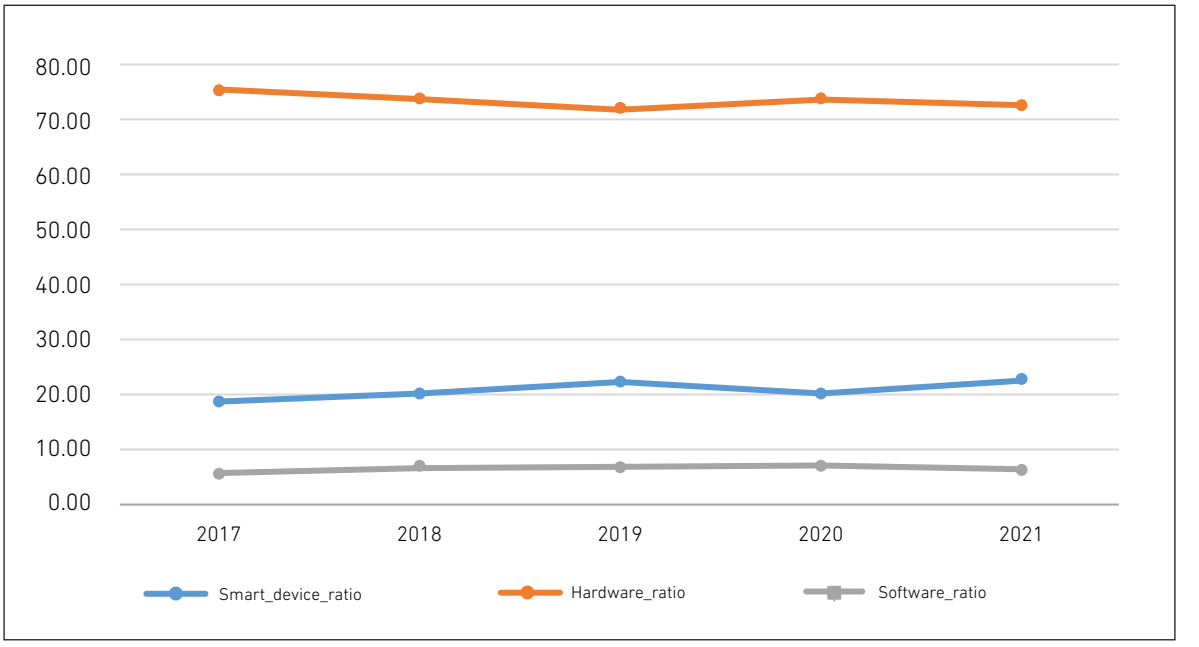
Table 9.2. Components of Digital Gross Domestic Product at 2017 Prices (US$ million) and Growth Rate (%)

Years	Consumption	Government	Investment	Export	Import	C_ growth	G_ growth	I_ growth	X_ growth	M_ growth
2017	10,516	483	3,919	70,165	55,066					
2018	12,155	476	4,357	71,518	59,672	10.0	-6.4	5.8	-3.0	3.2
2019	12,946	573	4,484	70,121	56,590	2.4	15.5	-1.1	-5.8	-8.9
2020	13,672	517	4,527	60,811	48,642	6.5	-9.0	1.8	-12.6	-13.4
2021	13,818	501	5,432	63,393	53,410	3.3	-1.0	22.6	6.5	12.2

Note: Investment refers to gross fixed capital formation.

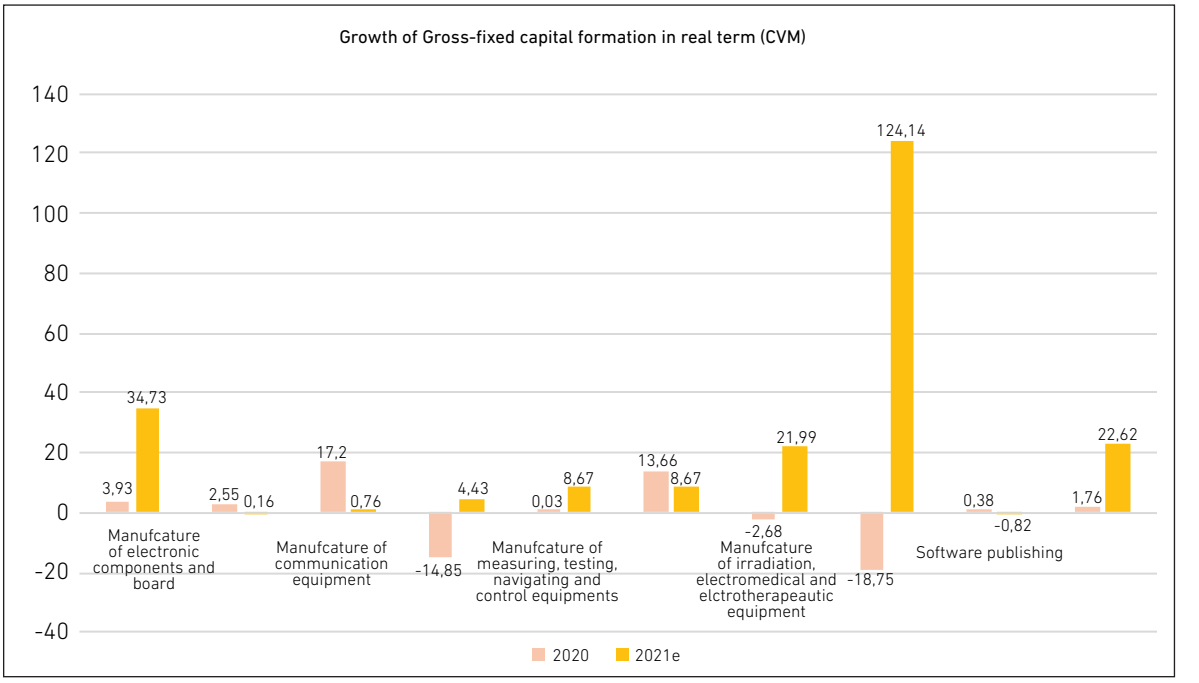
Source: Office of the National Digital Economy and Society Commission.

Figure 9.2. Proportion of Investment (%)



Source: Office of the National Digital Economy and Society Commission.

Figure 9.3. Investment Growth (at 2017 prices)



Source: Office of the National Digital Economy and Society Commission.

The importance of the digital economy is further revealed when the narrower definition is applied. Table 9.3 shows that the growth rates of hardware and smart devices, digital services, and software and software services increased substantially in 2021–2022 and are expected to keep growing at a similar pace over the next 3 years. However, whilst hardware (including smart devices) considerably dominates the digital industry, accounting for about 70%, the growth of software and digital services is expected to lag.[1] Increasing investment in software and software services has the potential to balance the development path of the digital industry in the country.

[1] The value of e-commerce increased significantly, rising from B2.76 trillion in 2017 to B4.01 trillion in 2021, with an average annual growth rate of about 10%. However, it is important to note that the value of e-commerce declined by around 6% in 2020, dropping from B4.05 trillion in 2019 to B3.78 trillion in 2020 amidst the pandemic. Business-to-consumer transactions dominate the e-commerce sector, accounting for 51% of the total value, followed by business-to-business at 27% and business-to-government at around 22%. Consumer-to-consumer (C2C) transactions are on the rise. This trend is reflected in the significant increase in monthly web visits to leading C2C e-commerce sites, which jumped from 49.6 million in the second quarter (Q2) of 2020 to 90 million in Q2 2021 and further to 103 million in Q3 2021. For more detailed information, you may refer to Statista and EDTA. The link of EDTA is as follows: https://www.etda.or.th/th/Useful-Resource/publications/Value-of-e-Commerce-Survey-in-Thailand-2021-Slides.aspx.

Employment in the digital industry continued to grow in 2022, except for digital services, which saw significant growth in 2021 (Table 9.4). However, the survey revealed a concerning trend: whilst the number of students enrolling in digital industry-related faculties has increased, the number of graduates has declined (Figure 9.4). If this trend persists, it could have an adverse implication on human capital and the future development of the digital industry.

Table 9.3. The Value of the Digital Industry (baht million) and Growth Rate (%)

	Value (Baht million)						Growth (%)				
	2020	2021	2022	2023e	2024e	2025e	2021	2022	2023e	2024e	2025e
Software and software services	114,978	160,872	190,766	218,999	241,775	265,469	11.0	18.6	14.8	10.4	9.8
Hardware and smart devices	1,021,442	1,218,588	1,431,980	1,472,075	1,744,409	2,065,381	19.3	17.5	2.8	18.5	18.4
Digital services	162,357	233,088	281,515	341,283	403,397	454,628	43.6	20.8	21.2	18.2	12.7
Digital content	39,332	42,065	40,518	41,143	42,710	44,983	6.9	-3.7	1.5	3.8	5.3
Telecommunication	630,250	647,654	669,330				2.8	3.3			

Note: Software includes system integration, software maintenance, customised software, and consultancy and training, whilst digital services include e-content, e-entertainment, e-retail, e-advertising, e-transactions, and fintech.

