Chapter 2

The Digital Economy in Cambodia

Pheakdey Heng

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Chapter 2
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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

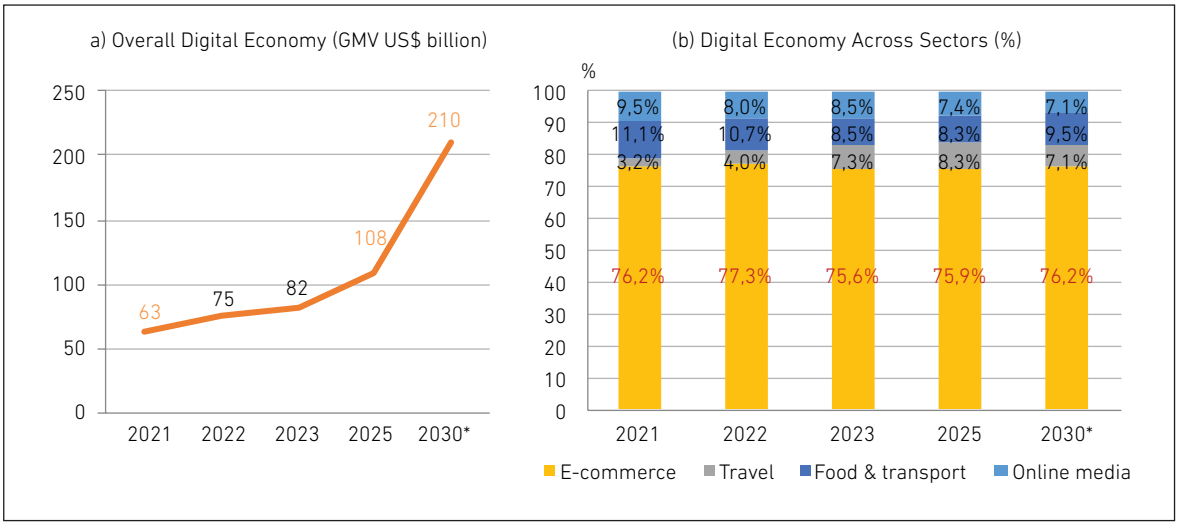
Chaikal Nuryakin

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

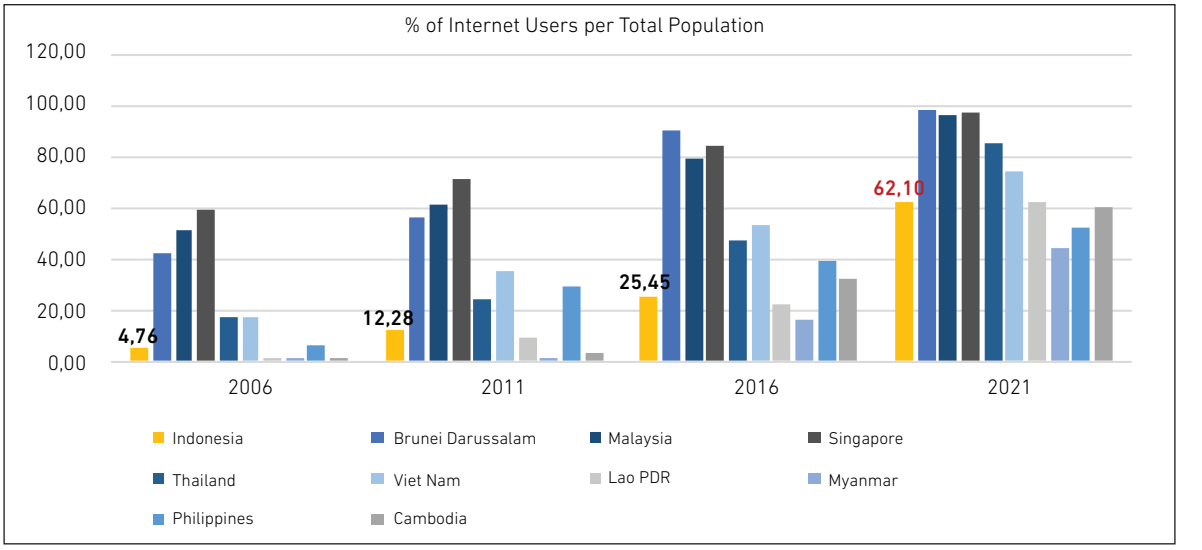


Source: Google, Temasek, and Bain & Company (2023).

