

Digital societies in Asia Pacific

Harnessing emerging
technologies to advance
digital nations





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Preface

This report is the GSMA's eighth annual Digital Societies report for Asia Pacific.¹ The 2022 edition introduced the concept of digital nations, which refers to the aspiration of governments in Asia Pacific to integrate digital technologies and services into every sector of the economy. It makes digitalisation the core element of nation building and a means to achieve sustainable and inclusive economic growth. This marked the beginning of the transition of this report series from focusing on digital societies to digital nations.

This report examines the five key components of a digital nation (infrastructure, innovation, data governance, security and people) and maps the aspirations of governments in the region to these components. The report considers the role of emerging technologies, such as AI, blockchain, drones and quantum computing, in building digital nations. It examines the steps required to ensure that the development and application of these technologies occur in a safe, responsible and sustainable manner.

As digital technologies and services play an increasingly central role in the economies of Asia Pacific countries, two vital needs are a whole-of-government approach (WGA) and international collaboration, in view of the cross-sector and cross-border implications of digital policies and initiatives.

¹ Throughout this report, Asia Pacific is defined as excluding Greater China.

Executive summary



Emerging tech: a matter of when, not if

This edition of the GSMA Digital Societies in Asia Pacific report assesses the role of emerging technologies in the aspirations of Asia Pacific countries to become digital nations. These aspirations are not a pivot away from ongoing digital society journeys; countries in Asia Pacific continue to advance along the digital society path by increasing access to and usage of connectivity, digital identity, digital citizenship, digital lifestyle and digital commerce services. Mobile broadband networks now cover 96% of the population in the region, while the rapid growth of cross-border digital commerce has spurred innovative payment solutions.

The rest of this decade will be characterised by efforts from countries in Asia Pacific to become digital nations. This entails integrating digital technologies and services into every sector of the economy as a means of building resilient economies with finite resources and achieving sustainable and inclusive economic growth. It comes as emerging technologies, with their potential to transform the entire fabric of society, are moving to mainstream, potentially accelerating digitalisation progress if channelled appropriately.

Artificial intelligence (AI) is the fastest developing of these emerging technologies and arguably the most important at this stage, given its potential impact on society. A growing number of tech startups are integrating AI into their solutions from the outset, while many established businesses have made it an integral part of their digital transformation plans. Governments have also become keen participants in conversations on how to maximise the AI opportunity and minimise the potential risks. Four countries in Asia Pacific are ranked in the top 10 of the 181 countries in the 2022 edition of the Government AI Readiness Index: Singapore (2nd), South Korea (6th), Australia (8th) and Japan (9th).

The adoption of emerging technologies is a matter of 'when' and 'how', not 'if', for countries in Asia Pacific. The rationale is clear: these technologies provide an opportunity to increase productivity with limited resources and help countries remain globally competitive amid growing uncertainties around established supply chains. However, it has become imperative for policymakers, private sector players and other stakeholders to adopt these technologies in a safe, responsible and sustainable manner.

Five key considerations

This report highlights five considerations for countries in Asia Pacific as they look to realise the potential of emerging technologies and transition to digital nations:

- **Leadership** is central to the effective formulation and implementation of policies and initiatives on emerging technologies, considering their far-reaching impact.
- **A whole-of government approach (WGA)** will bring together multiple stakeholders and diverse resources to provide a common solution to a particular issue, avoiding a potentially costly fragmented approach.
- **International cooperation** will help minimise the risk of exacerbating the significant digital advancement gap among countries in Asia Pacific.
- **Open data** that is accessible, reliable and timely will be crucial to train AI models.
- **Impact mitigation** is essential to address concerns around the potential impact (real or perceived) of emerging technologies.

1 Continuing on the path to digital societies



1.1

Key components of a digital society

Countries in Asia Pacific have been on a journey to becoming fully fledged digital societies for most of the last two decades. During this period, national governments and supranational organisations across the region have announced ambitious plans and looked to use digital connectivity and services to improve citizen wellbeing and tackle major societal challenges.

At no time was the benefit of being a digital society more evident than during the outbreak of Covid-19 and in the immediate aftermath of the pandemic. Previous reports² in this series have outlined the role of digital connectivity and services in fighting the spread of the disease, enabling people to stay in touch and businesses to operate in a safe way. They also explained the opportunities for authorities to build more resilient, sustainable and inclusive economies.

Today, people and businesses across Asia Pacific are increasingly using a network of intelligently connected devices and interoperable services for daily activities, including work, play and communication in a 'new normal' world powered by digital technologies. According to the Asian Development Bank (ADB), digital technologies play an important role in creating new job opportunities, improving and expanding economic activity, and enabling the transition to greener, more sustainable economies in the region.³

The GSMA Digital Societies Index tracks the progress of countries in their digitalisation journeys, using the five main components of a digital society (see Figure 1). The five components of a digital society are supported by digital platforms, enabling end users and producers to transact seamlessly, and the use of a whole-of-government approach (WGA) in the design and implementation of digital policies and initiatives across society. Figure 2 provides a snapshot of the performance of Asia Pacific countries on the path to digital societies.

2 [Digital societies in Asia Pacific: Progressing towards digital nations](#), GSMA, 2022; [Digital societies in Asia Pacific: Accelerating progress through collaboration](#), GSMA, 2021; [Advancing digital societies in Asia Pacific: a whole-of-government approach](#), GSMA, 2020

3 See: www.adb.org/what-we-do/topics/digital-technology

Figure 1

Key components of a digital society

Source: GSMA Intelligence

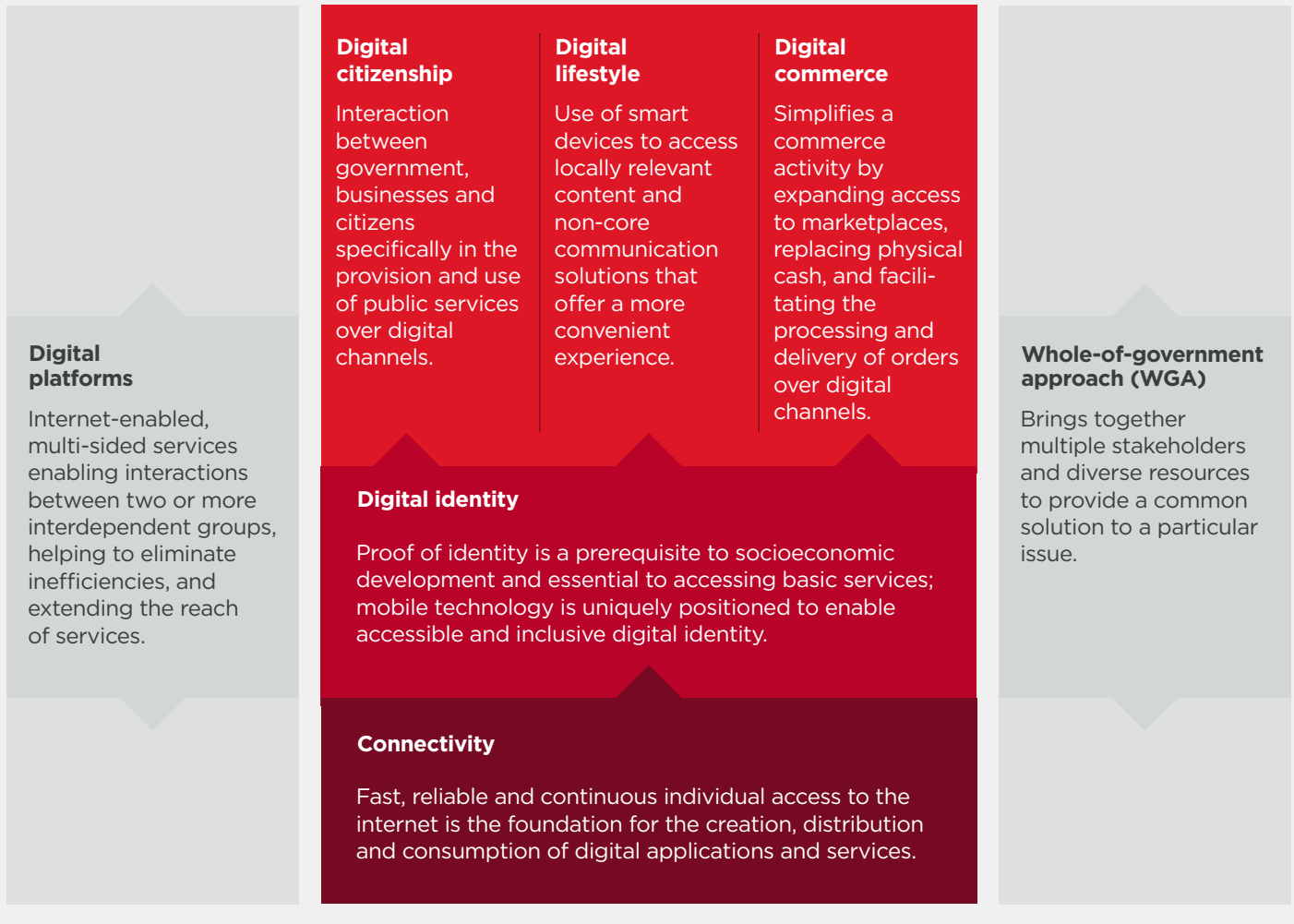
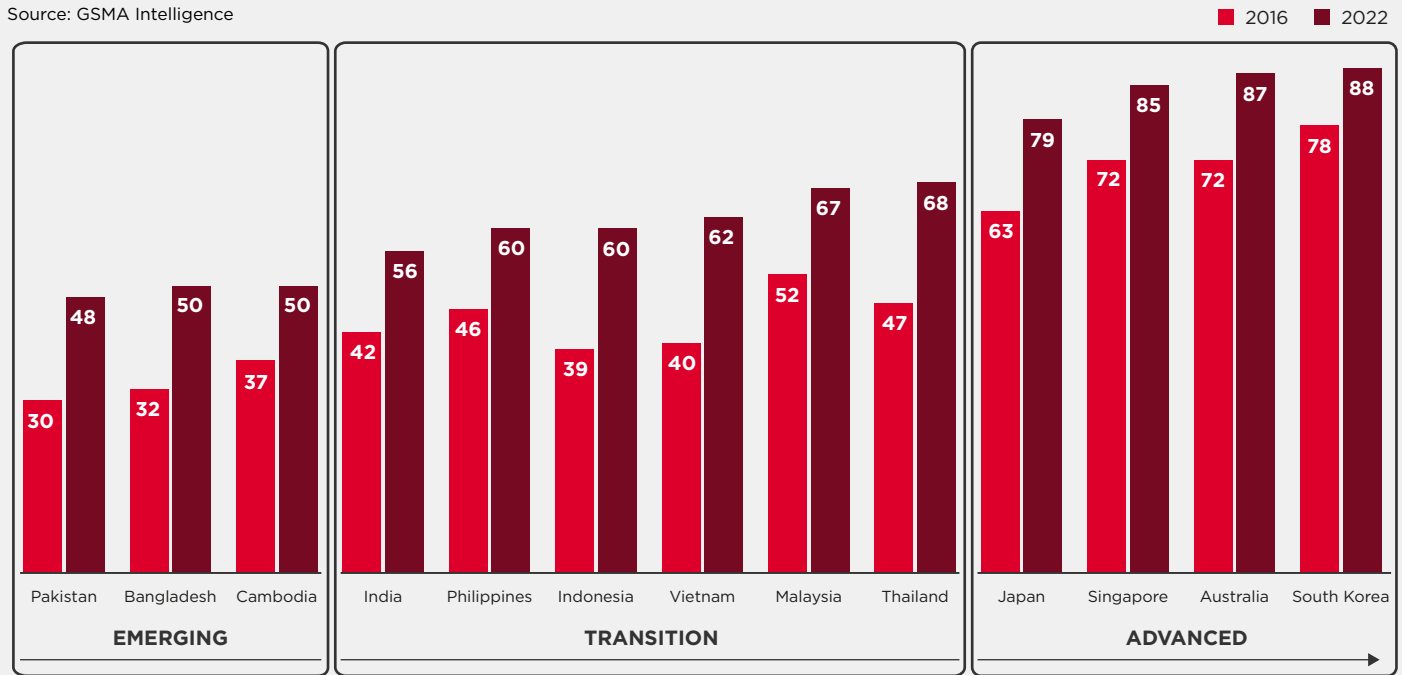


Figure 2

Assessing progress along the digital societies path

Source: GSMA Intelligence



Note: the index is a composite of 49 indicators under the five components on a 100-point scale, with 1 representing the worst and 100 the best situation.