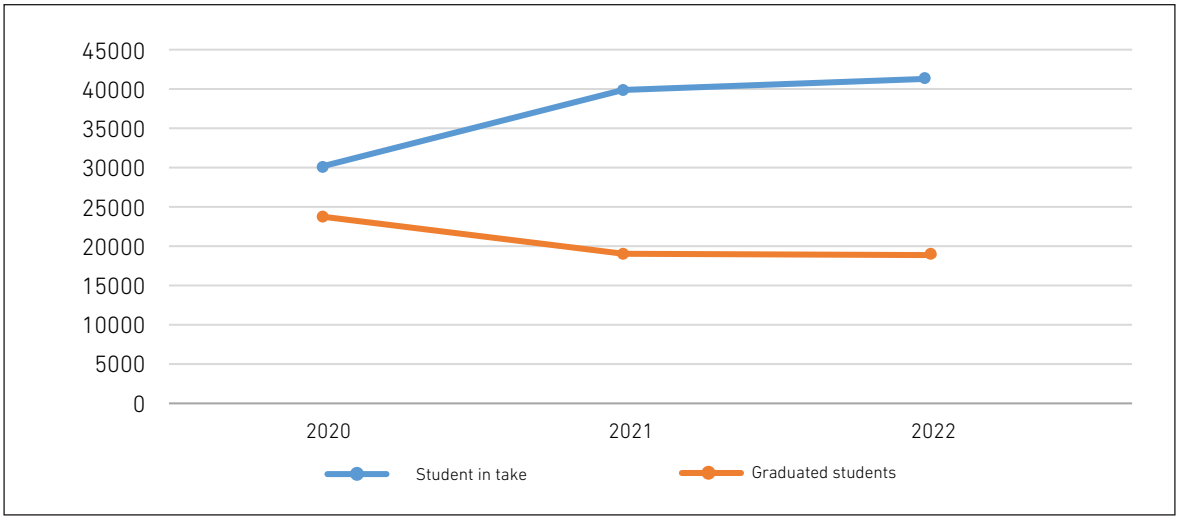
Source: Author, based on data from the Digital Economy Promotion Agency, Ministry of Digital Economy and Society, and the IMC Institute.

Table 9.4. Number of People Employed in the Digital Industry

	Persons			Growth rate (%)	
	2020	2021	2022	2021	2022
Software and software services	132,761	138,917	144,672	4.6	4.1
Hardware and smart devices	312,460	311,051	324,760	-0.5	4.4
Digital services	60,008	79,115	73,782	31.8	-6.7
Digital content	6,614	5,397	6,225	-18.4	15.3

Source: Author, based on data from the Digital Economy Promotion Agency, Ministry of Digital Economy and Society and the IMC Institute.

Figure 9.4. Number of Enrolled and Graduated Students



Source: Author, based on data from the Digital Economy Promotion Agency, Ministry of Digital Economy and Society and the IMC Institute

3. Policies for the Digital Economy

This section reviews key policies relevant to the digital economy. Using the broad definition of the digital economy as outlined by OECD (2020), the study focuses on three key policies: industrial transformation, digital plans, and rules and regulations. Some policies, such as those related to industrial transformation and investment, have been amended to support the digital economy, whilst others, such as the Personal Data Protection Act and the Cyber Security Act, have been designed for the digital sector.

3.1. Industrial Transformation

The Thailand 4.0 Policy, launched in 2018, aims to transform the economy into a value-based digital economy. The establishment of the Eastern Economic Corridor (EEC), which spans the three eastern provinces of Chonburi, Rayong, and Chachoengsao, is a key part of this strategy. Launched in 2018, the EEC includes the EEC-D (Digital Park) in Sriracha, Chonburi, which is designed to support digital

business innovators.[2] The government has made substantial investments in infrastructure to enhance the connectivity of the three provinces with the global market. Key projects include the high-speed train route linking Suvarnabhumi, Don Mueang, and U-Tapao airports; the development of U-Tapao airport; the third phase of Map Ta Phut and Laem Chabang ports; and a centre for the maintenance, repair, and overhaul of aircraft. A double-track railway and the expansion of the inter-city motorway network have been prioritised.

In 2017 and subsequent years, Thailand revised its investment incentives to attract higher-quality foreign direct investment and promote the digital economy. Thailand has made significant strides in both hard and soft digital infrastructure. In 2018, the government launched the country-wide village broadband network Connected Netpacharat, aiming to provide affordable high-speed internet to low-income households in more than 24,000 villages.[3] The Digital Park in Chonburi supports the country's digital development by introducing a submarine cable system, a cable landing station, and a data centre. In May 2020, a national 5G committee was formed to develop a clear roadmap for 5G adoption and enhance cooperation amongst agencies.

The Bank of Thailand has played a crucial role in accelerating the digital transformation of the financial sector. Initiatives include the central bank's e-payment platform, PromptPay, which links user accounts to their ID or phone number; the establishment of a new financial transaction report standard (ISO 20022) to facilitate e-invoicing and e-factoring; and the promotion of biometric and facial recognition systems in banking services. A peer-to-peer lending platform was created by the central bank in cooperation with the Ministry of Finance, enabling individual lenders to be matched with individual borrowers.

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[2] The EEC-D is envisioned as an innovation hub and destination for digital global players and business innovators. Key participants include hardware and software producers and service providers specialising in areas such as cloud computing, intelligent system, pervasive software, cognitive platforms, Internet of Things platforms, and machine learning. The park hosts digital content providers, including data centres, big data analytics, streaming content, content delivery platforms, virtual reality movies, holograms, and immersive animation, as well as digital tech start-ups. The EEC-D is equipped with ultra-high-speed broadband infrastructure, including an international submarine cable station, a satellite earth station, and a data management centre. It is crucial to note that the EEC-D faces competition within ASEAN from two other digital parks: Hoa Lac Hi-Tech Park in Viet Nam and Punggol Digital District in Singapore. These parks are also vying to attract foreign investment in the digital sector. Punggol Digital District aims to bring together global digital players, investors, innovators, start-ups, and professional researchers. The district will house the campus of Singapore Institute of Technology, which is planned to include the entire education system related to digital technology.

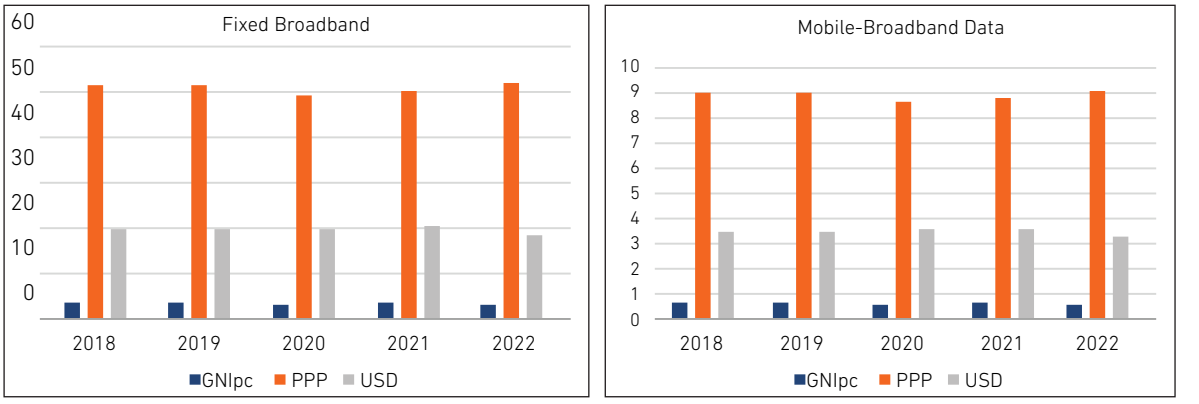
[3] The Ministry of Information and Communication Technology, in collaboration with the Office of the Non-formal and Informal Education, signed a memorandum of understanding in May 2018 to provide public internet services to approximately 10,000 remote locations over a 3-year period. In 2019, an additional 10,000 locations were included for a 6-month period. In 2021 and 2022, around 8,300 locations were covered, with service durations of 12 months and 6 months, respectively, offering improved internet quality. In addition, public internet access was provided to underprivileged groups, including non-formal education centres, public libraries, digital community centres, and border patrol police schools. However, the plan did not address how to ensure continued access to the internet after the projects ended, nor did it consider scaling-up public internet services for underprivileged groups.

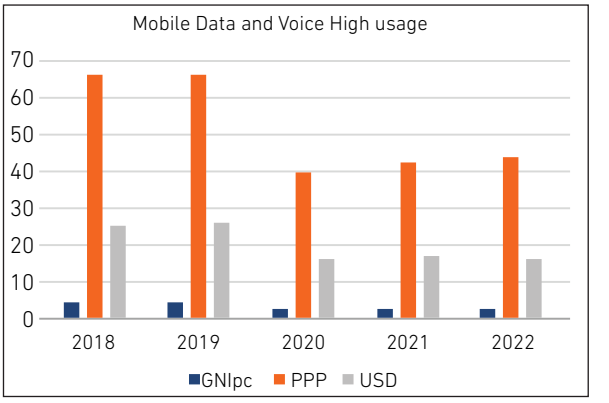
When considering infrastructure and accessibility, various indicators show that digital infrastructure has improved substantially over the past decade. By 2022, 99% of the population was covered by a mobile cellular network, and 98% had access to at least a 4G mobile connectivity. Household internet access increased from 64% in 2017 to 90% in 2022, with high acceleration observed during the COVID-19 pandemic. The gap in internet access between rural and urban areas narrowed from 12 percentage points in 2020 (69% for rural areas and 89% for urban areas) to 6 percentage points in 2022 (86% for rural areas and 92% for urban areas). Fixed broadband subscriptions per 100 inhabitants and active mobile broadband subscriptions have increased significantly since 2015. International bandwidth has improved, rising from 53 kbit/s in 2015 to 178 kbit/s in 2022.

However, compared to other countries in Asia, such as China, Singapore, Malaysia, and Viet Nam, Thailand still lags in certain aspects, particularly in terms of prices and information and communication technology (ICT) skills. In 2022, only 24% of the population had a computer at home. Whilst ICT skills have shown an upward trend, only 1% of the population is classified as having advanced ICT skills, with approximately 21% possessing basic ICT skills.

Over the past decade, the prices of fixed broadband, mobile broadband, and mobile cellular services in Thailand have declined noticeably, especially when measured as a percentage of gross national income (Jongwanich, 2023). However, since 2017, these prices have remained relatively unchanged. When adjusted for purchasing power parity, it appears that ICT prices, especially for fixed broadband and mobile broadband, have not yet declined as expected (Figure 9.5).