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 (%)

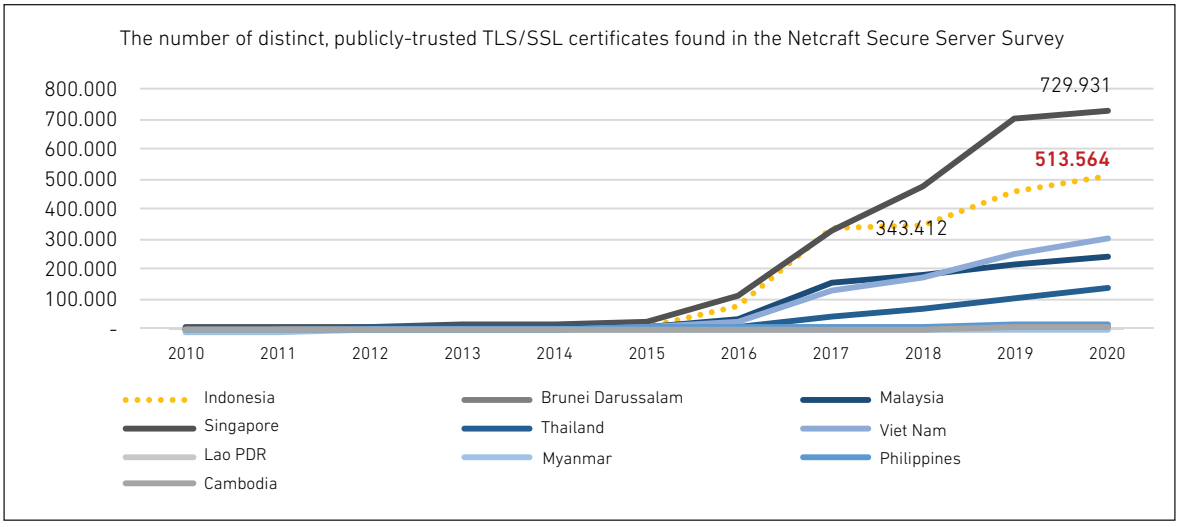


Lao PDR = Lao People's Democratic Republic.

