Digital societies in Asia Pacific:
Accelerating progress through collaboration

GSMA Intelligence

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Preface

This report is the GSMA's sixth annual Digital Societies report for Asia Pacific, which focuses on the key aspects of a digital society. The 2020 edition highlighted the concept of a whole-of-government approach (WGA), which allows governments to more efficiently address roadblocks and issues with a cross-ministry approach and collaboration with industry. This year, the focus is on how countries in Asia Pacific are accelerating progress on their digital society ambitions through collaboration and WGA-based implementation of digital transformation strategies.

Each edition of the report has evaluated how the target countries in Asia Pacific have progressed on their paths to full-fledged digital societies, as measured against five key criteria in the GSMA Intelligence digital society index: connectivity, digital identity, digital citizenship, digital lifestyle and digital commerce. There is no denying the digital transformation progress that has been made in these 11 countries (Australia, Bangladesh, India, Indonesia, Japan, Malaysia, Pakistan, Singapore, South Korea, Thailand and Vietnam), and across the rest of Asia Pacific as well. The advanced nations continue to be among the leaders in network technology, while other nations are taking proactive steps by adopting enabling policy frameworks that set the proper foundation to launch innovations. To better reflect a

country's journey towards a full-fledged digital society, this year's report includes an update to the underlying metrics in the index.

Digital technologies will play an increasingly central role in Asia Pacific as governments look to enhance productivity and drive inclusive socioeconomic development. At the same time, the Fourth Industrial Revolution (also known as Industry 4.0) is becoming a reality and will be crucial for post-pandemic economic recovery in countries across the region and beyond. As such, a coordinated approach to develop and implement digital transformation initiatives across the public sector, complemented by private sector investment and innovation, is essential to maximise the potential of digital technologies.

Executive
summary

The sixth edition of the GSMA Digital Societies in Asia Pacific[1] report series coincides with a significant upswing in the adoption and usage of digital technologies, driven in part by the response to the Covid-19 pandemic. Amid the disruptive impact of the pandemic on lives and livelihoods, there has been a renewed focus on digital transformation across society as governments, businesses and people moved from in-person interactions to online and digital-first platforms. The shift in consumer behaviour towards greater acceptance and usage of digital services has been a vital factor in this wave of digital adoption, and will be crucial to sustaining this trend in the long term.

1   In this report we define Asia Pacific as excluding Greater China, unless specified otherwise.

As the world adjusts to a new normal centred around internet connectivity and digital services, the need to accelerate progress to full-fledged, inclusive digital societies has become more important than ever. In the last year, governments across Asia Pacific have implemented measures to improve access to and drive usage of digital technologies in society; they have also initiated wide-reaching digital transformation plans within the public sector to improve service delivery. As economic activities begin to pick up again, digital technologies will be central to efforts to ensure more resilient and inclusive growth. Enhanced connectivity and digital technologies are already enabling new operating models as well as opening up access to new markets and supply chains for businesses.

The latest update to the GSMA Intelligence digital society index uses the same analytical framework as in previous years. However, some changes have been made in its implementation to improve the robustness of the analysis and reflect the emerging trends and developments that will shape the digital landscape in the coming years. Meanwhile, 5G is expanding across Asia Pacific – 14 countries in the region will have live 5G services by the end of 2021 – bringing new opportunities and capabilities for the digital society and Industry 4.0 initiatives in the region. But there is need for more to be done. For example, large swathes of the population in some countries still do not use the internet, putting them at risk of missing out on the emerging digital economy. Even in the advanced digital societies in the region, the pandemic has exposed the limitations and fault lines in many services.

Collaborative efforts can accelerate progress towards becoming full-fledged and inclusive digital societies. In the context of a WGA, or even a whole-of-society approach, collaboration has the potential to bring together governments, the private sector and other non-state institutions to address a common issue. Collaboration is particularly critical in an environment of rapid innovation and ecosystem-oriented businesses; today, digital services permeate virtually all industry verticals and can be impacted by policies and activities in multiple sectors of the economy. There are numerous benefits from collaboration to governments, the wider ICT industry and society, notably the assurance of interoperability of digital services and platforms, avoiding fragmentation and duplication of efforts, and ensuring inclusivity in the development of digital solutions.

Encouragingly, the expectation for greater collaboration within the digital ecosystem is widely shared among key stakeholders. This bodes well for future efforts to build new partnerships and expand existing ones. In this report, we highlight five key factors and considerations in establishing effective collaborative partnerships across the public and private sectors to advance the digital society:

- government leadership
- clarity on shared on shared purpose and objective
- clear, measurable and mutually beneficial benefits
- low entry barriers for new partners
- diverse viewpoints to improve outcomes and decision-making.