Figure 9.5. Prices of Fixed Broadband, Mobile Broadband, and Mobile Cellular in Thailand, 2018–2022





Source: Author's compilation from International Telecommunication Union (ITU).

3.2. Digital Plans

The government has long addressed the critical importance of ICT in enhancing productivity and promoting long-term growth. This focus dates back to the mid-1990s, when the first national information technology (IT) plan, the Thailand National IT Policy (1996–2000), was introduced. Since then, several national plans have followed, including the Thailand Information and Communication Technology Policy Framework (2001–2010), the Thailand Information and Communication Technology Master Plan (2002–2006, later extended to cover 2007–2008), the National Broadband Policy (2010), the Information and Communication Technology Policy Framework (2011–2020), and the Universal Service Obligation Master Plan for Provision of Basic Telecommunication Services (2012–2014).

In 2002, the Ministry of Information and Communication Technology (MICT) was established as the central body responsible for implementing these plans, coordinating measures, and overseeing related government agencies. In 2016, the ministry was restructured and renamed MDES, expanding its scope to include state-owned enterprises and public organisations involved in ICT activities, such as the Telephone Organization of Thailand, the Communications Authority of Thailand (CAT), the Electronic Government Agency (public organisation), and the Electronic Transactions Development Agency (public organisation). More importantly, the Software Industry Promotion Agency was replaced by the DEPA, which now plays a key role in promoting and supporting the development of the digital industry, innovation, and the adoption of digital technology.[4]

[4] The National Disaster Warning Center, formerly under MICT, is now being transferred to the Ministry of the Interior. MDES has set up a cybersecurity agency and a hacker training centre.

In 2018, MDES launched the 20-Year-National Master Plan for Digital Development (2018–2037), with four key goals: (1) enhancing the country's competitiveness; (2) ensuring equal opportunities, with broadband internet access for all as a basic utility; (3) developing human capital, ensuring that everyone is digitally literate; and (4) reforming government operations. Various government units have developed their own plans to align with the 20-Year National Master Plan for Digital Development. For example, MDES established the Strategic Digital Plan for Economic and Social Development for 2018–2021 and 2020–2024, the Office of the Permanent Secretary launched its strategic plan for 2020–2024, and DEPA introduced the Thailand Digital Plan for 2018–2022. Each government unit sets its own goals, strategies, and indicators to measure success, which has sometimes led to complications in aligning strategies and assessing the accomplishment of the overall plan.[5]

3.3. Rules and Regulations for Digital Activities and International Cooperation

Thailand has established rules and regulations governing the digital economy that align with those of other Asian countries and international standards. These include frameworks such as the United Nations Convention on the Use of Electronic Communications in International Contracts, OECD's Recommendation of the Council Concerning Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, the APEC Privacy Framework, and the European Union's General Data Protection Regulation.

Digital laws in Thailand can be categorised into three groups:

(1) **Laws related to digital infrastructure and business facilitation**. These include legislation such as the Electronic Transaction Act, digital ID laws, and provisions within the Penal Code.

(2) **Laws related to consumer protection and business trust.** Examples include the Consumer Protection Act, the Copyright Act, and the Direct Sales and Direct Marketing Act.

(3) **Laws related to securing the digital ecosystem.** This category includes the Personal Data Protection Act and the Cyber Security Act.

[5] There are differences in the indicators set by various government bodies, such as MDES and the Office of the Permanent Secretary. For example, under the 2018–2022 plan by DEPA, the indicators for strategy 2 include (1) achieving a 10% annual growth in the value of the digital industry (encompassing hardware, software, digital services, communication, and digital content); and (2) adding 1,000 digital small and medium-sized enterprises, digital transformation initiatives, and digital startups to the market during 2018–2022. In contrast, the indicators in the 2018–2021 and 2020–2024 plans of MDES focused on promoting the digital economy. For the earlier plan, the indicator was value of e-commerce, measured as 2% of total sales; for the latter plan, the target was set at 10% annual growth rate. Both plans aimed to increase the number of digital start-ups by 300 firms per year.

For example, under the first category, Thailand introduced the Electronic Transactions Act of B.E. 2544 in 2001. It acknowledges electronic transactions as having the same validity as traditional paper-based transactions. The act was amended in 2019 (the Electronic Transactions Act [No. 3] B.E. 2562 [A.D. 2019]) to strengthen the evidentiary weight of electronic transactions and to set conditions for legal consequences when documents lack a physical signature. The Digital ID Bill was approved in principle by the Cabinet in 2018. This digital ID system is designed to facilitate and expedite identity verification processes via online platforms.

In the second group, various laws have been enacted to protect consumers and build business trust, indirectly supporting the promotion of e-commerce. For example, the Consumer Protection Act of B.E. 2522 (1979) was amended in 2019 (The Consumer Protection Act [No. 4] B.E. 2562 [2019]). The Direct Selling and Direct Marketing Act of B.E. 2545 (2002) is another example, allowing customers the right to terminate contracts within an agreed period.

In the third category, Thailand has increasingly focused on securing its digital ecosystem. The Personal Data Protection Act B.E. 2562 and the Cyber Security Act B.E. 2562, both introduced in 2019, are key pieces of legislation. The Computer Crime Act of B.E. 2550 (2007) was amended in 2017 to address issues such as spam emails and to impose penalties for sending disruptive computer data or emails.

Regarding international cooperation in digital provisions, Thailand joined the World Trade Organization (WTO) Joint Initiative on Electronic Commerce (JIEC) in 2019. Progress under JIEC has mainly focused on laws related to digital infrastructure and business facilitation, as well as consumer protection and business trust, including electronic signatures, electronic contracts, paperless commerce, and online consumer protection.

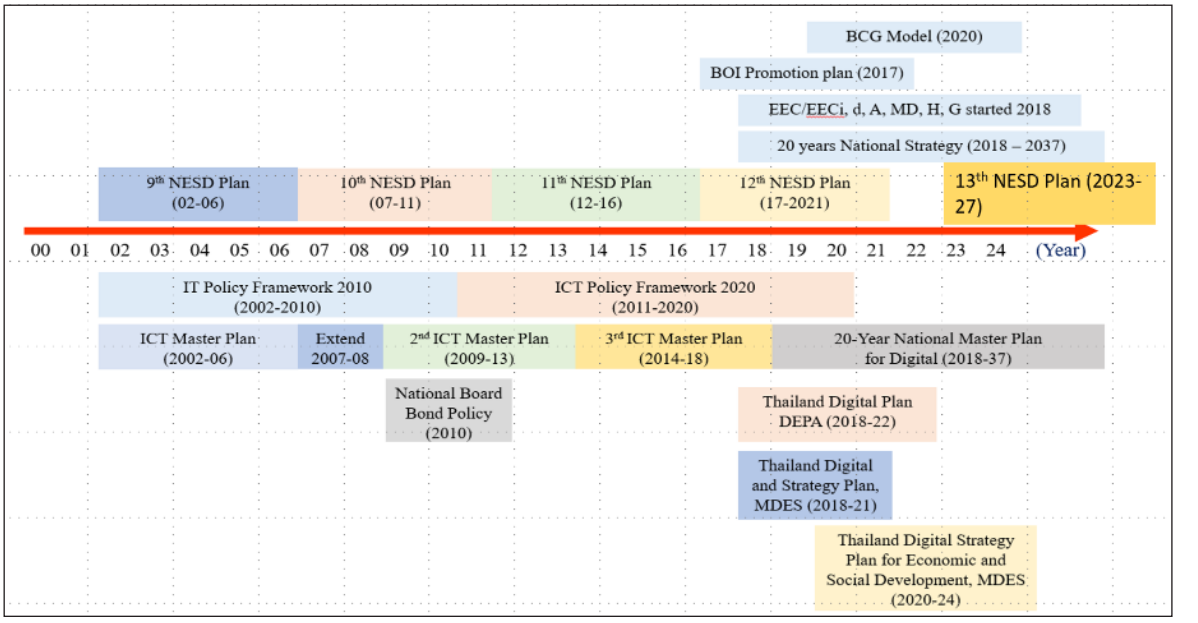
Thailand has included digital provisions in two bilateral free trade agreements (FTAs): the Thailand–Australia FTA (TAFTA) and the Thailand–New Zealand FTA. Most provisions in these agreements align with the WTO JIEC, although only TAFTA includes provisions relating to a moratorium on digital goods tariffs.

Regionally, the ASEAN–Australia–New Zealand FTA is notable for including a digital chapter that addresses issues such as consumer protection, online personal data protection, and paperless trade (see UN [2022] and Postigo [2023]). The Regional Comprehensive Economic Partnership includes a digital chapter, although its provisions are less restrictive than those in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership, of which Thailand is not yet a member.

Thailand is also a participant in the ASEAN Digital Economic Framework Agreement, which is expected to be completed by 2025. The agreement will cover issues such as digital talent, digital IDs, cybersecurity, retraining and upskilling, digital infrastructure, and interoperability within ASEAN.

In June 2022, Thailand signed a memorandum of understanding (MOU) on DEPA, initiated by Singapore, Chile, and New Zealand in 2020. The MOU aims to promote eight issues, including digital transformation, e-commerce, the setting up of centres to combat fake news, the creation of government data centres and cloud services, personal data protection, cybersecurity, investment in Thailand's Digital Valley and IoT Institute in the Eastern Economic Corridor, and the development of digital skills and literacy.

Figure 9.6. Key Plans Relevant to Digital Development in Thailand



BCG = Bio-Circular-Green Economy, BOI = Board of Investment, DEPA = Digital Economy Promotion Agency, EEC = Eastern Economic Corridor, ICT = information and communication technology, MDES = Ministry of Digital Economy and Society, NESD = National Economic and Social Development.

Source: Author's compilation.