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

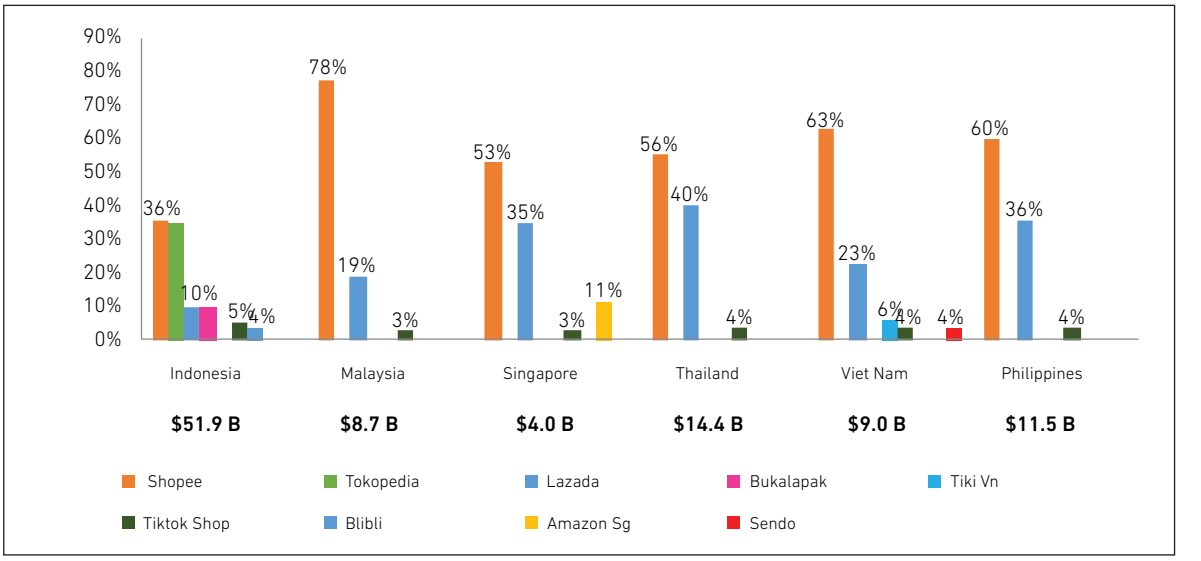


Lao PDR = Lao People's Democratic Republic, SSL/TLS = secure sockets layer and transport layer security.
Source: The World Bank (2020).