Connectivity

As the primary channel for most people to get online, mobile broadband networks are now accessible to 96% of the population in Asia Pacific. The underserved mostly live in rural locations with difficult terrain and remote islands. As such, mobile operators are exploring partnerships and other innovative solutions to extend coverage to the final frontier.

Some operators have recently announced partnerships with satellite firms to expand coverage to underserved areas. For example, in July 2023, Optus and SpaceX announced a deal to provide mobile connectivity using Starlink satellites, with a long-term plan to cover 100% of Australia.⁴ Telstra and New Zealand-based operators Spark and One NZ have recently signed similar agreements with SpaceX. In December 2022, KDDI announced that the first of more than 1,000 mobile towers in Japan to use Starlink has started commercial operation in Hatsushima, a remote island in Sagami Bay.⁵ As the prospects rise for satellites to help close the coverage gap, partnerships with mobile operators will be crucial to realising the opportunity.

Meanwhile, there is growing emphasis on accelerating mobile internet adoption and usage, especially among vulnerable population groups, such as the elderly and those in low-income brackets. Around 47% of the population in Asia Pacific live in areas already covered by mobile broadband networks but do not subscribe to a mobile internet service. Barriers to adoption include a lack of affordability and digital skills, and concerns around online safety.

Several governments are taking steps to address such barriers. For example, the New Zealand government has started a programme called Zero Data, which provides free access to critical online information and services, to support low-income households. In India, Reliance Jio has collaborated with the GSMA's Mobile for Development programme to roll out a digital skills initiative to train rural women and those from low-income groups to help them with greater digital access and adoption. In Singapore, the parliament has passed into law the Online Criminal Harms Act, which aims to safeguard users against online harm and promote a safer online environment.

Digital identity

A secure digital identity system that citizens can trust is fundamental to a digital society. As more services and interactions move online, people and businesses will increasingly rely on solutions that allow them to prove their identity and/or authenticate the identity of customers instantaneously and within a digital environment.

Digital identity solutions have evolved considerably across Asia Pacific in recent years, from basic mobile authentication to more sophisticated biometric authentication solutions using unique personal traits such as fingerprints and facial features via mobile devices. Advancements in mobile and other digital devices – underpinned by faster, lower latency broadband networks – have been instrumental in the design and operation of modern digital identity solutions. Examples include the following:

- In India, the government has announced the integration of a face authentication feature on the PM-Kisan mobile app that enables farmers to complete their electronic know-your-customer (e-KYC) process remotely by scanning their face, eliminating the need for one-time passwords (OTPs) or fingerprint authentication.
- South Korea has developed a blockchain-based national mobile digital identity system, which will be fully operational in 2024. The system is already in use for credentials such as a mobile driving licence, allowing new drivers to choose digital-only registration.
- The government in Thailand has integrated facial recognition into ThaiDee (ThaiID) – the app that underpins the country's digital ID and verification platform – to eliminate the need to manually input information.

Despite the importance and growing adoption of digital identity, there are still concerns around fraud, ethics, security and privacy. Institutions face the difficult tasks of protecting themselves against fraud and cybersecurity risks, avoiding inconveniencing users, and feeding into data privacy concerns. A robust regulatory framework is therefore essential to protect all parties while also supporting innovation. For example, the New Zealand parliament has passed into law the Digital Identity Services Trust Framework Act 2023, two years after it was first introduced, to streamline and regulate the use of digital identities and build trust among citizens.

4 "Together Optus and SpaceX Plan to Cover 100% of Australia", Optus, July 2023

5 "KDDI launches the 1st Mobile Tower powered by SpaceX's Starlink in Japan", KDDI, December 2022

Digital citizenship

People and businesses regularly use a range of government services. In a digital society, elements of such services that can be digitalised are delivered online. This helps to reduce costs and bureaucracy, improve transparency and convenience, and enhance the quality of service delivery. As part of their digital transformation and sustainability efforts, governments in Asia Pacific have put digital citizenship services at the top of their agenda, in view of growing demand for services and the limited resources available in a challenging economic environment.

In Vietnam, the government has partnered with mobile operators to issue free digital signatures to citizens to enable fast and convenient transactions in the online environment and simplify administrative processes in accessing public services. In February 2023, the Philippines House of Representatives passed a bill establishing e-government services to encourage the use of digital technologies and transform government procedures, operations and service delivery into more citizen-centric, networked and transparent governance.

Digital lifestyle

The shift to a digital-first approach for many daily activities continues to build momentum, as governments and businesses use digital platforms to increase access to services. In the wake of the pandemic, the healthcare sector has seen a significant increase in digital products and services. In Singapore, for example, wearable sensors, remote monitoring equipment and home monitoring kits are increasingly being used to collect and send health data from patients to healthcare providers to record vital signs, track symptoms and spot potential health risks.

Several countries in the region have moved to integrate digital solutions into cities to make them smarter and enable digital lifestyle services. However, there is a growing trend to implement similar solutions in rural areas through 'smart village' initiatives that aim to close the rural-urban digital divide and foster economic growth in rural areas, where a considerable proportion of the population in some countries still lives. In Vietnam, the provincial People's Committee of Bac Giang has launched a plan to use digital technology to develop new-style rural areas. In the Philippines, the government has launched a smart village initiative in Sacol Island, Zamboanga to enhance healthcare, educational, agricultural and local government services.

Digital commerce

Digital commerce encompasses the entire value chain of buying and selling goods and services online, from marketing and pricing to checkout and delivery. In a digital society, human intervention in these processes is reduced to a minimum, with automation and other digital technologies facilitating activities in real-time. Asia Pacific is home to some of the most advanced digital commerce markets in the world, helped by innovative payment solutions. However, an important growth area is cross-border digital commerce, with key stakeholders in the region already working together to establish the necessary building blocks.

At the 42nd summit of the Association of Southeast Asian Nations (ASEAN) in Labuan Bajo, Indonesia, in May 2023, leaders of the regional body resolved to advance regional payment connectivity and promote local currency transactions. The initiative aims to link member states to a QR code-based payment system to accelerate cross-border digital commerce. It is also expected to make payment systems more seamless and potentially save up to 30% in transaction costs by settling payments in local currency, bypassing the need for US dollars as an intermediary. To date, Indonesia, Malaysia, Singapore and Thailand are connected, with Vietnam and the Philippines expected to be linked by the end of 2023.



The transition from digital societies to digital nations

Countries in Asia Pacific have launched transformational plans to become digital nations – a scenario where digitalisation is at the core of nation building. This is not a pivot away from their digital society journey, which is a continuous process of improving access to and use of the above-mentioned components of a digital society; rather it is an opportunity to build on the foundations to fully integrate digital technologies into every sector of the economy.

The rest of this report and subsequent editions in this series will focus on how governments are capitalising on the gains of a digital society to transform their countries into digital nations, considering the interdependence of both concepts and their underlying enablers.

2 Progressing towards digital nations



2.1

The rationale for a digital nation

This decade will be characterised by efforts from countries in Asia Pacific to become digital nations. This entails integrating digital technologies and services into every sector of the economy as a means of building resilient economies with finite resources and achieving sustainable and inclusive economic growth. It comes as emerging technologies, with the potential to transform the entire fabric of society, are moving to mainstream, potentially accelerating progress if channelled appropriately.

Figure 3

The rationale for a digital nation

Source: GSMA Intelligence



2.2

Key components of a digital nation

GSMA Intelligence has identified five key components required to become a digital nation (see Figure 4). These are interconnected and must be developed together to avoid potentially costly gaps and delays in the implementation of digitalisation initiatives. For example, a lack of adequate infrastructure could offset efforts to support innovation, while a lack of trust due to poor data governance and security could delay the full use of infrastructure investments. This underlines the importance of a WGA to bring together multiple stakeholders and diverse resources to drive the digital nation agenda.

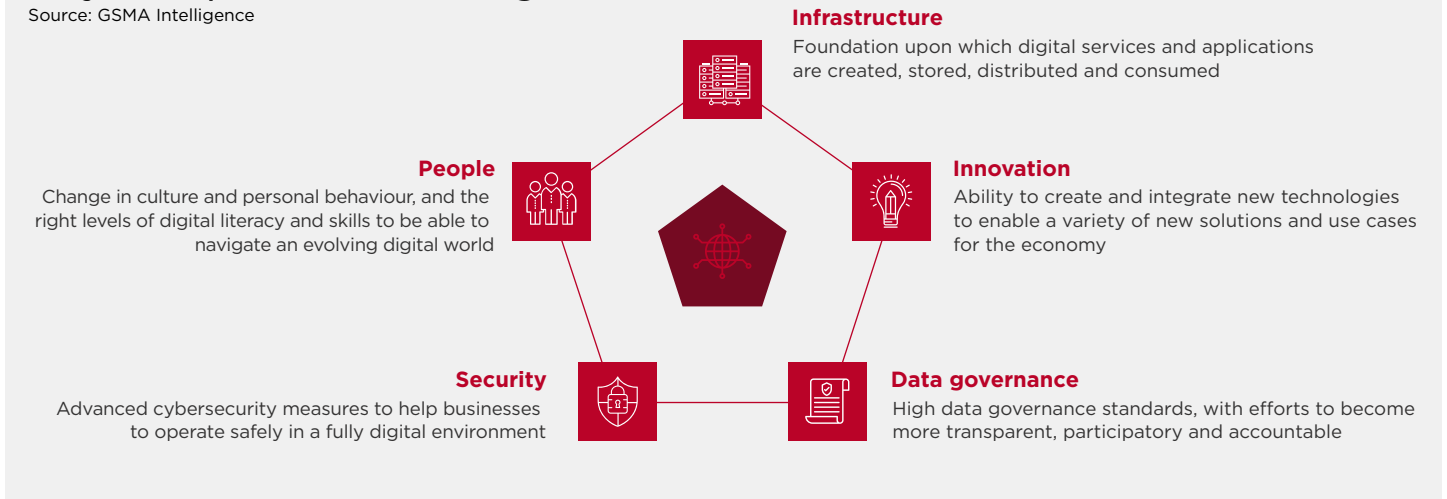
Another important underlying factor is investment. Governments have important roles to play in creating an enabling environment to attract private investment and in investing themselves to develop certain components of a digital nation (such as fit-for-purpose cybersecurity architecture and skills programmes for public servants). Private sector investment is particularly crucial for the infrastructure and innovation components.