5. Conclusions and Policy Recommendations

This chapter examines the potential of the digital economy in Thailand and reviews key policies across three areas: industrial transformation, digital plans, and digital rules and regulations, including international cooperation. The digital economy experienced significant growth, outpacing GDP growth from 2017 to 2020. Before 2021, consumption grew faster than other components, but in 2021, following the easing of the pandemic, investment in digital sectors and exports increased markedly, indicating a promising outlook for digital development. However, this growth was primarily concentrated in digital hardware sectors such as electronics, computer parts, medical electronic equipment, and sonar and control equipment, whilst investment in software slightly declined in 2021. The proportion of investment in smart devices remained considerably smaller than that in traditional hardware. Although the number of students enrolled in digital-related faculties has steadily increased, the number of graduates has not kept pace. This trend is concerning, as it could have severe implications for human capital and the future development of the digital industry if it continues.

Thailand's digital infrastructure has improved over the past decade, but in comparison to other Asian countries, including China, Singapore, Malaysia, and Viet Nam, the country still lags in certain areas, particularly in ICT skills and affordability. Whilst various rules and regulations have been amended and introduced to support digital development, some aspects, such as the regulation of cross-border personal data transfers, remain unclear. These developments, along with certain programmes, have implications for improving political-security and socio-cultural pillars in addition to the economic pillar. Thailand has initiated international cooperation on digital provisions at bilateral, regional, and multilateral levels.

To transform Thailand into a digital economy, this study proposes four key policy recommendations:

(1) **Strengthen digital transformation plans.** It is crucial to reinforce digital transformation plans, ensuring continuity in the policy framework and prioritising clear policy coordination amongst government agencies. MDES should take an active role in coordinating these plans across institutions to avoid policy overlap and failures in coordination and enforcement. Adequate budget allocations should be made for both hard and soft digital infrastructure and for promoting the digital industry. The current lack of policy continuity, overlapping policies, and coordination failures amongst government agencies lead to inefficient budget utilisation, potentially delaying digital development and making it difficult to track progress. Given the dominance of digital hardware, stimulating more investment in software and smart devices would help balance the digital development path. Whilst digital technology has been more prevalent in services, its use in manufacturing and agriculture has been limited, making it essential to prioritise technological adoption in these areas.

(2) **Develop human capital, particularly ICT skills.** Further development of human capital, especially in ICT skills, is essential in the context of digital transformation. Whilst the government has plans to improve human capital, policy overlap and coordination failures remain key obstacles. The government should establish clear evaluation criteria for each project or policy and ensure an effective whole-of-government approach, particularly by establishing coordination processes and communication channels across institutions. Continued public–private partnerships in enhancing human capital development are also crucial, with a focus on encouraging large companies to support small and medium-sized enterprises in developing their workforce skills.

(3) **Enhance ICT infrastructure.** Improving ICT infrastructure is vital to ensure digital development, particularly in terms of accessibility and affordability. Investments in infrastructure, public–private partnerships to scale up potential infrastructure projects in remote areas, and modernised rules and regulations to support infrastructure development should be encouraged. This would not only improve economic aspects enhanced by digital development but also promote the political-security and socio-cultural pillars.

(4) **Modernise and monitor rules and regulations.** With the rapid pace of digitalisation, it is important to regularly monitor and modernise established rules and regulations – including those concerning data security, privacy, consumer protection, competition policy, cross-border data flow restrictions, and data localisation requirements – to address public concerns. Strengthening regional cooperation on regulatory compatibility should be encouraged to facilitate business in the region and protect consumers against privacy and security risks. As digital transformation could potentially have negative impacts (Jongwanich, Kohpaiboon, and Ayako, 2022; and works cited therein; Jongwanich, 2022), especially in traditional sectors, the government should develop a systematic evaluation process. This process should include monitoring and evaluating job creation, potential job and business losses, technology adoption, and technology transfer to mitigate any potential negative economic and social impacts of digital transformation.

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Chapter 10
Building an Inclusive Digital Economy in Viet Nam

Duc Anh Dang

1. Introduction

Viet Nam's digital economy is growing rapidly, creating new opportunities for businesses and individuals. The country has recognised that developing its digital economy is a key strategy for improving livelihoods and achieving its broader economic goals: surpassing low-middle-income status by 2025, reaching the average income level by 2030, and attaining high-income status by 2045.[1] With the right policies and investments, Viet Nam's digital economy has the potential to become one of the most dynamic and innovative in Southeast Asia (Trong Dat, 2022).

Despite the significant progress Viet Nam has made in advancing its digital economy, it is crucial to prioritise inclusivity and ensure that the benefits of this growth are accessible to all.[2] An inclusive digital economy can create opportunities for people from all backgrounds, including those who are traditionally underserved or excluded, and ensure that everyone has access to digital technologies and the benefits they offer. To achieve this vision, Viet Nam must address key challenges and gaps that hinder its digital transformation. This includes ensuring access to digital infrastructure, such as high-speed internet, bridging the digital divide, promoting digital literacy, and supporting small and medium-sized enterprises (SMEs).

This chapter provides an overview of the digital economy in Viet Nam and explores the challenges the country faces in building an inclusive digital economy that benefits all. It suggests recommendations to address the main barriers to inclusivity and to seize the opportunities presented by the digital economy.

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[1] Decision No.411/QD-TTg, by the Prime Minister on 31 March 2022, approves the national strategy for development of digital economy and digital society by 2025, with a vision extending to 2030.

[2] This is an objective outlined in Directive 01/CT-TTg 2020, 14 January 2020, on promoting the development of digital technology enterprises, issued by the Prime Minister. The directive states that 'Vietnamese digital technology businesses will contribute to the mission of turning Vietnam into a developed industrial country, with the Vietnamese economy making a breakthrough, developing rapidly, sustainably, and inclusively with the goal of making Vietnam become a high-income country by 2045'.

2. Digital Economy

Viet Nam's digital economy is comprised of four main sectors: e-commerce, online tourism, digital communications, and logistics technology (Google, Temasek, and Bain & Company, 2022). Alongside Indonesia, Viet Nam leads digital economy growth in Southeast Asia, with both countries achieving growth rates of over 40% annually (Vietnamplus, 2021). In 2022, Viet Nam's digital economy accounted for about 8.2% of its gross domestic product (GDP) (Nguyen, 2021). A resolution passed by the Politburo on guidelines for participating in the Fourth Industrial Revolution has set a goal to increase the digital economy's contribution to GDP to 20% by 2025.[3] The resolution aims to establish a system of national, regional, and local data centres that are synchronised and unified, creating reliable and stable data systems for the state and businesses. It seeks to build a national digital payment infrastructure that is cohesive, unified, and shared, leveraging telecommunication network infrastructure to provide low-cost payment services and to develop mechanisms and policies that strongly promote non-cash payments.

Figure 10.1. Overall Digital Economy (US$ billion)

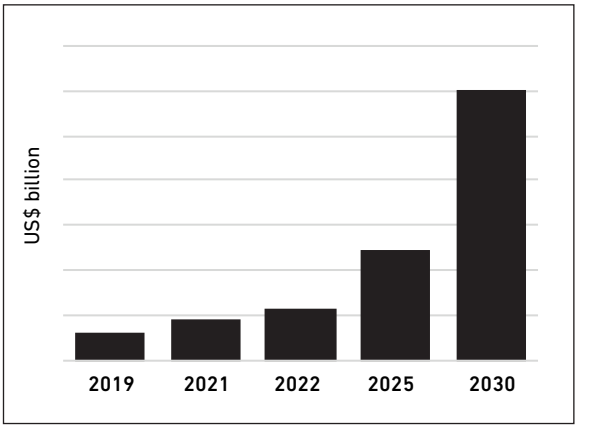
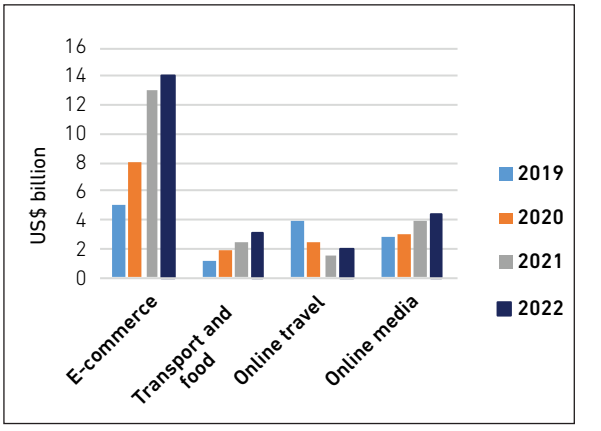


Figure 10.2. Contribution to the Digital Economy (US$ billion)



Source: Google, Temasek, and Bain & Company (2022).

[3] Resolution No.52-NQ/TW, 27 September 2019, provides guidelines and proactive policies for participating in the Fourth Industrial Revolution.

According to Google, Temasek, and Bain & Company (2022), Viet Nam's digital economy is expected to grow from US$23 billion in 2022 to nearly US$50 billion by 2025, the highest growth in the region, driven primarily by the booming e-commerce sector (Figure 10.1). E-commerce alone contributes about 68% to the digital economy (Figure 10.2). Viet Nam's e-commerce market grew at an average annual rate of 30% from 2015 to 2019, making it one of the fastest-growing sectors of the digital economy. According to the Ministry of Industry and Trade, the value of e-commerce transactions in Viet Nam reached US$11.8 billion in 2019. The coronavirus disease (COVID-19) pandemic further accelerated the growth of e-commerce as consumers turned to online shopping in response to social distancing measures. The most popular products purchased online include clothing and footwear, consumer electronics, household appliances, and personal care products (Huynh and Nguyen, 2020). E-commerce revenue is projected to have a compound annual growth rate of 12.8% from 2023 to 2027, leading to a projected market volume of US$21,591 million by 2027 (EcommerceDB, n.d.).