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

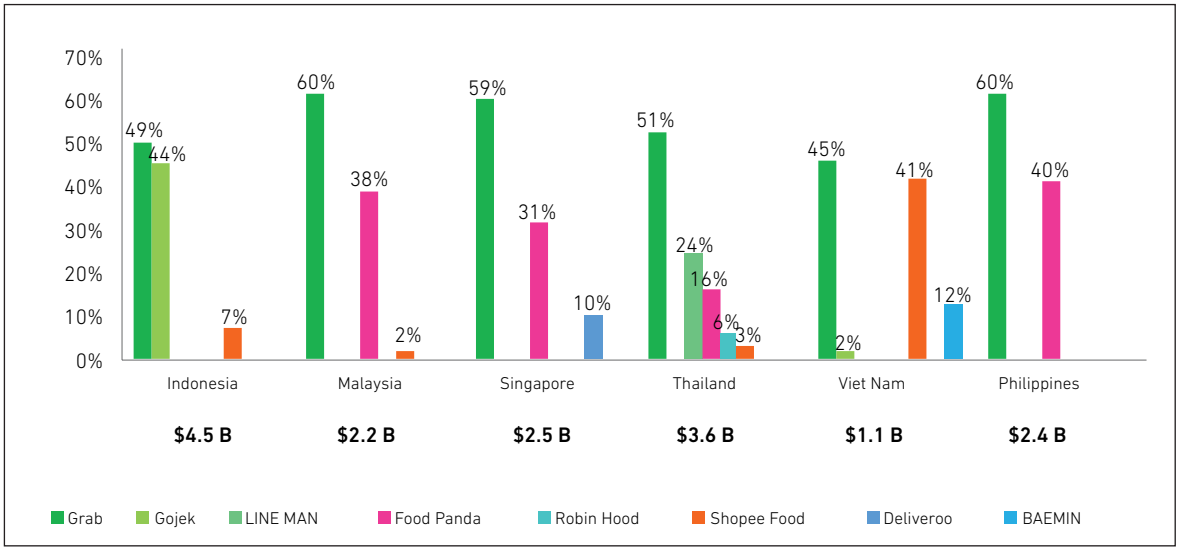


Notes: The 2022 GMV estimation by Momentum Works combines on-the-ground sources, including platforms, restaurants, delivery fleets, and other stakeholders. This estimate covers only food delivery orders from Grab, Foodpanda, Gojek, Deliveroo, LINE MAN, Baemin, ShopeeFood, and RobinHood. GMV includes 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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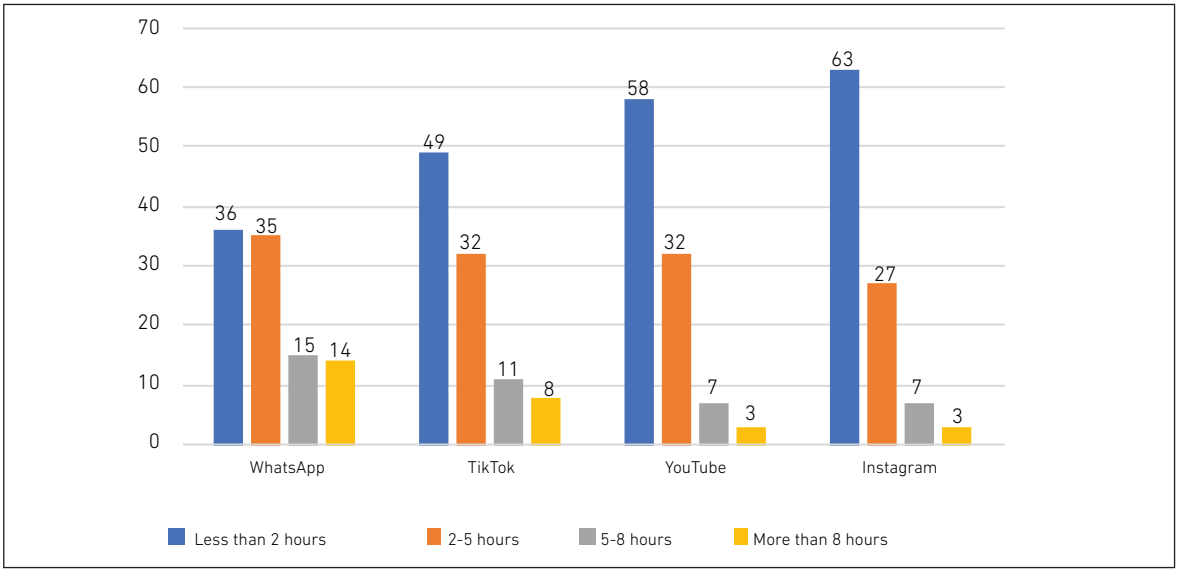
3. Challenges of Digitalisation

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

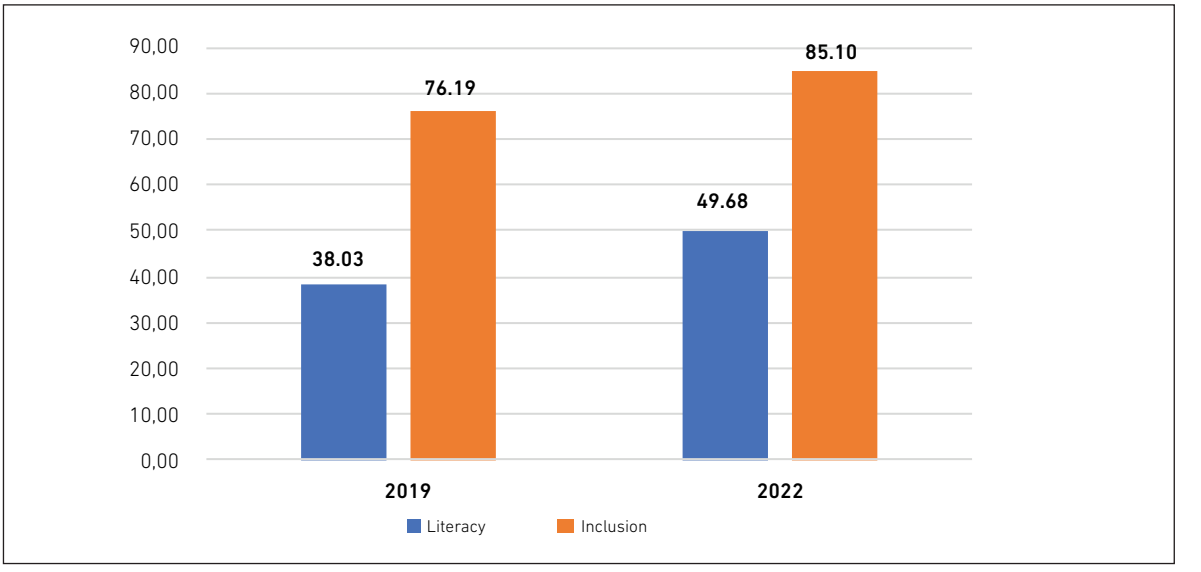
Countries	2017	2018	2019
Brunei Darussalam	47	46	35
Cambodia	109	107	112
Indonesia	34	39	52
Lao PDR	72	81	74
Malaysia	13	11	10
Philippines	48	24	22
Singapore	7	6	5
Thailand	57	61	66
Viet Nam	79	98	97
Number of Countries in the Ranking	131	139	141