Mobile operators in Asia Pacific will spend \$259 billion on their networks during 2023–2030, mostly on 5G. There is an opportunity for policymakers to complement this commitment by reducing the fiscal burden on the mobile industry, ensuring access to spectrum under the right conditions⁶ and implementing other measures to support the timely and efficient rollout of much-needed advanced network infrastructure.

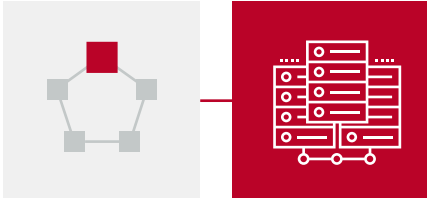
Figure 4

Key components of a digital nation

Source: GSMA Intelligence



6 5G Spectrum: GSMA Public Policy Position, GSMA, 2022



Infrastructure

Digital infrastructure encompasses the physical and software-based infrastructure necessary to create, distribute and consume digital products and services. It is the bedrock of a digital nation and the foundation upon which other components are built. Connectivity is at the centre of digital infrastructure, with high-performance fixed and mobile networks connecting people and a growing number of 'things'. Reliable network-based services, such as edge compute and ultra-low-latency applications, which 5G networks are well placed to deliver, are essential to enable cloud-based applications and the emerging technologies that will power future digital nations. As of the end of June 2023, 32 mobile operators in 16 markets across Asia Pacific had launched commercial 5G mobile services.



■ India

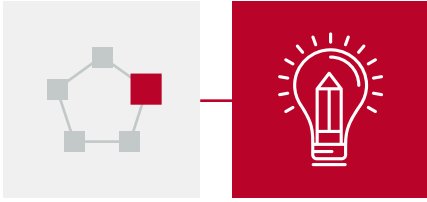
Airtel and Reliance Jio deployed in total more than 270,000 5G base stations in India within nine months of the completion of 5G spectrum auctions in July 2022. The success of the 5G auctions and subsequent investment in network rollout may be attributed to policy reforms introduced by the government, including lower spectrum reserve prices and the telecoms reforms introduced in September 2021 to improve the financial sustainability of the telecoms industry. Meanwhile, the government has launched the Bharat 6G Alliance, in collaboration with the private sector, academics, research institutions and standards organisations, to lead the design, development and deployment of 6G technologies in India.

■ New Zealand

The Digital Economy and Communications Ministry is working with telecoms operators to bring 5G connectivity to around 55 rural and regional towns across New Zealand, extending coverage to underserved areas. To complement the investment commitments, the government will provide long-term access to 80 MHz of spectrum in the 3.5 GHz band to each operator. Meanwhile, New Zealand's Department of Internal Affairs has entered into an all-of-government agreement with Datacom to provide public cloud infrastructure and associated professional services as part of plans to modernise and streamline the delivery of public services.

■ South Korea

South Korean operators have deployed more than 115,000 5G base stations using the 3.5 GHz band across 85 cities, covering most metropolitan areas and ensuring the country was one of the first to reach nationwide population coverage. The early commercialisation of 5G services in South Korea is attributed to close collaboration between government, operators and vendors. This has helped build a strong foundation for the future of mobile networks and digital infrastructure more broadly.



Innovation

Digital innovation refers to the application of modern digital technology to solve business problems by optimising production and distribution processes, and enabling new business models. Recent years have seen IoT and AI-based innovations applied to business processes across industries including healthcare, finance and agriculture. The adoption of these and other emerging technologies will increase in the coming years as governments scale up their digital nation ambitions. The global nature of digital technologies means innovation can be easily imported and applied locally. However, several governments are taking steps to drive indigenous innovation to tackle unique local problems as well as build up a domestic skills and knowledge base.



■ Malaysia

The Ministry of Science, Technology and Innovation (MOSTI) has launched a series of micro-conferences, MYStartup NXT, as part of efforts to create an inclusive, impactful and sustainable startup ecosystem in the country. MYStartup NXT will be held across the country with the aim of engaging local startups and providing the necessary support to scale. It intends to create more than 5,000 startups by 2030.⁷ Meanwhile, in March 2023, Malaysia's sovereign fund Khazanah Nasional Berhad launched the Future Malaysia Programme to support the local startup ecosystem and facilitate collaboration with domestic and international partners.

■ Singapore

In June 2023, Singapore's government launched the National Quantum-Safe Network Plus (NQSN+), which aims to deliver quantum-safe communications. NQSN+ is part of Singapore's Digital Connectivity Blueprint, which outlines the next phase of the country's digital connectivity over the period to 2030. Building on more than 10 years of quantum research efforts from the Centre for Quantum Technologies, hosted by the National University of Singapore, the NQSN was launched in 2022 to conduct nationwide trials of quantum-safe communication technologies to enhance network security.

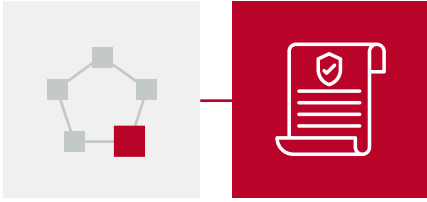
■ South Korea

South Korea is a global leader in technology innovation. The country had 1,214 scaleup-sized companies as of H1 2023⁸ – a 35% increase on 2020. Capital investments more than doubled over the same period, reaching a cumulative \$48.2 billion.⁹ The recent surge in activity has been fuelled by a change of law in 2021 that made it possible for South Korean holding companies to establish financial firms. As a result, some of South Korea's biggest conglomerates, including Hyundai, LG and Samsung, have set up start-up investment funds, spurring rapid expansion of the country's innovation ecosystem.

⁷ "Malaysian government launches MYStartup NXT to create sustainable startup ecosystem", TechNode Global, May 2023

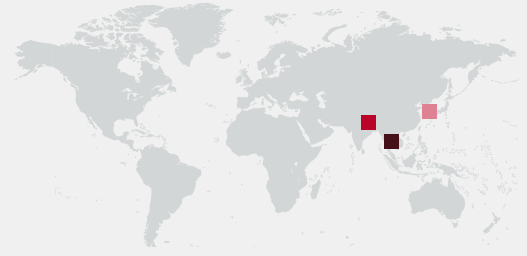
⁸ A scaleup has a mature, established and profitable product or service, as opposed to a startup, which is still in the initial 'birth' stage.

⁹ Tech Scaleup South Korea Report 2022, Mind the Bridge, 2022



Data governance

The continuous use of digital technologies generates huge amounts of data, comprising information that people or organisations may consider personal and/or sensitive. In this context, data governance refers to the internal standards and policies that apply to how data, including that generated over digital platforms, is gathered, stored, processed and disposed of. It controls who can access what kinds of data and for what purposes. With growing use of emerging technologies, a high-standard and enabling data governance framework is essential to maintain ethics, ensure transparency and build trust within a digital environment.



■ Bangladesh

The Bangladeshi government is attempting to address the country's lack of a comprehensive data protection law through the proposed Data Protection Act 2023 (DPA 2023), released by the ICT Division of the Ministry of Posts, Telecommunication and Information Technology in August 2023. The DPA is the first specific data privacy law to be proposed in Bangladesh and aims to establish the governance related to the processing, storage and transfer of data. After multiple iterations of the 2022 draft bill, the recently published draft DPA 2023 aims to address criticisms around digital protectionism and restrictive provisions on digital business activity, by proposing the introduction of a new independent board, called the Bangladesh Data Protection Board, to act as a supervisory authority.

■ South Korea

In August 2023, the Personal Information Protection Commission (PIPC) published its guidance for the safe use of personal data to support AI. PIPC drafted the guidance in response to concerns about the possibility of personal information infringements and to instruct stakeholders on how to minimise the risks of privacy infringement while also ensuring safe use of data for the development of AI.

The guidance presents rules on how to interpret and apply the Personal Information Protection Act in the AI environment, and presents a blueprint for jointly designing a regulatory system through cooperation between the government and the private sector.

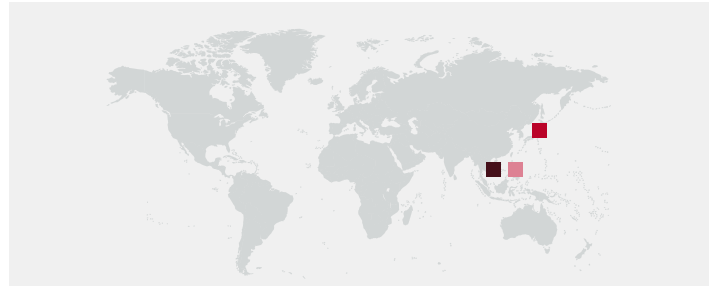
■ Thailand

In January 2023, Thailand's Electronic Transactions Development Agency issued a draft guideline to govern electronic data delivery services. The guidelines provide standards and information security control procedures for safe electronic data transmission, to instil trust among citizens and organisations who use electronic data transmission services. Agencies that must comply with the law include service providers supplying electronic information to the Revenue Department, interagency electronic data transmission service providers linked to the National Single Window system, and other electronic data transmission service providers involved in sending or receiving electronic data.



Security

As with physical assets, digital assets face threats from bad actors, who can employ different types of attack, including phishing, ransomware, identity theft and cyber-espionage. It could be argued that the 'borderless' nature of the digital world potentially increases the risk of attacks and makes detection and remediation more difficult. Authorities at national and international levels therefore need to include robust cybersecurity measures in their digital nation plans, creating the necessary awareness around potential threats and working collaboratively with all stakeholders to mitigate threats.



■ Japan

In August 2023, KDDI Corporation, KDDI Research Inc., Fujitsu Limited, NEC Corporation and Mitsubishi Research Institute Inc. announced that they will embark on a series of trials to explore the introduction of software bill of materials¹⁰ (SBOM) in the communications field, including for 5G and LTE network equipment, to strengthen cybersecurity. The companies will use the SBOM to view the software supply chain from end to end, and quickly respond to vulnerabilities. In May 2023, Japan's Ministry of Internal Affairs and Communications commissioned KDDI to conduct a survey on the introduction of SBOM in the communications field.