Decree 52/2013/ND-CP on e-commerce, 16 May 2013, is a cornerstone of the e-commerce legal framework. It has contributed to establishing a legal foundation for e-commerce activities, ensuring benefit sharing amongst participants, promoting e-commerce development, and enhancing business competitiveness. As technology has rapidly advanced in recent years, e-commerce has developed in a variety of forms. In response, the government issued Decree 85/2021/ND-CP, 25 September 2021, which amends and supplements several articles of Decree 52. The updated decree adds regulations to ensure transparency of information on websites, outlines content requirements for managing e-commerce activities, strengthens the responsibilities of e-commerce platform owners, and introduces specific regulations for e-commerce activities on social networks, along with the corresponding responsibilities of e-commerce platform owners.

3. Challenges to an Inclusive Digital Economy

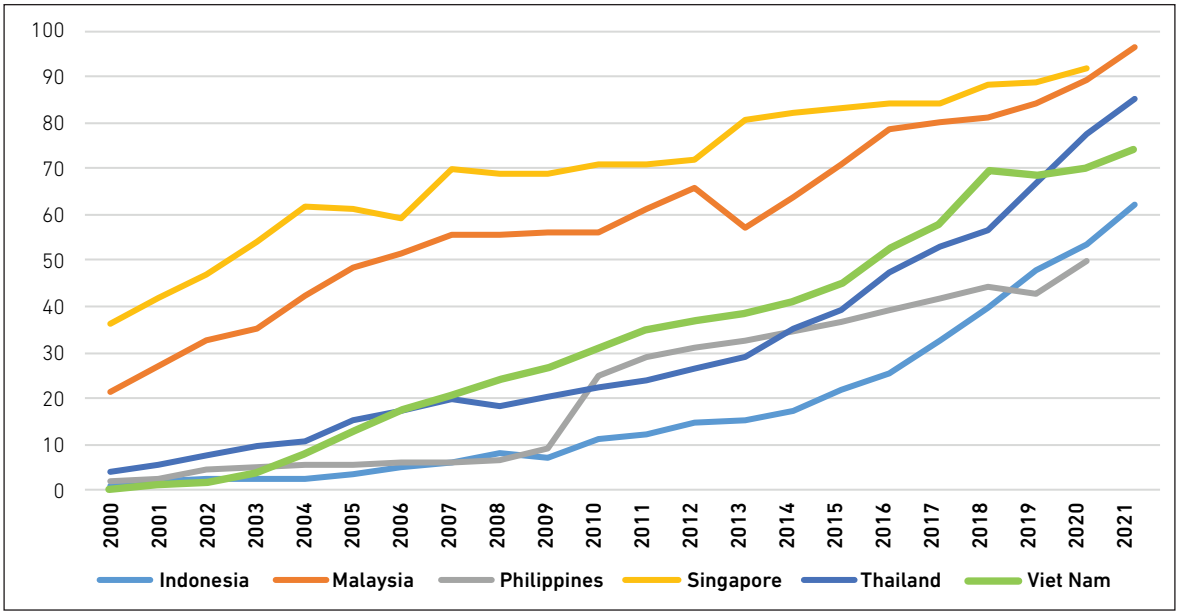
The government has recognised the importance of the digital economy and has implemented various policies and initiatives to support its development. In 2016, the government launched the National Program on Information and Technological Development, which aims to develop e-government, promote digital literacy, and enhance the competitiveness of the information and communication technologies (ICT) industry. Despite efforts to bridge the digital divide, significant barriers still prevent many from accessing digital technologies and participating in the digital economy.

3.1. Digital infrastructure

Viet Nam has made considerable strides in developing its digital infrastructure, focusing on expanding internet connectivity and increasing access to technology. According to the World Bank (2021), Viet Nam has seen significant progress in improving its digital infrastructure, particularly in terms of mobile broadband coverage and affordability. By the end of 2020, Viet Nam had roughly 69 million internet users (Huynh, 2021).

Figure 10.3 shows that more than 74.2% of the population had access to the internet in 2021. This figure is higher than in Indonesia and the Philippines but lower than in countries such as Singapore, Thailand, and Malaysia. Viet Nam's mobile communications sector has experienced rapid growth, with 3G/4G networks reaching almost all households. Major providers such as Viettel, VNPT, and Mobifone offer these services. Viet Nam launched 5G services for commercial and military purposes in 2022, which could enable more digital transformation opportunities (Onishi, 2021).

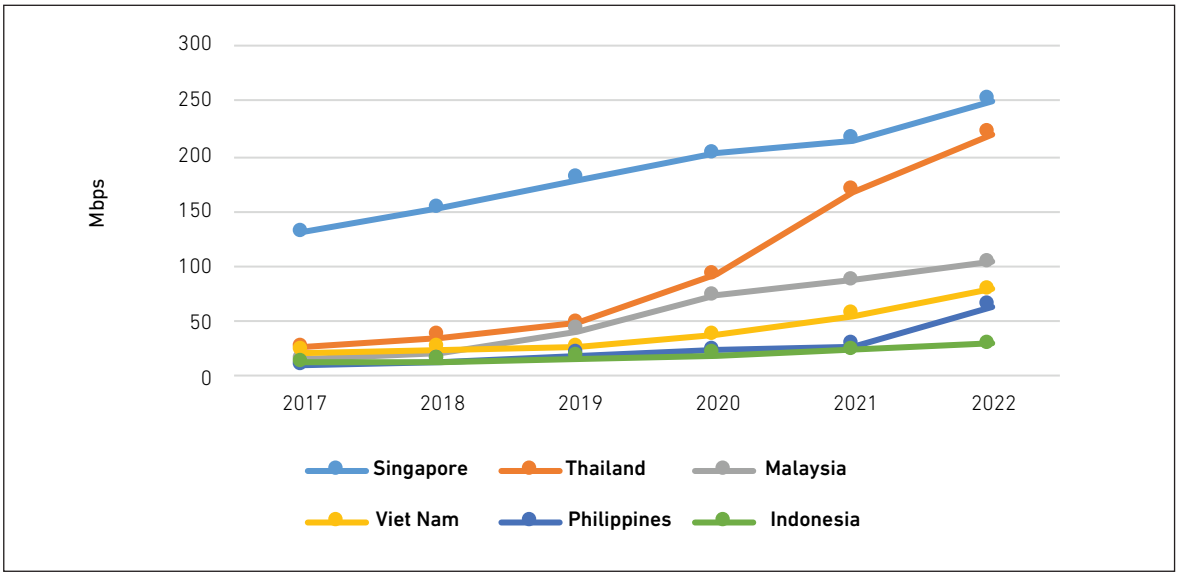
Figure 10.3. Share of the Population Using the Internet (%)



Source: World Development Indicators.

The Inclusive Internet Index 2019 ranked Viet Nam 44th out of 95 countries globally and 5th amongst 8 Southeast Asian countries (Dang, 2020). The average fixed broadband download speed in 2022 was over 77.2 megabits per second (Mbps), higher than Indonesia's 27.5 Mbps and the Philippines' 61.6 Mbps but lower than Thailand's 220 Mbps, Malaysia's 101.8 Mbps, and Singapore's 250.4 Mbps (Figure 10.4). However, fixed broadband penetration remains low and high-speed internet is still limited in rural areas (World Bank, 2021).

Figure 10.4. Average Fixed Broadband Download Speed



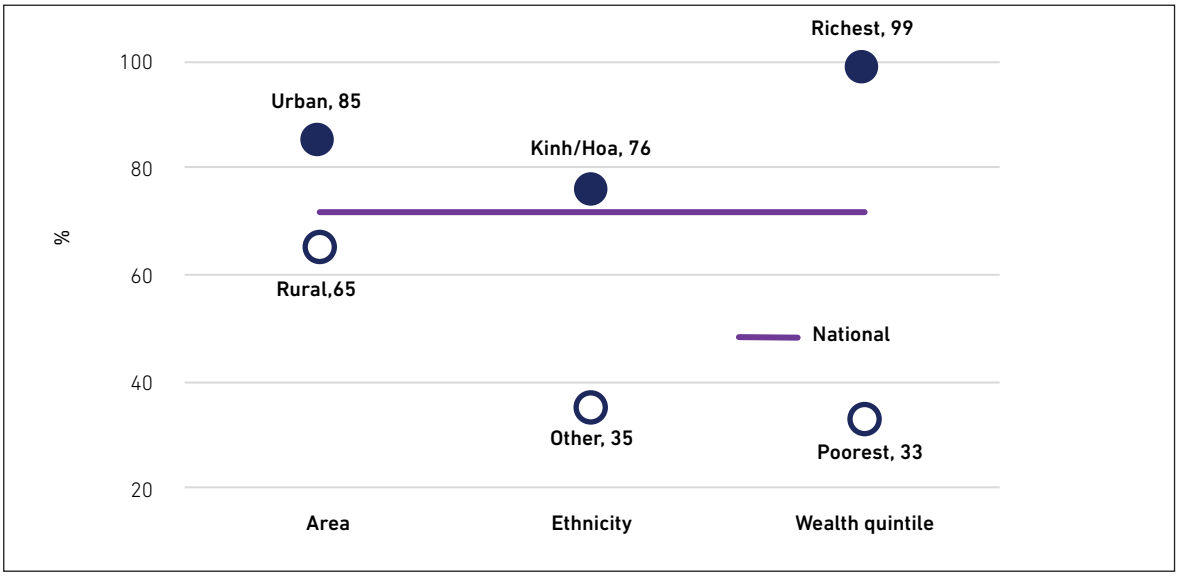
Mbps = megabits per second.

Note: Year refers to the date of data collection.

Source: Economist Impact estimate.

Figure 10.5 shows that internet penetration rates in urban areas are high (over 85%), but rural areas lag, with only 65% of residents having access to the internet. This digital divide is partly due to a lack of digital infrastructure in rural areas, as well as lower levels of education and income amongst rural residents. Only 33% of households in the poorest income group have internet access, compared with nearly all households in the richest income group. There are also significant disparities in internet use between those with low education levels (17%) and those with university degrees (98%). Financial constraints further exacerbate this divide, with 30% of households unable to afford devices that can access the internet (General Statistics Office and UNICEF, 2021).