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).

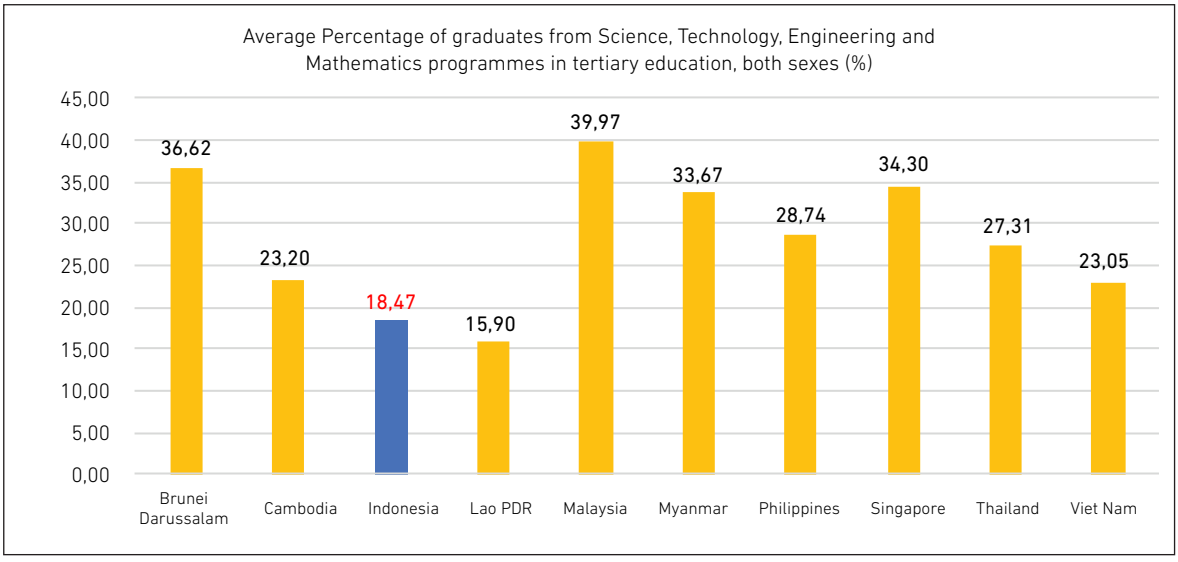
Figure 3.7. Financial Literacy and Inclusion Indexes (%)



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.