■ Philippines

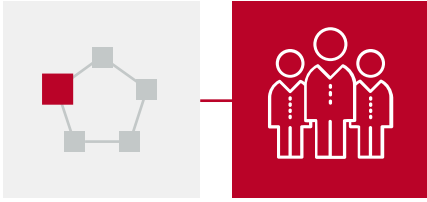
The Department of Information and Communications Technology has drafted the National Cybersecurity Plan (NCSP) 2023–2028 to provide a safe and reliable cyberspace for all Filipinos. The NCSP 2023–2028 is organised around six pillars: enact the Cybersecurity Act to strengthen the policy framework; secure and protect critical information infrastructures; proactively defend the government and people in cyberspace; operationalise a computer emergency response team (CERT); capacitate the workforce in cybersecurity; and enhance international cooperation.

■ Vietnam

Vietnam has set a goal to establish a cybersecurity research and development centre to safeguard information systems in 11 critical sectors, and set up cybersecurity forces at ministries, sectors and state agencies by 2025. The government is keen to protect its digital infrastructure, digital platforms, digital data and national cyber infrastructure and information systems, and create a safe and regulated cyberspace to protect vulnerable users. According to the Ministry of Information and Communications, computer viruses resulted in economic losses of VND21.2 trillion (\$903 million) in 2022.¹¹

¹⁰ Lists all software components, licences and dependencies for a particular product.

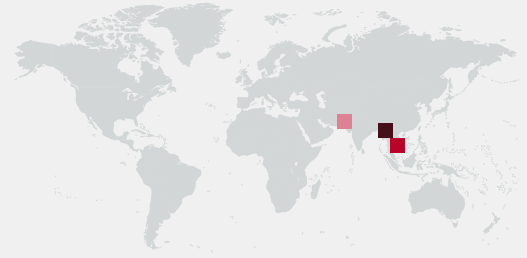
¹¹ "Conference reviews implementation of national cyber security and safety strategy", Vietnam+, August 2023



People

A digital nation is only as effective as the skills level of its citizens – as innovators and creators of digital services and as users of those services. To this end, enhancing the digital skills of citizens has become a strategic focus of many countries, with initiatives such as specialist training in emerging technologies and compulsory ICT courses across the educational curriculum.

Beyond digital skills, another important aspect of the human element is culture. Here, governments and other stakeholders need to help people become comfortable with a digital-first approach and take steps to address any concerns about the impact of technology on people's livelihoods.



■ Cambodia

A Digital Skill Competencies Framework is being developed to support university students, businesses and training providers to meet growing demand for digital talent. The framework identifies seven skills tracks: digital infrastructure; cybersecurity; data governance; software and application; data and AI; digital communication and marketing; and digital innovation and entrepreneurship. The Ministry of Post and Telecommunications is collaborating with the Ministry of Education, Youth and Sports to create a digital skills development roadmap.

■ Pakistan

The DigiPakistan national skills development initiative provides digital skills training to 1 million Pakistanis within and outside the country. The objective is to build a highly skilled workforce in diversified IT domains and contribute to growing a knowledge-based economy through a series of technical and non-technical courses.

■ Thailand

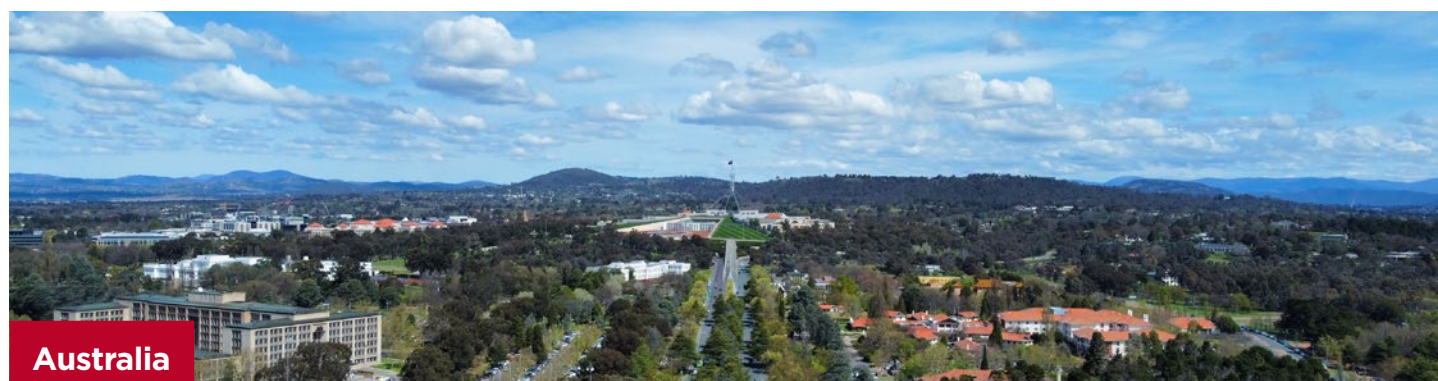
Be Internet Awesome (BIA) teaches the fundamentals of digital safety and citizenship, enabling people to explore the online world with confidence. The programme was officially launched at Phaya Thai school in February 2020, in partnership with the Ministry of Education and Office of the Basic Education Commission, as part of Google Thailand's mission to "Leave No Thai Behind". Since then, Google has trained more than 3.4 million teachers and students across all provinces in Thailand, with 9 in 10 teachers agreeing that, since teaching BIA, they have seen their students have more positive interactions online.¹² For 2023, Google is on a mission to bridge the digital divide by reaching underserved communities in Thailand with its ChromeOS Flex and BIA offering, allowing device equity among communities that do not have access to the internet.

2.3

Assessing the digital nation ambitions of countries in Asia Pacific

Several countries in Asia Pacific have recently outlined digitalisation plans that demonstrate their ambitions for digital nations. Achieving the plans within the stipulated timeframe depends on the

components of a digital nation. As such, it is essential for governments to develop these components to achieve their digitalisation objectives.



Australia

Plan The Digital Economy Strategy¹³

Launch 2022

Goal Australia to become a top 10 digital economy and society by 2030

Infrastructure	5G networks now reach more than 80% of the population. The 2022-2023 federal budget includes a AUD758 million (\$500 million) investment programme to improve digital connectivity in regional, rural and remote Australia.
Innovation	In a 2023 update to the Digital Economy Strategy, the government committed an additional AUD93 million (\$61 million) to support 5G innovation and a quantum commercialisation hub.
Data governance	The government is reviewing the Privacy Act 1988. Proposed reforms are aimed at strengthening the protection of personal information and the control individuals have over their information.
Security	In February 2023, the government announced plans to overhaul its cybersecurity rules, and establish an agency to oversee government investment in the field and help coordinate responses to hacker attacks.
People	Digital skills training is a key element of the Digital Economy Strategy, with funds committed to helping women transition mid-career to the digital workforce.

¹³ See: Towards 2030: Positioning Australia as a leading digital economy and society, at dfat.gov.au



Bangladesh

Plan Smart Bangladesh¹⁴

Launch 2022

Goal Use inclusive digital transformation to build a developed and prosperous country by 2041

Infrastructure	4G now covers more than 98% of the population but adoption has been slow. All operators have trialled 5G, and the government is working to finalise the National Broadband Policy 2023 to enable the infrastructure required for the future. The government needs to carefully consider both the timing of 5G rollout to support the elements of Smart Bangladesh that rely on advanced connectivity (e.g. the implementation of Fourth Industrial Revolution projects) and creating the right conditions for 5G by first ensuring 4G for all.
Innovation	In July 2023, the Agency to Innovate (A2I) Bill 2023 was passed in parliament. The bill allows for the formation of an autonomous agency (chaired by the Information and Communication Technology Minister) to drive tech innovation. This builds on the establishment of Startup Bangladesh Limited – the flagship venture-capital fund of the ICT Division in 2020.
Data governance	The lack of data governance laws, such as personal data protection and open data laws, mean Bangladesh has ranked poorly on global data governance indices. This could change once the proposed Data Protection Act is passed in parliament.
Security	The government plans to replace the much criticised Digital Security Act (DSA) with the Cyber Security Act of 2023. The proposed new law retains parts of the provisions of the DSA but removes or adjusts sections that had the potential to be “misused”.
People	Digital literacy remains low in the country, as many previous digital skills initiatives focused on basic connectivity. Recognising that the limited focus on advanced skills could create gaps in the digital workforce required to support the country’s digital nation ambitions, the government has prioritised the development of these skills to achieve Smart Bangladesh 2041.

¹⁴ See: Smart Bangladesh Vision 2041, at a2i.gov.bd



Cambodia

Plan Digital Economy and Society Policy Framework 2021–2035¹⁵

Launch 2022

Goal Build a vibrant digital economy and society by laying the foundations to promote digital adoption and transformation in all social actors including the state, citizens and businesses, to accelerate new economic growth and promote social welfare in the new normal

Infrastructure 4G networks are near-ubiquitous in Cambodia but the transition to 5G continues to face delays. In 2021, the government halted progress on the rollout of 5G due to a lack of policy and roadmap.

However, in August 2023, two government decrees were promulgated: the Frequency Allocation decree, which could accelerate 5G rollout, and the Infrastructure Sharing decree, which is expected to make infrastructure regulation clearer.

Innovation In February 2023, the government launched the National Research Agenda 2025, a strategic document on how to enhance and direct research efforts and build innovation ecosystems.

The government has also established a new Ministry of Industry, Science, Technology and Innovation, and adopted the Science, Technology and Innovation Roadmap 2030 to drive tech innovation.

Data governance There are no data protection laws or regulation that protects IP data and privacy yet in Cambodia. That said, the proposed Cybersecurity Law is expected to have elements of data protection.

Security A Cybersecurity Law is under development and in its final stage. It will be the first legal text on the subject and will criminalise a range of cyber activities, including hacking, phishing and identity theft. The law will also provide a legal framework for addressing cybersecurity incidents and protecting critical infrastructure.

People The government is developing a Digital Skill Competencies Framework to support university students, businesses and training providers to meet the demands of the job market. The framework identifies seven skills tracks: digital infrastructure; cybersecurity; data governance; software and application; data and AI; digital communication and marketing; and digital innovation and entrepreneurship.

The government has also established the Capacity Building Research and Development Fund with the objective to improve the knowledge base and skillsets of Cambodian digital experts.

¹⁵ See: Cambodia Digital Economy And Society Policy Framework 2021 – 2035, at mptc.gov.kh



Indonesia

Plan Digital Roadmap for 2021-2024¹⁸

Launch 2021

Goal To accelerate Indonesia's digital transformation agenda

Infrastructure

The government set out plans to complete three key projects in 2023 to improve digital infrastructure: connectivity projects; a national data centre; and the Telecommunications Equipment Testing Center (BBPPT).

However, 5G rollout is slow, with just 5% of the population covered two years since launch.

Innovation

Indonesia is home to some of the region's best known tech startups. The government is supporting the growth of the innovation ecosystem through enabling policies and incentives.

Data governance

The personal data protection bill was signed into law in October 2022. The law establishes responsibilities for the processing of personal data and rights for individuals similar to other international data protection laws.

Security

Cybersecurity in Indonesia is governed by EIT Law and GR 71/2019, but they provide no specific definitions or terms on cybersecurity itself. A bill on cybersecurity was proposed but was eventually rejected and failed to be enacted in 2019.

People

The government estimates that Indonesia will need around 9 million people with digital skills by 2030.¹⁹ To that end, the government launched a national digital literacy programme for the general public, a digital talent scholarship programme for professional workers, and a digital leadership academy for managers.