Figure 10.5. Share of Households with Internet Access at Home (%)

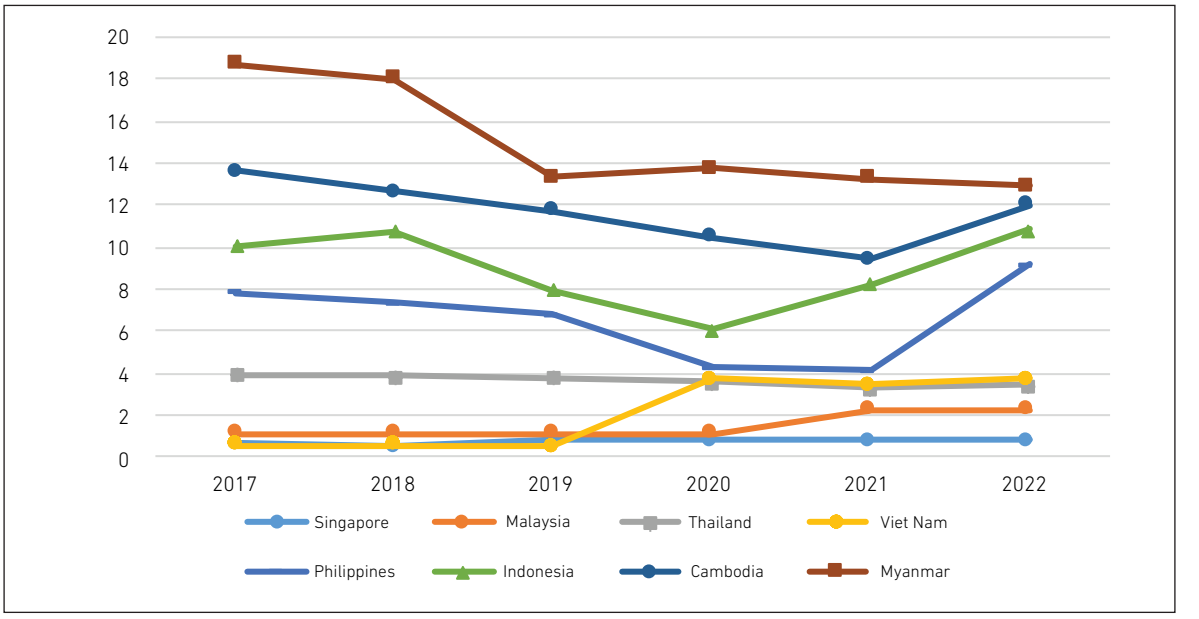


Source: Vietnam Sustainable Development Goal Indicators on Children and Women Survey 2020–2021.

Whilst about half of the households in the lowest two income groups use the internet, their experience is often inferior to that in more affluent areas. Poor families in mountainous regions face weak 3G/4G signals, limiting their ability to use digital services and mobile money (World Bank, 2021). These vulnerable groups frequently find the quality of the network insufficient for their needs. For example, 29.2% of the poorest households reported dissatisfaction with their internet connection quality, compared with only 19.6% of the wealthiest households. Similarly, the dissatisfaction rate was 21% amongst ethnic minority groups, slightly lower than the 30% reported by Kinh and Hoa households. This disparity may be due to the groups' financial limitations, which restrict them to low-quality internet service packages (Viet Nam Academy of Social Sciences and Oxfam, 2022).

Fixed-line monthly broadband costs in Viet Nam are competitive with other ASEAN countries, being almost the same as those in Thailand but higher than in Malaysia and Singapore (Figure 10.6). Viet Nam ranks as one of the countries with the cheapest internet globally, placing 12th out of 211 countries for low fixed broadband internet rates in 2020 (Trong Dat, 2021).

Figure 10.6. Fixed-line Monthly Broadband Cost (% of monthly gross national income per capita)

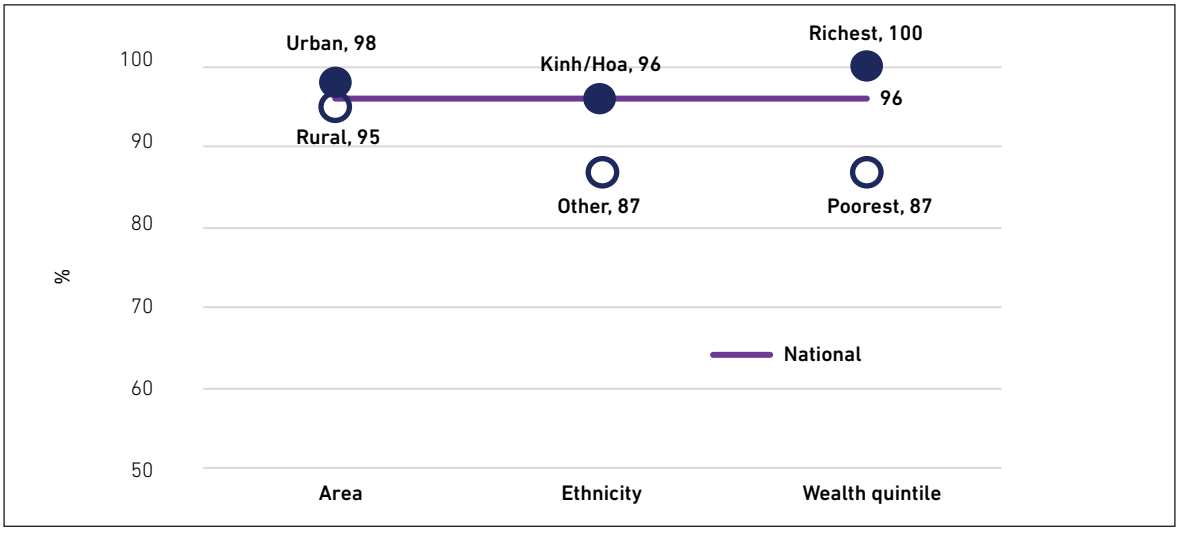


Note: Year refers to the date of data collection.

Source: International Telecommunication Union, Economist Impact estimate.

Mobile phones are common amongst Vietnamese families across all income levels, but not all households, particularly the poorest, can afford or access more advanced technologies (Figure 10.7).

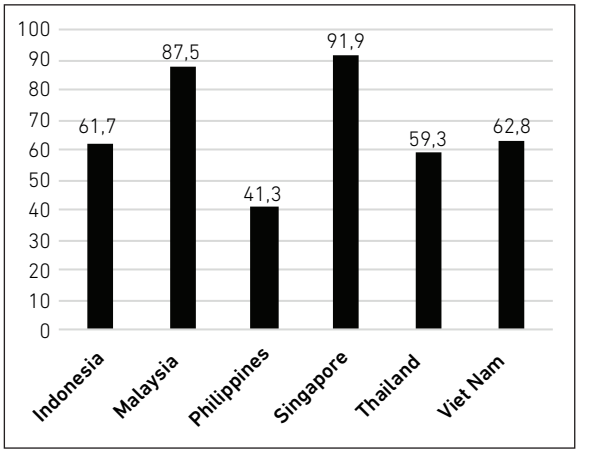
Figure 10.7. Share of Households with Mobile Phones (%)



Source: Vietnam Sustainable Development Goal Indicators on Children and Women Survey 2020–2021.

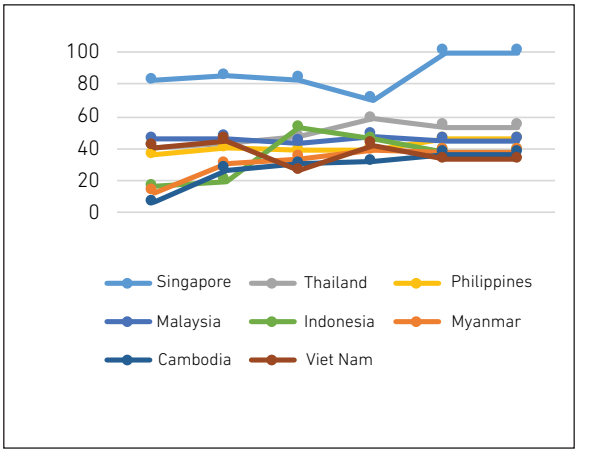
The number of smartphone users and the penetration rate of smartphones are the foundations for the development of the digital economy. In Southeast Asia, Indonesia and Viet Nam are the two markets with the highest number of users. In 2020, Indonesia had up to 160.2 million smartphone users, ranking fourth globally. Viet Nam had 61.3 million users, placing it amongst the top 10 countries with the largest number of smartphone users worldwide (Duy Vu, 2021). Figure 10.8 shows that in 2021, the smartphone penetration rate in Viet Nam was 62.8%, higher than in Thailand (59.3%) and the Philippines (41.3%). However, Viet Nam ranks lowest amongst ASEAN countries in smartphone affordability (Figure 10.9).

Figure 10.8. Smartphone Penetration Rates in 2021 (% population)



Source: Statista.

Figure 10.9. Affordability of Smartphones



Note: Score ranges from 0 to 100, with 100 being the most affordable. Year refers to the date of data collection.

Source: Economist Impact estimate.

Although Viet Nam's e-government index is higher than the global average (Statista, 2023), data from the National Digital Transformation Committee shows that only a small percentage of individuals have utilised e-government services. The Provincial Governance and Public Administration Performance Index survey indicates that only 3.05% of respondents had created user profiles on the national e-service portals (ESP), and slightly over 1% of respondents used an ESP to submit administrative procedures. Five main issues have been identified regarding the applicability of provincial ESPs: insufficient features for implementing end-to-end ESPs; inefficient administrative procedure processes on electronic platforms; difficulties in connecting data, user accounts, and interfaces between local and central ESP systems; difficulties in granting access to ESPs for visually impaired individuals and ethnic minorities; and a lack of commitment to information security and data protection (UNDP, 2023).