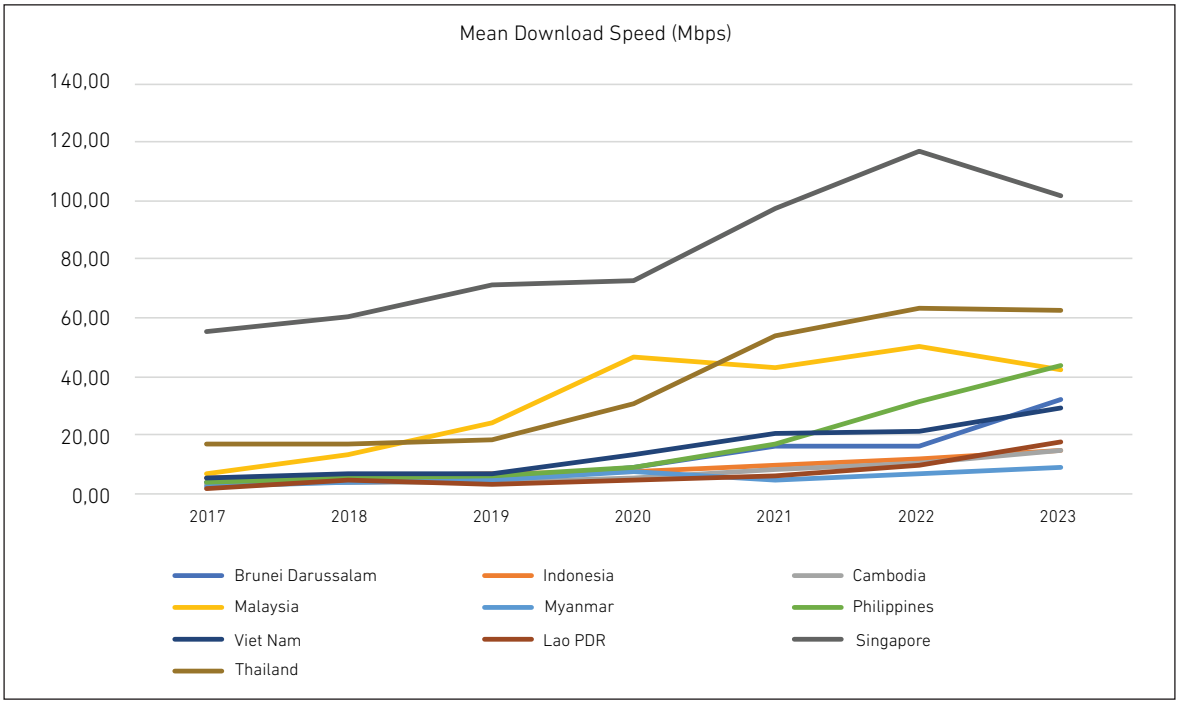
Source: World Bank (2023).