¹⁸ Indonesia: Digital Economy Opportunities, International Trade Administration

¹⁹ "Indonesia needs nine million digital talents in 2030: Minister", Antara News, March 2022



Japan

Plan Society 5.0²⁰

Launch 2016

Goal A human-centred society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space.

Infrastructure The government aims to achieve 5G coverage for 90% of the population by March 2024; achieve universal fibre coverage of households by 2030; and build more than 12 regional data centres by 2027.

Innovation Innovation is an important feature of Society 5.0. As such, the government encourages startups and other players in the ecosystem to come up with innovative ideas to help realise its digitalisation ambitions.

Data governance Japan has a well established data governance framework. However, to further support its digital nation ambitions, the Ministry of Economy, Trade and Industry (METI) announced in April 2022 a data management framework for collaborative data utilisation and trust to promote the value creation of data.

Security Japan has a dedicated cybersecurity law, the Basic Cybersecurity Act, enacted in November 2014.

People The government plans to train an additional 110,000 students and working adults in key digital skills in the 2024 fiscal year. It estimates there are 1 million digital workers in the country and expects a shortage of 2.3 million by the 2026 fiscal year.²¹

²⁰ See: What is Society 5.0?, at cao.go.jp/index-e.html

²¹ "Japan Government to Expand Digital Skills Training", TS2, July 2023



Malaysia

Plan Malaysia Digital²²

Launch 2022

Goal To encourage and attract companies, talent and investment while enabling Malaysian businesses and Rakyat to play a leading part in the global digital revolution and digital economy

Infrastructure Lack of competition at the infrastructure level for 5G poses a risk to network investment and service adoption. However, the government is reportedly considering a second 5G network to bring competition to the 5G infrastructure space. Details of a second 5G network are expected by the end of 2023.

In August 2020, the government introduced the JENDELA initiative aimed at upgrading Malaysia's digital infrastructure, including achieving 100% 4G coverage.

Innovation The government has established several agencies, including the Malaysian Research Accelerator for Technology & Innovation (MRANTI), to collaborate with investors and entrepreneurs in developing innovative digital solutions.

Data governance Malaysia's Personal Data Protection Act (PDPA), which was last updated in 2016, regulates the processing of personal data for commercial use in the country. It does not apply to the public sector or government (federal or state).

Security In June 2023, the prime minister disclosed plans to draft a new law to bolster the country's resilience and response to cyber-threats. The Cyber Security Bill would provide the National Security Council's National Cybersecurity Agency with clear legal jurisdiction and authority to protect the country's cybersecurity and carry out enforcement.

People One of the three strategic objectives of Malaysia Digital is to drive digital adoption among aspiring young entrepreneurs, companies and the Rakyat (people). To this end, several initiatives have been put in place to increase digital literacy and create a digital workforce in Malaysia.

²² See: mdec.my/malysiadigital



New Zealand

Plan Digital Strategy for Aotearoa New Zealand²³

Launch 2022

Goal To become a thriving digital nation – where people, businesses and government are all using technology to drive innovation, improve productivity, and enhance quality of life for all New Zealanders

Infrastructure The 5G rollout programme is a key initiative under the Digital Strategy for Aotearoa New Zealand, with the government committing to allocating long-term rights to radio spectrum to roll out 5G.

Innovation The Digital Technology Industry Transformation Plan includes a focus on data-driven innovation around emerging technologies, including AI, 5G and IoT.

Data governance New Zealand was one of the first countries to enact a law dedicated to its residents' rights to privacy with its Privacy Act of 1993. In recognition of the evolution of privacy, the Privacy Act of 2020 was passed with some additional protections for individuals and obligations for organisations.

Security The Cyber Security Strategy 2019 outlines the areas where government will prioritise action and how it will work with individuals, businesses and communities to ensure New Zealand is confident and secure in the digital world.

People The Industry Transformation Plan released by the government in February 2022 is expected to help create new jobs by 2040. To meet this demand, the government is considering initiatives to encourage more people to pursue a career in technology and to upskill the existing workforce.

²³ See: The Digital Strategy for Aotearoa, at digital.govt.nz



Pakistan

Plan Digital Pakistan²⁴

Launch 2018

Goal To promote connectivity, improve digital infrastructure, increase investment in digital skills, and promote innovation and tech entrepreneurship

Infrastructure The USF Next Generation – Broadband for Sustainable Development Programme has provided 4G coverage to 12 million people in the last year, and 35 million over the last four years.

The Pakistan Telecommunication Authority (PTA) prepared a policy framework aimed at rolling out 5G by April 2023 but missed the deadline. This could further delay the realisation of the Digital Pakistan objectives.

Innovation The government has been a driving force behind Pakistan’s startup ecosystem, with initiatives such as the Pakistan Startup Act and the establishment of incubators and accelerators across the country, providing an enabling environment for startups.

Data governance The Prevention of Electronic Crimes Act 2016 is currently the primary legislation that provides a legal framework in relation to various kinds of electronic crimes and also extends to unauthorised access to personal data. The government has introduced the Personal Data Protection Bill 2021, which is yet to be promulgated into law.

Security The National Cyber Crime Policy 2021 was approved by parliament in July 2021. It provides objectives aimed at addressing cybersecurity challenges and risk factors prevalent in Pakistan.

People Much of the government’s focus is on eliminating the digital skills barrier for unconnected populations. There is an opportunity to drive skills trainings at both the academic and professional development levels to create a digital-ready workforce.

²⁴ See: digitalpakistan.pk/blog



Philippines

Plan National Innovation Agenda and Strategy Document 2023-2032²⁵

Launch 2023

Goal Achieve a smart and innovative Philippines – a productive, resilient, sustainable and inclusive nation by 2032

Infrastructure 5G infrastructure is growing rapidly in the country; nearly 70% of the population now have access to the technology. The government has significantly reduced red tape for obtaining permits for infrastructure rollout, using a WGA to demonstrate its intention to improve digital infrastructure.

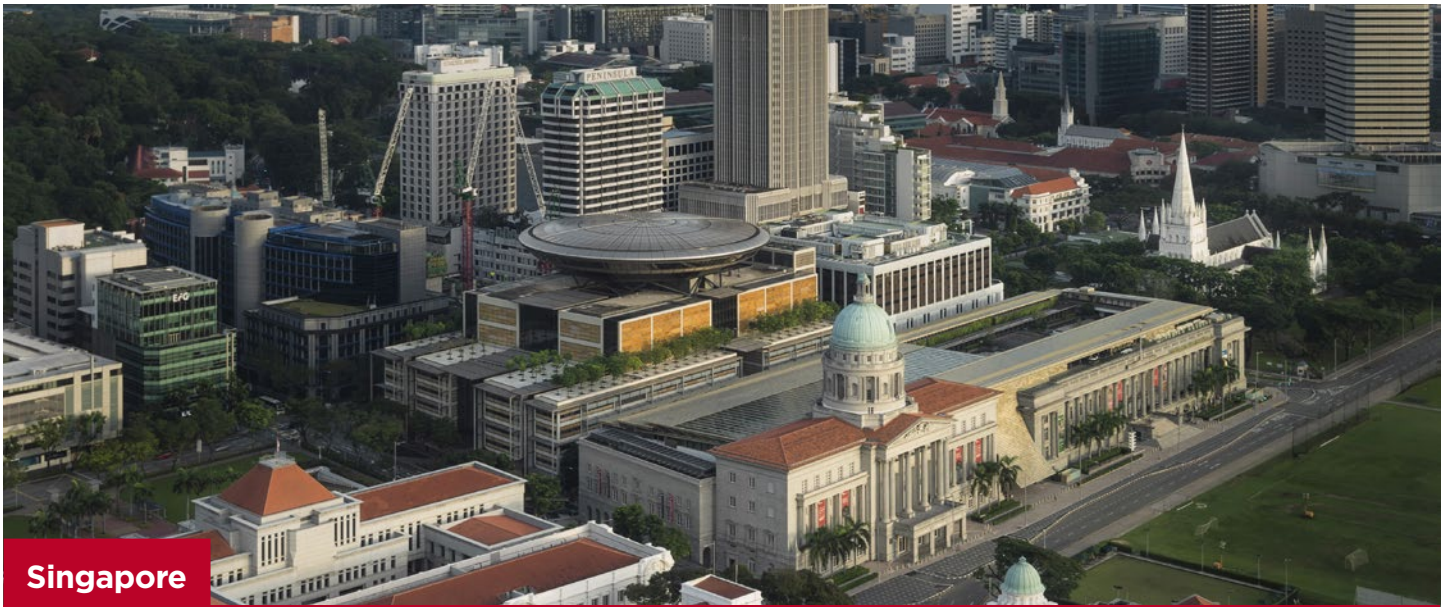
Innovation The government has implemented supportive policies, including the Innovative Startup Act and the Philippine Innovation Act. Several incubators have also emerged, (many through universities), while a grants programme to finance stand-out startups has been launched.

Data governance The Philippines Data Privacy Act adopts international principles and standards for personal data protection related to the processing of personal data across government and the private sector.

Security The Critical Information Infrastructure Protection Act 2023 aims to establish a framework to help protect the country's ICT against vulnerabilities, stealing of information, disruption of essential services and other attacks.

People The government provides workshops and IT skills training to employers and workers, in collaboration with Google.

25 National Innovation Agenda 2032, Republic of the Philippines National Innovation Council



Singapore

Plan Digital Economy Framework for Action²⁶ **Launch** 2018

Goal To digitalise every industry and every business, raising productivity and efficiencies to grow the economy.

Infrastructure

In June 2023, the government launched the Digital Connectivity Blueprint, which sets the direction for the next phase of Singapore's digital connectivity. The blueprint outlines five strategic priorities:

- Provide capacity to enable submarine cable landings to double within the next 10 years.
- Build seamless end-to-end 10 Gbps domestic connectivity within the next five years.
- Ensure world-class resilience and security for digital infrastructure.
- Pioneer a roadmap for the growth of new Green Data Centres and push the sustainability envelope.
- Drive greater adoption of the Singapore Digital Utility Stack, to expand the benefits of seamless digital transactions.

Innovation

As one of the most innovative cities in the world, Singapore hosts an ecosystem comprising organisations experimenting with new ways to solve global challenges.

Collaboration between players in Singapore's vibrant startup ecosystem provides invaluable opportunities to network, connect and grow together. One such initiative is the Startup SG Network, a community that brings together more than 4,000 tech startups, 400 venture-capital firms and 220 incubators and accelerators in Singapore.

Data governance

Data governance in the public sector is governed by the Public Sector Act and the Government Instruction Manual on Infocomm Technology & Smart Systems Management.

The Personal Data Protection Act applies to the private sector.

The government uses two different legal frameworks governing data management in the public and private sectors, as the public has different expectations of the services provided by government and the private sector.

Security

The Cybersecurity Act 2018 governs the prevention, management and response to cybersecurity threats and incidents, and regulates owners of critical information infrastructure and cybersecurity service providers. The provisions apply to any critical information infrastructure, computer and computer system located wholly or partly in Singapore. The provisions also apply to the Singapore government, except that the government will not be liable to prosecution for an offence.