4. Lack of Digital Literacy

Viet Nam boasts an exceptional primary completion rate of 98%, nearing universal primary education. However, there is a slight decline in completion rates at the lower secondary level, followed by a more pronounced drop at the upper secondary level. Despite this, the percentage of those completing lower secondary education remains relatively high at 87% (O'Connell et al., 2022). However, enrolment in tertiary education and the digital skills of the active population are low in Viet Nam (Morriset, 2021). According to a survey by the Ministry of Information and Communications, only 41% of the population possess basic digital skills, such as using email and search engines (Vietnamplus, 2022). Fewer than 3 in every 10 men and women aged 15–49 have basic ICT skills (General Statistics Office and UNICEF, 2021).

ICT skills are evenly distributed between males and females, but urban youth possess about twice as many ICT skills as their rural counterparts. This disparity highlights a significant digital divide, likely linked to socio-economic status. Youth from the wealthiest quintile are nearly seven times more likely to possess ICT skills compared with those from the poorest quintile. There is also a marked variation in ICT skills based on educational attainment: 54% of youth with higher education possess ICT skills, compared with only 5% of those with lower secondary education. Ethnic disparities are evident, with just 1% of the Mong ethnic group possessing ICT skills, compared with 44% amongst the majority of Kinh and Hoa ethnic groups (O'Connell et al., 2022). This lack of digital literacy limits people's ability to use digital technologies for education, work, and entrepreneurship.

The information technology workforce has grown rapidly, with nearly 1.1 million people employed in the information technology (IT) industry in 2020, reflecting an average annual growth rate of 13.4% in 2011–2020. In 2020, the IT workforce represented nearly 2% of the total labour force aged 15 and over (Le, 2022). Through Decision No. 749/QD-TTg, 3 June 2002, the Prime Minister approved the National Digital Transformation Program until 2025 with an orientation towards 2030. This directive emphasised the promotion of social, digital transformation by focusing on skills development, providing massive open online courses, and cooperating with large global organisations and businesses to enhance knowledge and skills in digital technology and transformation, ultimately fostering a digital culture. The human resources needed for digital transformation are being developed to ensure the creation of a digital society where no one is left behind. The Prime Minister issued Decision 146/QĐ-TTg, on 28 January 2022, approving Raising Awareness, Training and Developing Human Resources for Digital Transformation Until 2025, with a Vision to 2030. The goal of the decision is to train 1,000 digital transformation experts. At the same time, more than 5,000 engineers, bachelors, and high-quality practitioners specialising in digital technology are being trained at universities and colleges with strengths in digital transformation.

Despite these efforts, there remains a significant gap between the demand for IT professionals and the number of workers with the necessary skills. According to a market report by TopDev, a leading IT recruitment platform, in 2022, the country is expected to face a shortfall of up to 150,000 IT workers as market demand increases to 530,000 (Nhat Ha, 2022). The most acute shortages are in fields such as data science, artificial intelligence, cybersecurity, and software development (Hung Anh, 2018). In terms of quality, only about 30% of newly graduated engineers and bachelors meet the actual requirements of their jobs (Phuc Minh, 2023). This talent shortage has been further exacerbated by the brain drain, with many skilled workers migrating to overseas markets.

4.1. Enabling SMEs' Digital Transformation

As in other ASEAN countries, SMEs are the backbone of the Vietnamese economy, accounting for 98% of all business establishments and nearly half of total employment (Urata, 2021). However, compared with larger firms and those in urban areas, SMEs still face difficulties with digitalisation, which prevent them from fully embracing digital technologies.

To support SMEs in their digital transformation, the government issued Decree No. 80/2021/ND-CP 26 August 2021, detailing and guiding the implementation of several articles of the Law on Support for SMEs. The decree includes provisions to support businesses in digital transformation: (i) providing up to 50% of the contract value for consulting digital transformation solutions related to management, production processes, technology, and business model transformation; and (ii) offering up to 50% support for the costs associated with renting and purchasing digital transformation solutions.

However, according to a survey conducted by the Agency of Enterprise Development under the Ministry of Planning and Investment, the main obstacle to adopting digital technology is the high cost of investment, which affects 60.1% of respondents. Small enterprises and microenterprises are especially challenged, as they have limited financial resources and often struggle to perceive the benefits of digital transformation. The second most common obstacle is the difficulty in changing habits and business practices, which affects 52.3% of respondents. Some businesses have implemented software solutions, but their employees and workers do not use them effectively or consistently, resulting in suboptimal outcomes. The third obstacle is the lack of internal human resources with the necessary experience, knowledge, and skills to execute digital transformation projects, which affects 52.3% of respondents. The fourth obstacle is the lack of digital technology infrastructure, which affects 45.4% of respondents. The fifth and sixth obstacles are the lack of information on digital technology and the difficulty in integrating digital technology solutions, which affect 40.4% and 38.5% of respondents, respectively (Ministry of Planning and Investment and USAID, 2022).

These barriers are similar to those faced by SMEs in other ASEAN countries, where the adoption of digital technologies is hindered by the reluctance to change business processes on the part of micro, small, and medium-sized enterprise (MSME) owners and a shortage of human resources familiar with digital technologies (Economic Research Institute for ASEAN and East Asia, 2019).

4.2. Low Financial Inclusion

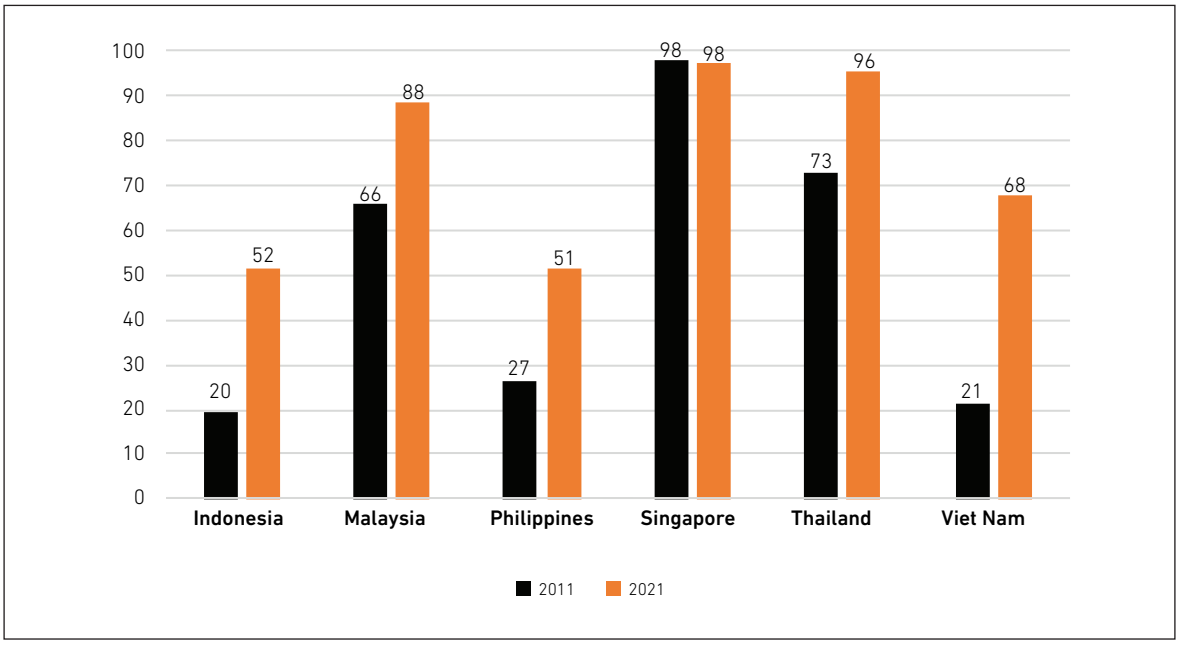
Financial inclusion plays a crucial role in building an inclusive digital economy. As more people gain access to financial services, they become better equipped to participate in the digital economy by making online purchases, using digital payment platforms, and obtaining credit through online lending services. By providing underserved populations with access to financial services such as mobile banking and e-wallets, financial inclusion can help bridge the digital divide, ensuring that everyone can benefit from the digital economy.[4] Financial inclusion supports the growth of SMEs, which is vital for driving economic growth and job creation. By providing SMEs access to financing and other financial services, financial inclusion enables them to participate more fully in the digital economy, including setting up online stores and utilising digital marketing tools.

In recent years, the financial service industry launched several initiatives that have spurred growth in digital payments, created delivery channels for financial services, expanded credit reporting data and lending models, provided government-to-person (G2P) payment solutions, and encouraged e-commerce. The government has taken steps to promote fintech development and allow non-bank payment service providers to operate. These initiatives have increased access to financial services for many people, particularly those without a bank account.

Currently, 32 private service providers offer intermediary digital payment services through bank accounts, including electronic payment services, cash collection, e-money, and e-wallet (Fintech News Vietnam, 2020). However, the number of fintech firms in Viet Nam remains lower than in other ASEAN countries, accounting for just 6% of the sector (Vo and Do, 2019). Many people still lack access to formal financial services. According to the Global Findex Database 2021, the number of people aged over 15 with an account increased more than threefold, from 21.4% in 2011 to 68% in 2021 (Demirguc-Kunt et al., 2022). Whilst this figure is higher than those of Malaysia and the Philippines, it lags behind countries like Thailand or Singapore (Figure 10.10).

[4] Announcement No. 261/TB-VPCP, 23 August 2022, from the Office of the Government: Conclusion of the National Steering Committee on Comprehensive Finance at its First Meeting.