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

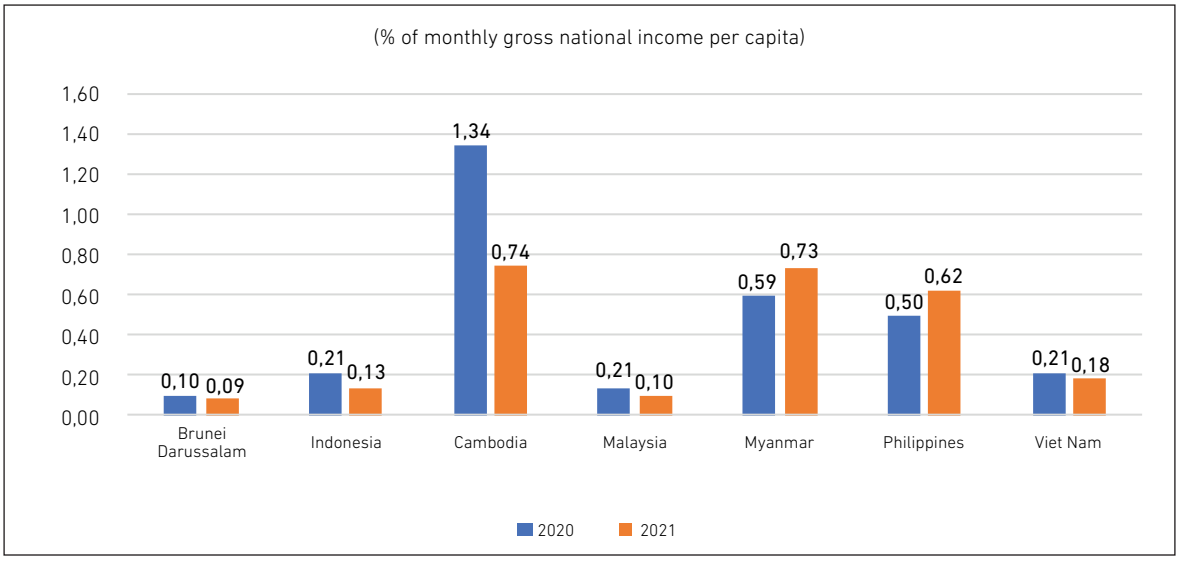


Lao PDR = Lao People's Democratic Republic.

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.

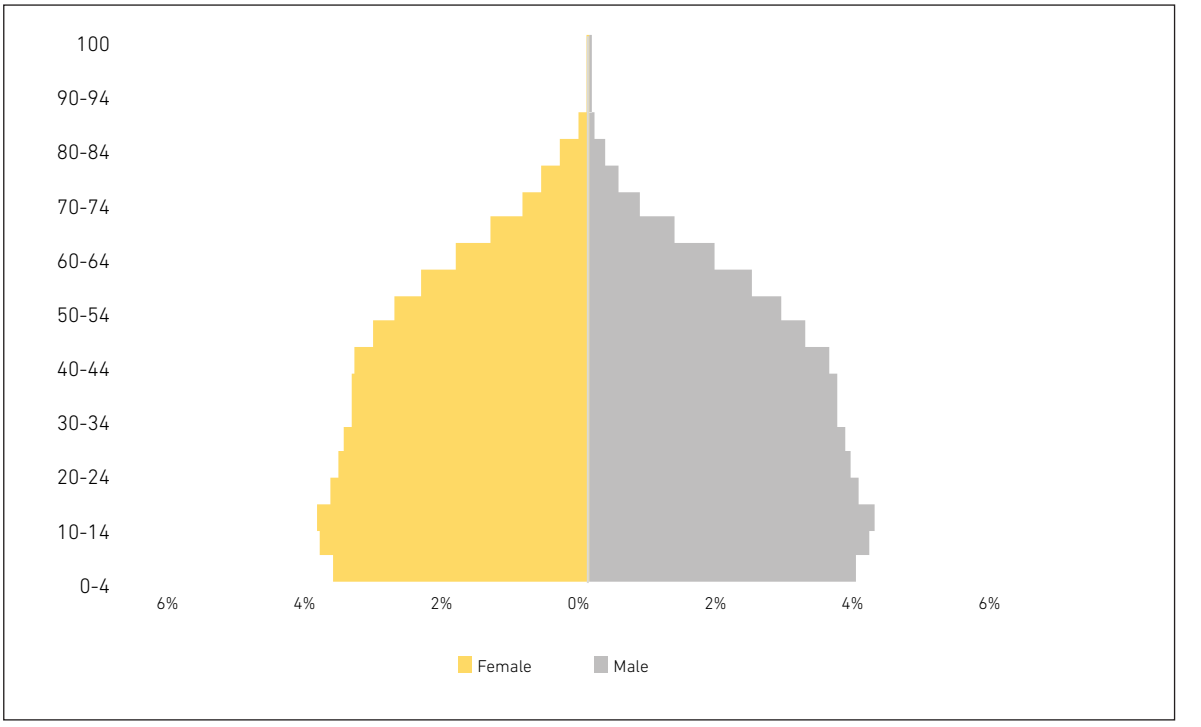
All ASEAN Member States, including Indonesia, may need to adopt regulations that strengthen the digital economy regionally. This could be achieved through initiatives such as the ASEAN Digital Community 2045, which would enable Member States to address regional challenges and fully realise their digital 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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