People

There are numerous initiatives to build a digital talent pool in Singapore. These include the Innovation and Enterprise Fellowship Programme, which is jointly administered by the National Research Foundation and Enterprise Singapore. It aims to increase the pool of deep-tech talent in Singapore to drive innovation in the economy, support the commercialisation of deep tech research, and bring emerging technologies to market.

²⁶ See: Digital Economy Framework for Action, at [imda.gov.sg](https://www.imda.gov.sg)



South Korea

Plan The Digital Strategy of Korea²⁷

Launch 2022

Goal A roadmap to implement intelligent service design and delivery, data-driven public administration, and robust and inclusive digital infrastructure

Infrastructure	<p>South Korea's digital infrastructure is among the best in the world. The country was a 5G pioneer market and among the first to reach mass-market 5G adoption, thanks to strong government commitment and public-private collaboration to accelerate the rollout of 5G.</p> <p>Beyond 5G, other types of digital infrastructure are at advanced stages of development.</p>
Innovation	<p>In May 2023, the government announced plans to create 10 global innovation special zones by 2027, implementing a negative regulation system for the first time in the country. Negative regulation is a policy that permits everything except explicitly prohibited items. This initiative aims to support domestic startups by providing an environment conducive to the development of new products in advanced technology fields.</p>
Data governance	<p>In February 2023, South Korea revised its core data privacy law the Personal Information Protection Act (PIPA). Among other amendments, the law reinforces the rights of data subjects, introducing the right to data portability. Data subjects can now request a transfer of their sensitive personal information to themselves or an eligible third party.</p>
Security	<p>In addition to PIPA, South Korea's main cybersecurity laws are: the Act on the Promotion of Information and Communications Network Use and Information Protection, which imposes extra cybersecurity requirements on online service providers; and the Act on the Protection of Information and Communications Infrastructure, which includes cybersecurity requirements for securing critical infrastructure across various sectors.</p>
People	<p>South Korea plans to spend KRW453.7 billion (\$367 million) in 2023 to nurture digital talent in fast-growing business sectors. This is part of a long-term plan to nurture talented people in next-generation industries.</p>

²⁷ "Korea to Come up with the Roadmap of Digital ROK, Realizing the New York Initiative", Ministry of Science and ICT, October 2022



Thailand

Plan Thailand Digital Economy and Society Development Plan (Digital Thailand)²⁸

Launch 2016

Goal Phase 3 of the Digital Thailand Plan is now underway and aims to achieve full-scale digital transformation by 2027. This phase involves the comprehensive adoption of digital technologies across various sectors and industries.

Infrastructure The Ministry of Digital Economy and Society is developing a policy framework and action plan to encourage the development of new 5G products and services, as a way to drive innovation and build a 5G and IoT ecosystem. It is expected to help advance the digital economy, with an emphasis on accelerating growth in several sectors and target industries.

Innovation The National Innovation Agency is responsible for attracting foreign investment by promoting Thailand's startup ecosystems as centres for innovation in a number of key industries. Additionally, Startup Thailand, a government-supported programme, organises events and activities to promote entrepreneurship. It also provides funding and mentorship opportunities to startups.

Data governance The Personal Data Protection Act, Thailand's first data privacy legislation, took effect in June 2022. The law regulates how businesses in Thailand should handle the personal data of the country's citizens and their right to privacy.

Security In August 2023, ministers presented the Royal Decree on Measures to Prevent and Suppress Technology Crimes B.E. 2566 (2023) to the House of Representatives. The Royal Decree is intended to prevent and suppress technological crimes and facilitate the resolution of grievances for the people.

People To bridge the talent gap and enable Thais to access high quality, in-demand jobs, the Smart Skills programme was designed to enable reskilling without the need for a college degree or experience in the fields of IT, data analytics, digital marketing & e-commerce, and cloud technology. The Grow with Google programme will offer 22,000 scholarships by 2024 for Google Career Certificates (via Coursera) and Google Cloud Computing Foundation (via Google Cloud Skills Boost).

²⁸ Thailand Digital Economy and Society Development Plan, Ministry of Information and Communication Technology



Vietnam

Plan National strategy for development of digital economy and digital society to 2025, orientation to 2030²⁹

Launch 2020

Goal Digital development – with the creation of growth based on digital technology and digital data as input factors – becomes one of the new mainstream development methods for Vietnam to develop quickly, sustainably and inclusively, as well as adapt and become resilient to challenges in a volatile and unpredictable world

Infrastructure The government has declared its intention to achieve national 5G coverage by 2030. However, the launch of commercial 5G has yet to happen, more than two years after initial trials. Meanwhile, in June 2023, the Ministry of Information and Communications disclosed that a recent spectrum auction had been unsuccessful, with no bids for airwaves.

It is essential to lay the connectivity groundwork to ensure seamless 5G commercial rollout. Collaboration between the government and mobile operators will be instrumental in achieving this.

Innovation The government has implemented several initiatives to support innovation and nurture the growth of the local startup ecosystem. These include tax incentives, funding programmes, and incubator and accelerator programmes – for example, establishing the National Innovation Centre to foster partnerships with international companies such as AWS and Google.

Data governance In April 2023, the government promulgated the Decree of Personal Data Protection. Before then, personal data protection in Vietnam was governed by 19 different laws and regulations, resulting in a fragmented legal framework. The decree aims to fill these gaps and provide a comprehensive and uniform approach to personal data protection.

Security The Law on Cybersecurity, Decree No. 53/2022/ND-CP was issued by the government in August 2022 and took effect in October. The decree was issued to improve cyber-safety and security against a backdrop of increasing cross-border e-commerce and digital services.

People The National Innovation Centre has unveiled a digital workforce platform. It was developed by digital experts and aims to serve as an information system, with details of career paths within the digital space. It is expected to equip aspiring professionals with the essential skills necessary to thrive in the digital era.

²⁹ National strategy for development of digital economy and digital society to 2025, orientation to 2030, NAPA, 2023

3 Harnessing emerging technologies to advance digital nations



3.1

Defining emerging technologies

The digital landscape in Asia Pacific and around the world is being reshaped by emerging technologies capable of transforming lives, modernising industries and altering the course of the international economy. In recognition of the opportunity this provides to achieve their digital nation ambitions, governments are increasingly adopting measures to incorporate the technologies across society and accelerate progress with their digitalisation plans.

The term 'emerging technologies' is used to describe a new technology or the ongoing evolution of existing technologies, such that they become







more essential to businesses, including those in industries that previously recorded little or no digital disruption. The list of technologies that fall within the definition of emerging technologies is almost incalculable, especially as the fast pace of innovation means new ones regularly emerge.

Some emerging technologies have become so prominent that they now underpin digitalisation initiatives at national and international levels. Table 2 highlights six emerging technologies that are supporting digital nation initiatives in Asia Pacific.

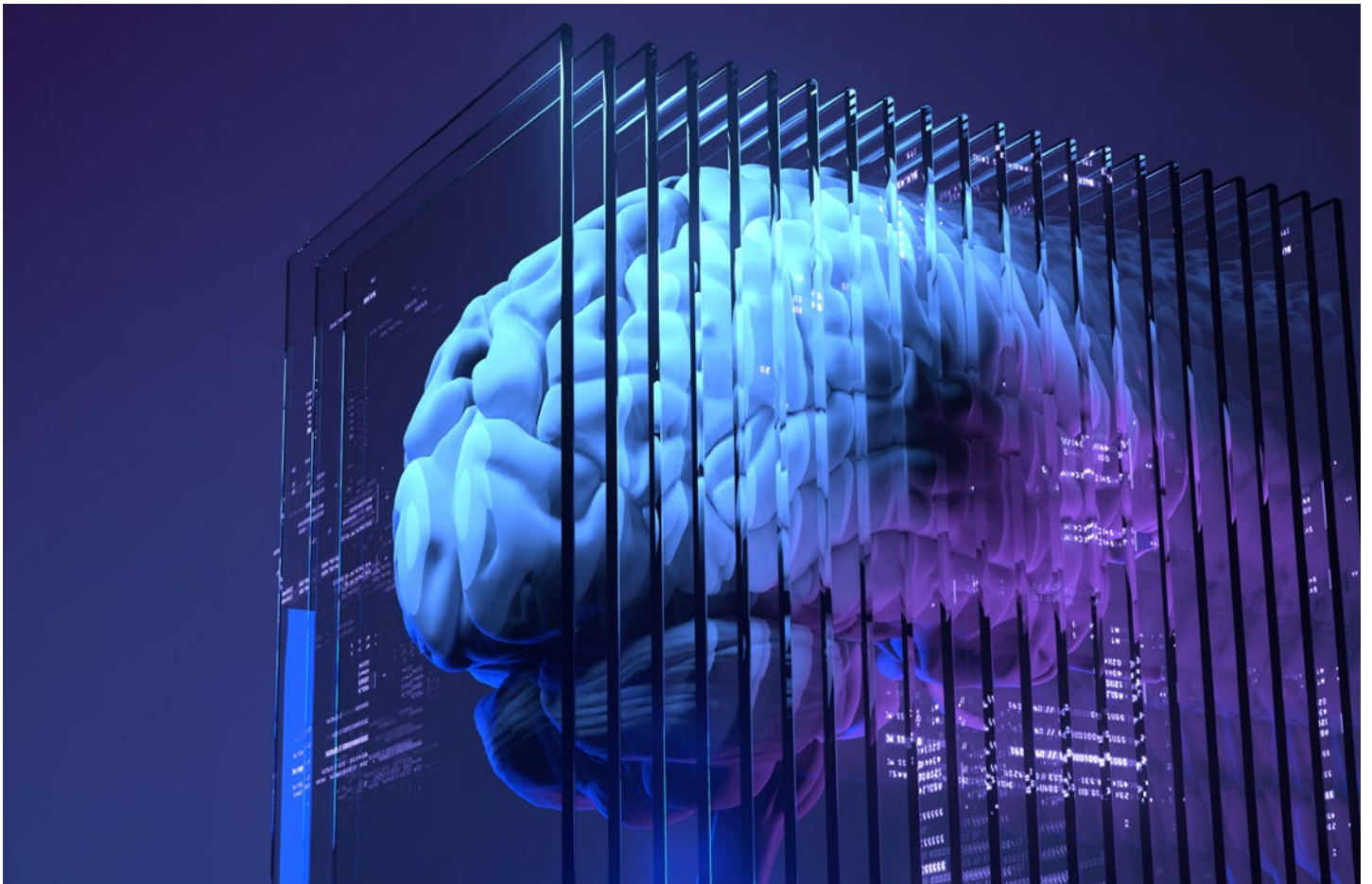
Table 2

Examples of emerging technologies

Source: GSMA Intelligence

	Artificial intelligence (AI)	The ability of a computer or machine to emulate human tasks through learning and automation.
	Blockchain and crypto	A distributed ledger that provides a way to record and share information between members of a community.
	Drones	An unmanned vehicle, on the ground, in the air or under water.
	Extended reality (XR)	An umbrella term for immersive technologies, including augmented reality (AR), virtual reality (VR) and mixed reality (MR).
	Internet of Things (IoT)	The coordination of multiple machines, devices and appliances connected to the internet through multiple networks.
	Quantum computing	The encoding of data in quantum bits (qubits) ³⁰ – rather than bits, which today's computers rely on – to solve complex problems.