Figure 10.10. Share of People Aged Over 15 with a Bank Account (%)

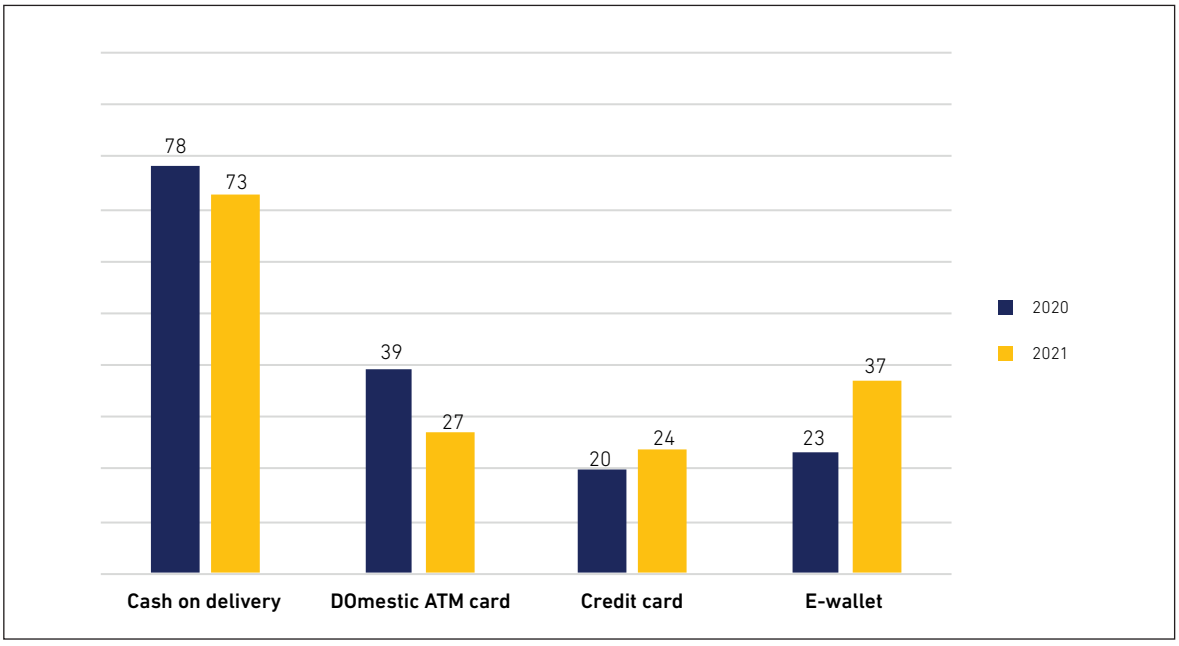


Source: World Bank.

The legal foundation for non-cash payment activities was established with Decree No. 101/2012/ND-CP, 22 November 2012, which has helped promote non-commercial payment activities in recent years. The implementation of Decision No. 2545/QD-TTg, 30 December 2016, approved by the Prime Minister, contributed positively to the development of non-cash payments in 2016–2020. Infrastructure and technology supporting non-commercial payment centres have been modernised with the adoption of new technologies such as fingerprint authentication, facial recognition, and QR codes (Le Thanh, 2020).

Although more people are embracing cashless payment methods, most transactions are still cash-based. Access to cashless payment methods is particularly limited amongst those living outside urban areas. According to the World Bank's 2018 financial inclusion survey, only 22% of Vietnamese had made or received digital payments in the previous year (World Bank, 2019). The E-commerce 2022 Report by the Ministry of Industry and Trade showed that when purchasing goods through e-commerce, most customers still prefer cash-on-delivery (73% in 2021), followed by e-wallets (37%) (Figure 10.11).

Figure 10.11. Payment Methods (%)



ATM = automated teller machine.

Source: Ministry of Industry and Trade.

Financial inclusion and access to digital services are particularly limited in rural areas (Pazarbasioglu, 2017). This lack of financial inclusion limits people's ability to participate in the digital economy, as many digital services require a bank account or credit card. The absence of formal financial services makes it difficult for people to access credit and start businesses.

5. Policy Recommendations

Despite the challenges, there are many opportunities to build an inclusive digital economy in Viet Nam, especially in bridging the gap between those who have access to digital technologies and those who do not. To capitalise on the potential of the digital economy, Viet Nam may consider carrying out the following strategies to address the main barriers to an inclusive digital economy.

5.1. Building Digital Infrastructure

Expand access to high-speed internet. The government should invest in building and upgrading broadband networks to ensure that high-speed internet is widely available throughout the country, especially in rural areas. This will help bridge the digital divide between urban and rural areas and ensure equal access to digital services. Improving the delivery of important public e-services and enhancing user experience through more intuitive and user-friendly interfaces is essential (United Nations Development Programme, 2023).

Encourage private sector investment. The private sector can play a critical role in building digital infrastructure by investing in its construction. The government can incentivise private sector investment through tax breaks, subsidies, and other inducements.[5]

Promote public–private partnerships. Public–private partnerships can help leverage the strengths of both sectors to build digital infrastructure. The government can collaborate with private companies to fund and implement digital infrastructure projects that benefit both the public and private sectors (Nguyen, 2022).

Focus on rural areas. Addressing regional disparities in access to digital technologies requires a focus on developing digital infrastructure in rural areas. This includes establishing community internet centres, providing mobile banking services, and investing in e-learning platforms for remote education.

5.2. Promoting Affordable Access to Digital Technologies

To address income disparities in access to digital technologies, the government can promote affordable access to devices and services. This can be done through subsidies for low-income households, tax incentives for device manufacturers, and public–private partnerships to provide low-cost internet services:

Provide subsidies for low-income households. The government can provide subsidies for low-income households to purchase digital devices such as smartphones and access high-speed internet services.

[5] Currently, 70 companies provide fixed broadband services in Viet Nam, including 17 state-owned enterprises, 1 foreign-invested enterprise, and 52 private enterprises. However, most broadband infrastructure investment is government led, with private enterprises contributing only 7.52% of the total investment in fixed broadband infrastructure (Nguyen, 2022).

Encourage private sector engagement. Private companies can contribute by developing low-cost devices and offering affordable internet services, making digital technologies more accessible.

Establish public internet centres. Public internet centres can provide access to digital technologies, such as computers and high-speed internet, for those who cannot afford their own devices or internet connections.

5.3. Providing Digital Education and Training

Viet Nam urgently needs to **enhance IT education and training at all levels,** especially within the vocational training system. This requires fundamental changes, including new business models (e.g. performance-based funding, public–private partnerships), updated curricula (e.g. data science and analytics), and stronger links between secondary and higher education (World Bank, 2021).

Authorities should identify basic and advanced digital knowledge and skills for workers and **integrate related subjects, including digital finance, into training programmes** to equip learners with basic and advanced digital skills. Fostering a culture of innovation and entrepreneurship that encourages creativity, experimentation, and collaboration is crucial.

Provide digital education and training programmes for low-income individuals and underrepresented groups. The programmes can include basic digital literacy courses, coding boot camps, and entrepreneurship training. Viet Nam needs to enhance workers' soft skills, increasing their flexibility in a rapidly evolving job market. The government can partner with non-governmental organisations and private companies to develop and implement the programmes. Initiatives should be launched to attract talent from Viet Nam's diaspora working in digital sectors worldwide.

5.4. Assisting SMEs in Digitalisation

The government and the private sector should collaborate to create programmes that combine skills development with financing and mentorship for digital entrepreneurs. These initiatives could train SME employees and employers in technology adoption and upgrade their skills.

The government can **assist small businesses in establishing digital platforms** to facilitate their transformation. By adopting such platforms, small businesses can modernise their operations internally and externally. The government may endorse digital tools that aid small businesses in their transformation efforts, such as e-commerce, official websites, social media, and mobile applications.

The government can **provide digital training for SME owners and managers** to improve their digital capabilities, which is essential for successful digital transformation. Increased digital capability amongst small business owners and managers is essential for driving digital innovation and developing new digital products that meet customer needs. By supporting small businesses in

developing their own digital learning and training systems, the government can help reduce the cost associated with hiring and training new employees.

The government should work towards **creating collaborative ecosystems** that enable small businesses to build networks and cooperate with other stakeholders. Such collaboration can help small businesses overcome challenges, including limited resources, a shortage of human resources, and insufficient knowledge. By forming partnerships, small businesses can enhance their business performance and achieve growth despite resource constraints.

5.5. Promote National Strategy for Financial Inclusion

To promote financial inclusion, the government should **encourage the application of digital technology solutions to diversify products and services and intensify the development of non-cash payments.** This includes encouraging commercial banks to expand automated teller machines, points of sale, and transaction networks in rural and remote areas and promoting microfinance institutions to diversify offerings for the poor and low-income earners and small businesses. Developing operating models that link with commercial banks and fintech cooperation is essential.

6. Conclusion

By 2045, the digital economy in Viet Nam is likely to be characterised by the increased use of artificial intelligence, the growth of the Internet of Things, the expansion of e-commerce, the shift to digital payments, and the adoption of cloud computing. These trends present significant opportunities for businesses, consumers, and households. An inclusive digital economy can bring about many benefits, such as improved access to information, education, healthcare, financial services, and social protection; increased productivity, income, and jobs; enhanced participation, empowerment, and social inclusion; reduced poverty, inequality, and environmental impact; and greater resilience to shocks and crises. Therefore, building an inclusive digital economy is essential for the sustainable development of the economy.

Whilst there are still many challenges to overcome – such as access to digital technologies, digital literacy, and financial inclusion – there are also many opportunities for growth in sectors such as e-commerce, fintech, and digital education. Addressing these challenges will require collaboration between the government and the private sector to ensure that the benefits of the digital economy are shared by all. This includes investing in digital infrastructure, promoting digital literacy, and expanding access to financial services. By addressing these challenges and building on its strengths, Viet Nam can work towards creating a more equitable and inclusive digital society. Addressing the digital divide is not only important for social justice but also for driving economic growth, innovation, and democratic participation.

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