³⁰ Subatomic particles, such as electrons or photons, that allow particles to exist in more than one state (i.e., 1 and 0) at the same time.



Among emerging technologies, **AI** is the fastest developing and arguably the most important at this stage, given its potential impact on society. A growing number of tech startups are integrating AI into their solutions from the outset, while many established businesses have made it an integral part of their digital transformation plans. Governments have also become keen participants in conversations on how to maximise the AI opportunity and minimise potential risks. In the 2022 edition of the Government AI Readiness Index,³¹ four countries in Asia Pacific are ranked in the top 10 of 181 countries – Singapore (2nd), South Korea (6th), Australia (8th) and Japan (9th).

Blockchain technology could revolutionise many industries, including finance and supply-chain management, and adoption is increasing in many countries. **IoT** is already revolutionising the way connected devices communicate and perform a range of tasks. In July 2023, Airtel disclosed it had connected more than 20 million devices through its IoT solutions for enterprises in several industries, including automotive, energy, utilities, logistics, financial services and manufacturing.³²

XR devices and technologies form the basis of metaverse applications and other use cases that benefit from virtual experiences and remote collaboration. XR solutions are increasingly being used in industries such as retail, healthcare, education and training, mining, and emergency services. For example, in December 2022, KT launched a metaverse platform called KT Meta Lounge, which provides AI-based virtual assistants and translation services for public organisations and private companies.

It is still early days for **drone** adoption and **quantum computing**, but their long-term impact could be profound. Advancements in drone capabilities, wider availability of hardware and affordable equipment mean unmanned aerial vehicles (UAVs) are moving towards commercial adoption. The UAV ecosystem broadly expects the market to move to mainstream from 2025, with medicine deliveries, precision spraying and mapping in agriculture, and emergency response expected to be among the top use cases.³³ Together with AI, quantum computing can be applied to a variety of use cases involving the analysis of large amounts of data, such as disease risk prediction, financial modelling, weather forecasting and traffic optimisation.

31 Government AI Readiness Index 2022, Oxford Insights, 2022

32 "Airtel Business becomes India's first enterprise to power over 20 million connected devices", Airtel, July 2023

33 **UAVs: commercial applications and the opportunity for mobile operators**, GSMA Intelligence, 2023

3.2






The components of a digital nation as enablers of emerging technologies

The five components of a digital nation are important enablers for the implementation of emerging technologies. Table 3 shows the impact of the five components on the application and adoption of emerging technologies in a digital nation.

Table 3

The impact of the digital nation components on emerging technologies

Source: GSMA Intelligence

	Infrastructure	Digital infrastructure, such as 5G connectivity and data centres for cloud services, form the basis of most emerging technologies. For example, mobile networks provide support for airborne connectivity for drones, industrial IoT communications and low-latency connectivity for XR applications.
	Innovation	While the underlying principle for many emerging technologies may be generic, their application in a region/country-specific context will need to consider local nuances and unique characteristics to maximise impact. A local innovation ecosystem is vital to develop solutions relevant to a particular market.
	Data governance	AI, quantum computing and several other technologies rely on high-quality data to function effectively. As such, a lack of an effective data governance framework can limit the availability of much needed data in the required format and/or create opportunities for unethical deployment of the technologies.
	Security	Emerging technologies increase the exposure of many aspects of the economy and wider society to the digital world. As such, a cybersecurity architecture that protects vital information and essential services (for example, an IoT-based smart utility network) is a core requirement.
	People	Aspiring digital nations must prioritise skills acquisition in emerging technologies to be able to deploy them at scale. This should involve a combination of measures, including redesigning the academic curriculum for future workers and providing ongoing reskilling and upskilling opportunities for existing workers.

3.3

Emerging technology initiatives in Asia Pacific

For countries in Asia Pacific, the adoption of emerging technologies is a matter of ‘when’ and ‘how’, not ‘if’. The rationale is clear: many of the technologies provide an opportunity to increase productivity with limited resources and help countries remain globally competitive amid growing uncertainties around established supply chains. As such, governments across the region have started making emerging technologies an integral part of nation building, from reforming the delivery of public services to boosting output in the private sector. In Japan, for example, the government is promoting the use of AI tools, such as generative AI, to help overcome labour shortages caused by population decline.

The below highlights examples of initiatives from across the region, grouped into five categories.



National frameworks

Government-level frameworks to foster the development and application of emerging technologies

India

In August 2023, the Draft National Deep Tech Startup Policy was introduced for public consultation. The policy identifies nine areas that require intervention to create a robust ecosystem, including nurturing R&D and strengthening the intellectual property regime.

Australia

In May 2023, the government revealed it was supporting “critical technology” with relevant policies to ensure economic prosperity, national security and social cohesion. This includes quantum technologies, autonomous systems and robotics, and AI.

Japan

In May 2023, the government released a draft of the Integrated Innovation Strategy for 2023, which highlights plans to promote the use of generative AI while addressing risks such as copyright infringement and exposure of confidential information.



Skills development

Creating a talent pool for public and private organisations adopting emerging technologies

India

In June 2023, the government approved the establishment of a universal AI University in Mumbai to provide undergraduate and postgraduate programmes focused on AI. The university is the first of its kind in India and will also offer courses in other emerging technologies, including quantum computing, IoT and XR.

South Korea

In August 2022, the government launched the Comprehensive Plan to Nurture Digital Talent to develop around 1 million digital workers by 2026. Under the plan, new colleges specialising in digital courses will be established, while postgraduate courses will expand into areas such as AI, the metaverse, cybersecurity and big data.

Singapore

In May 2022, Singapore launched the National Quantum Computing Hub and the National Quantum Fabless Foundry to boost talent development and make quantum technology more accessible. The hub will help train government agencies and company users in quantum technology.



Investments

Commitments to invest or facilitate investments in emerging technologies

Japan

In July 2023, Japanese operator SoftBank unveiled plans to invest \$138 million in advanced computing infrastructure to power its own generative-AI model to target Japanese enterprises. The operator will begin building its AI infrastructure by the end of 2023, using Nvidia's graphics processing unit for large language models.³⁴

Indonesia

In July 2023, Indonesia officially launched the world's first state-backed cryptocurrency bourse, supervised by the Commodities Futures Trading Supervisory Agency. According to the agency, Indonesia has an estimated 17 million cryptocurrency investors.³⁵

South Korea

In June 2023, South Korean operator KT presented plans to invest \$5.5 billion in its AI business by 2027. The operator's AI-related services cover a range of sectors, including customer care, logistics, robotics, healthcare, nutrition and education. In November 2022, SK Telecom outlined a strategy to use AI to reshape its business and customer relationships.



Innovation

Research and development into new solutions using emerging technologies

Singapore

In August 2023, Singapore announced it is developing a multi-sensory XR training system to revolutionise training for civil defence officers in the areas of road traffic accident management and hazardous material mitigation procedures.

Philippines

In August 2023, the Philippines AI Research Center for Community Development revealed a research project that will use deep learning to estimate flood levels and provide real-time notifications through websites, social media and SMS for better disaster preparedness.

Malaysia

In June 2023, the Malaysian Research Accelerator for Technology & Innovation (MRANTI) announced plans for a 5-acre drone facility to advance the development of Industry 4.0 solutions. MRANTI is leading Malaysia's Drone Technology industry development initiative as part of its mandate to spur emerging technology innovation.

34 "SoftBank to develop generative AI for corporates", Mobile World Live, June 2023

35 "Indonesia Launches World's First State-Backed Cryptocurrency Bourse", ASEAN Briefing, July 2023



Industry adoption

Efforts by governments and private companies to accelerate the deployment of emerging technologies across industries

Japan

In July 2023, Japanese operator NTT Docomo announced it had agreed partnerships with 13 companies across industries including financial services and manufacturing, to develop systems, create use cases and establish rules to easily and safely use Web3 services and blockchain technology.

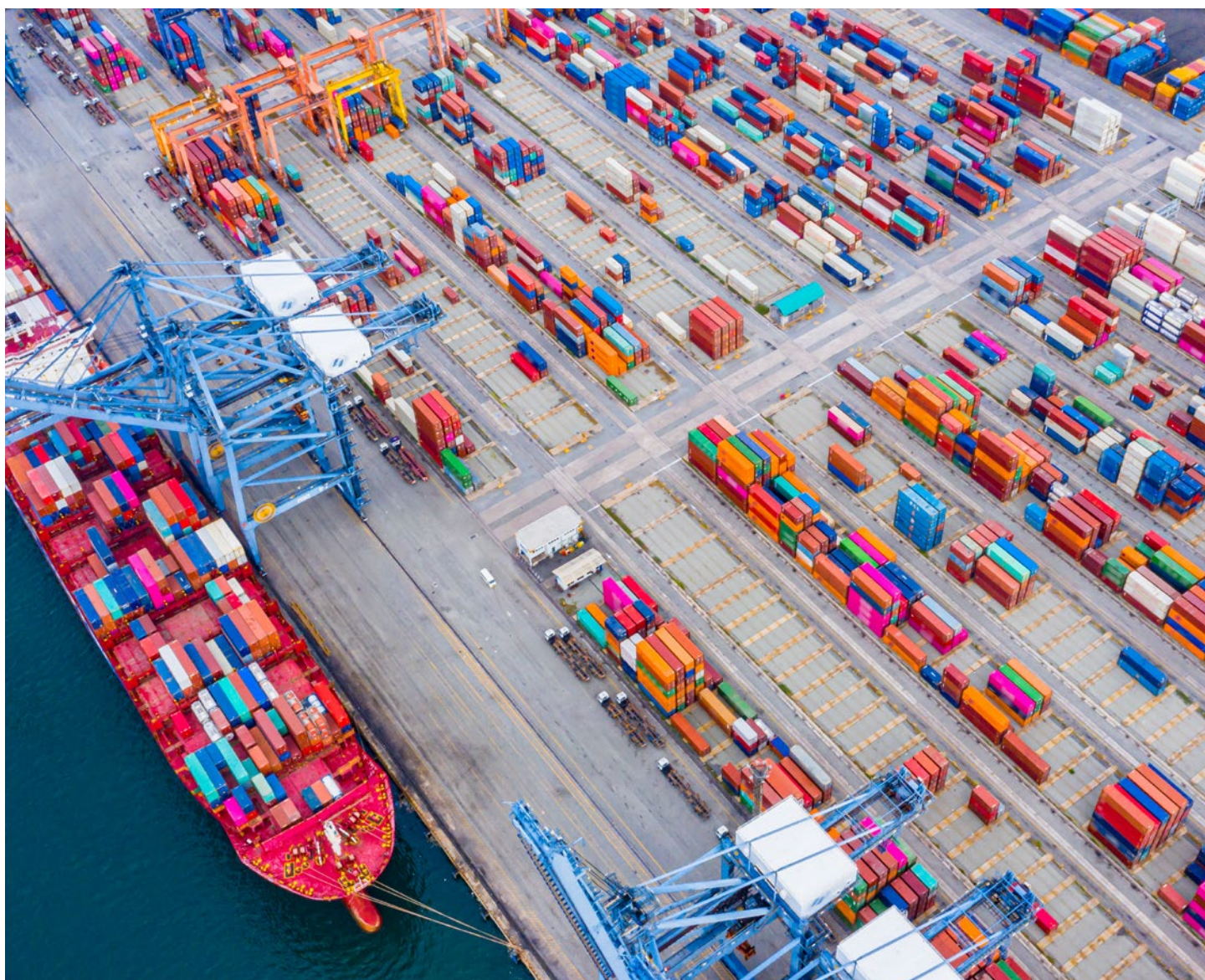
Indonesia

In July 2023, a research team developed a solution using drones and IoT to measure ship emissions over vast areas of the port region. It reported in real time, enabling prompt decision-making and targeted actions to combat pollution.

Thailand

In June 2023, the Federation of Thai Industries collaborated with mobile operator AIS to deliver Industry 4.0 solutions to Thailand's SMEs. The 5G-enabled solutions will leverage emerging technologies, such as IoT, for industrial sectors including manufacturing, and SMEs.

Also in Thailand, Pinfah Farm is employing drones to spray pesticides, fertiliser and various chemicals in farmlands to boost output, save time and money, and improve farmer health.



4 Realising the potential of emerging technologies



4.1

Key considerations to unlock the potential

In view of the profound impact emerging technologies will have on society and the opportunity they provide for governments to realise their digital nation ambitions, it has become imperative for policymakers, private sector players and other stakeholders to adopt these technologies in a safe, responsible and sustainable manner. This is necessary to foster innovation and build trust in the use of the technologies and, by extension, realise the immediate and long-term benefits for society.

In March 2023, non-profit organisation Future of Life Institute issued an open letter with more than 1,000 signatories, including X Corp founder Elon Musk and Apple co-founder Steve Wozniak, warning that AI

systems with human-competitive intelligence posed “profound risks to society and humanity... and should be planned and managed with commensurate care and resources”.³⁶ Meanwhile, the governance of AI and several other emerging technologies, including blockchain, drones and quantum computing, has risen to the top of the policy agenda for governments around the world, underlining the need for all stakeholders to take the right approach to the implementation of the technologies.

Figure 5 highlights five key considerations for countries in Asia Pacific as they look to realise the potential of emerging technologies and transition to digital nations.

Figure 5

Key steps to realising the potential of emerging technologies

Source: GSMA Intelligence



36 "Experts demand pause to out-of-control AI race", Mobile World Live, March 2023

Leadership

Leadership is central to the effective formulation and implementation of policies and initiatives on emerging technologies, given the far-reaching impact of the technologies and their potential to significantly affect a government's overall domestic and foreign policy framework. In several leading economies around the world, such as the UK and US, emerging technologies and their adoption occupy a position of national strategic importance for several reasons, including economic competitiveness and national security. As such, government policies and activities around many of the technologies, particularly AI and quantum computing, are coordinated from the highest levels of government. The same is true for certain governments in Asia Pacific. Examples include the following:

- In May 2023, Japan's prime minister hosted the inaugural meeting of the government's AI strategy council, which has been established to examine how the country can maximise the potential of AI and address its risks.
- In December 2022, Thailand's prime minister chaired the inaugural meeting of the National Artificial Intelligence Committee, which has been mandated to drive the development and application of AI across the public and private sectors.
- In Australia, the Critical Technologies Policy Coordination Office is domiciled in the Department of the Prime Minister & Cabinet, from where it leads a WGA strategy involving other government departments, the research and civil society communities, and the private sector.

Whole-of-government approach

A whole-of-government approach (WGA) brings together multiple stakeholders and diverse resources to provide a common solution to a particular issue. When it comes to the development and application of emerging technologies as part of a country's digitalisation strategy, the use of a WGA is non-negotiable. A disjointed and fragmented approach will at best be ineffective and costly, and at worst dangerous on numerous grounds, including national security and social cohesion. In this regard, how quickly countries adopt emerging technologies in a safe, responsible and sustainable manner will be a function of the level of collaboration across government, the private sector and other non-state institutions.



South Korea puts WGA at the heart of its AI strategy³⁷

South Korea's AI Bill (which is awaiting final approval by parliament) proposes the convening of an AI committee under the Prime Minister's Office to review policies and investments and allocate budgets. The committee will comprise heads of government agencies and experts from the private sector appointed by the president and prime minister. The AI Committee will also host an AI Trustworthiness Expert Committee to gather opinions and conduct discussions and research on fairness, transparency and other issues.

Additionally, the bill contains measures for the government to designate innovative AI companies to provide systematic support for technology development and commercialisation, with the Minister for Science and ICT charged with supporting AI startups, while local and national governments are to support the creation of AI clusters across the country.

³⁷ "Spurred by ChatGPT, South Korea pushes world's first AI Bill", PS engage, March 2023

International cooperation

The development of digital solutions using emerging technologies and their potential impact transcend national and even regional borders. For example, In March 2023, generative-AI company OpenAI released GPT-4, the largest language model created to date, trained on around 570 GB of datasets, including web pages and books from around the world.³⁸ It can be accessed by users in most countries.

Numerous benefits can be derived from international cooperation at various levels – bilateral, multilateral and regional. These include knowledge sharing, standards harmonisation, tackling cross-border issues, and resource pooling. Examples of cooperation include the following:

- Singapore is working with other ASEAN countries to produce a set of guidelines on the responsible use of AI in the region, to be released in early 2024 at the ASEAN Digital Ministers’ Meeting. Singapore’s Ministry of Communications and Information expects the guide to serve as a “practical and implementable step” towards supporting the safe deployment of “responsible and innovative AI” in the region.³⁹
- In January 2023, the Indian government revealed it was in discussions with the US to deepen cooperation in emerging technology areas, including AI, quantum, semiconductors, clean energy and advanced wireless.
- In June 2023, Singapore signed two MoUs with the UK to strengthen cooperation on the digital economy and emerging technologies, including AI, future communications and data flows.

Beyond the benefits mentioned above, there is a salient point that cannot be overlooked: the need to avoid the risk of exacerbating the significant digital advancement gap that exists among countries in Asia Pacific. Given the transformational potential of emerging technologies, there is a case to make collective progress in the development and application of emerging technologies and for no country to be left behind. This will not only help to realise the benefits; it will also create new markets for emerging technology products and services to scale across the region.



AI governance is a key area for international cooperation

AI governance will be a priority for governments in Asia Pacific and around the world in the coming years. While large economies such as China, the European Union and the US will likely set the benchmark for AI governance, countries in Asia Pacific have the opportunity to shape a governance framework that benefits them and can drive investment and innovation in the region. With the growing focus on cross-border trade, the exchange of regulatory best practices and how to deal with challenges in the development of AI technologies will be crucial to devise beneficial AI governance.

Countries in the region already cooperate through regional, multilateral and bilateral agreements in various areas, including e-commerce and digital payments, cybersecurity, and cross-border data flows. There is now an opportunity to extend those partnerships to include AI governance. Individual countries around the world have already made pronouncements on their expectations and approach to ensuring responsible AI deployment. There is an opportunity to pool these approaches via a collaborative mechanism to devise a common, mutually beneficial framework that works for individual markets and the whole region.

38 “50 ChatGPT Statistics and Facts You Need to Know”, InvGate, February 2023

39 “Singapore, Asean to develop new regional guidelines on AI by early 2024”, The Straits Times, June 2023

Open data

Open data initiatives have contributed significantly to national planning efforts and private sector investment. However, the utility of open datasets so far pales in comparison to what is expected in the emerging technologies era. A recent Unesco report highlights the importance of open data principles to the development of AI technologies.⁴⁰ Data is essentially the lifeblood of many AI tools and other emerging technologies with an analytics base. At the same time, the increasing use of digital technologies more broadly is already generating enormous amounts of new datasets that could feed into AI and quantum tools, creating a virtuous cycle.

Governments are the biggest collectors and custodians of data covering all aspects of society, such as healthcare, housing, economic development and education. Government agencies also produce census figures, financial market information, weather data, transport routes and more. In a data-driven governance scenario, the timely release of accurate and reliable datasets is an important first step in realising the potential of emerging technologies and the benefits they can bring to society. For example, in Singapore, the government's one-stop portal enables access to datasets from 70 public agencies. In 2021, the Asia Open Data Partnership launched an open data portal to bolster the region's industrial development across all sectors and emerging technologies, such as AI and IoT.

However, the use of open datasets for AI and other emerging technologies raises risks around bias, data privacy and security. To mitigate these, governments are implementing measures to use open data in a trustworthy manner, protecting the data from both intentional tampering and unintentional inaccuracies. In June 2023, Singapore launched the AI Verify Foundation to harness the collective power and contributions of the global open-source community to develop AI testing tools for the responsible use of AI. In May 2023, it was reported that Thailand's Digital Economy Promotion Agency was looking to gather accurate and dependable data on the country's software, hardware, smart devices, digital services and big data industries for the next three years to help enhance its digital economy.

Impact mitigation

The benefits that emerging technologies can bring to society are not in doubt. Similarly, the risks have received considerable attention from various quarters, including policymakers and representatives of vulnerable groups. As such, discussions on policy formulation for emerging technologies have rightly included suggestions to mitigate the potential risks for people, communities and businesses that may be affected by the application of the technologies. Examples include how to respond to job displacements from the use of technologies such as AI, IoT and drones, and how to support unconnected and digitally illiterate populations as emerging technologies become more widespread and limit human interaction.

In this context, governments should take into account social goals and concerns, whether real or perceived, from the beginning of the development process and put in place measures to build trust and minimise resistance to adoption. These measures are varied and the approach may be determined by unique local circumstances. However, some fundamental measures that can be adopted, in addition to data governance and security, include transparency, inclusivity and safety nets for vulnerable groups (for example, commitments to re-skill displaced workers).

40 Open data for AI - What now? Unesco, 2023



Efforts by countries in Asia Pacific to become digital nations coincide with emerging technologies moving towards mainstream. Building on the foundation of the five key components for a digital nation (infrastructure, innovation, data governance, security and people), these technologies have the potential to transform the fabric of society.

Much of this transformation will be positive, as governments and other stakeholders leverage the capabilities of various technologies to improve service delivery, productivity and economic competitiveness. However, there are potential risks and considerations that must not be overlooked in the development and application of emerging technologies.

The adoption of emerging technologies is a matter of 'when' and 'how', not 'if' for countries in Asia Pacific. Policymakers, the private sector and other stakeholders must therefore prioritise the safe, responsible and sustainable development and application of the technologies. This is essential to build trust and minimise resistance, especially from people, communities and businesses concerned about the impact of these technologies on their values and livelihoods.

Leadership at the highest level of government is an important first step to achieving this priority, considering the significance of these technologies for both domestic and foreign policy objectives. Added to that is the need for a WGA to policy development and initiatives to avoid a potentially ineffective and costly fragmented approach. International cooperation is also necessary to reap the benefits of scale and ensure collective progress in realising the potential of emerging technologies in Asia Pacific.

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