1 A sharpened focus on digital societies in Asia Pacific

Across Asia Pacific, digital technologies are being harnessed to support the public health response to the pandemic and to enable many social and economic activities to continue safely, including work, education, shopping and healthcare. For instance, South Korea's Covid-19 smart management system relies on digital technologies, such as mobile connectivity and IoT,[2] to help control the spread of the virus. In Singapore, there was a 20% rise in businesses undergoing digital transformation during the pandemic, compared to the previous year, with many new businesses signing up to e-commerce platforms with the support of government-led programmes.[3]

2   COVID-19 Smart Management System (SMS) in Korea, MLIT, KAIA, 2020
3   "More businesses taking the digital plunge", The Straits Times, June 2020
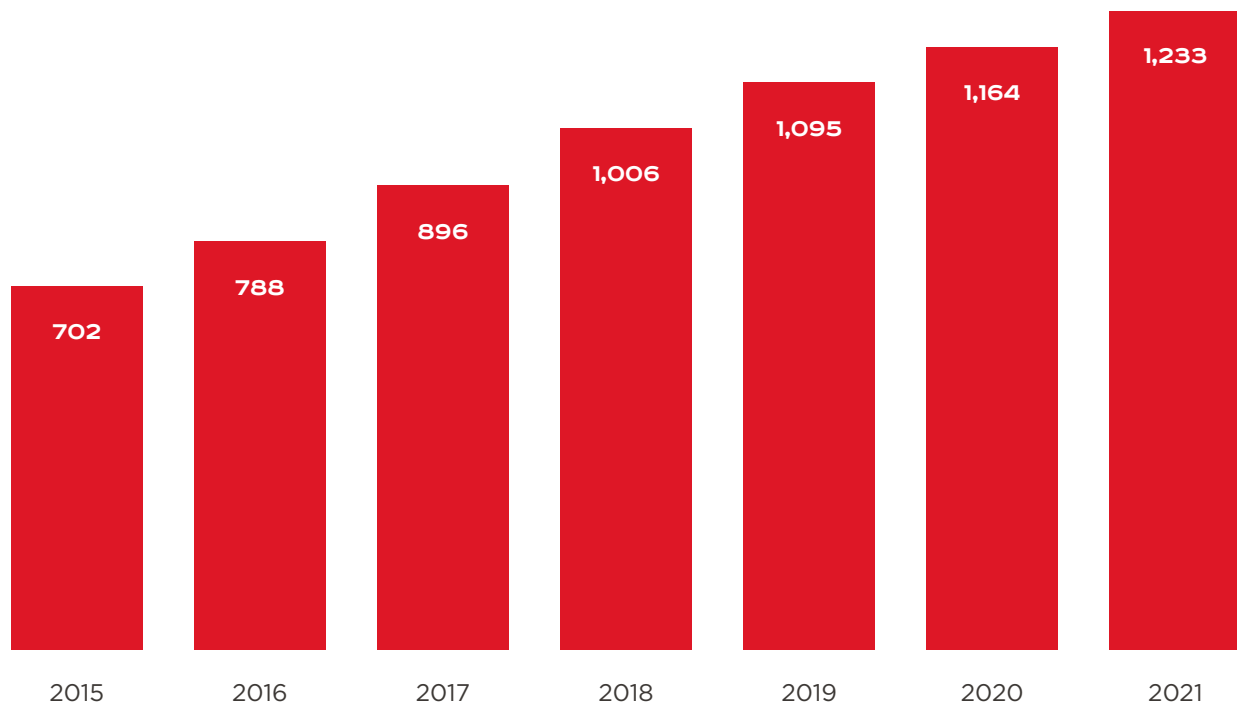
Against this backdrop, access to fast, reliable and continuous connectivity has become a vital lifeline for people to participate effectively in society. Nearly 130 million people across Asia Pacific subscribed to mobile internet services for the first time during 2020 and 2021, taking the total number of internet users in the region to more than 1.2 billion.[4]

Figure 1

Mobile internet is the primary way for people to access digital services in Asia Pacific

Number of mobile internet subscribers in Asia Pacific (million)

Source: GSMA Intelligence

In addition to connectivity, new services have emerged from the public and private sectors to serve the lifestyle needs of people and new operating models of businesses, in many cases necessitated by the pandemic. Existing services and platforms have also seen a sharp rise in adoption and usage, with digital payments services seeing some of the biggest increases due to changing consumer sentiments towards digital transactions. According to Bank Indonesia, the value of e-money transactions in Indonesia grew by 39% in 2020 to IDR201 trillion ($14 billion) and is projected to grow by another 32% in 2021 to IDR265 trillion.[5] Similarly, the Bank of Thailand has disclosed that the average number of daily digital transactions more than doubled to 22.3 million in February 2021, compared to a year earlier.[6]

The shift in consumer behaviour towards greater acceptance and usage of digital services has been a defining factor in the increase of digital adoption. Many new digital consumers who have gone through the initial steps of digital adoption, such as learning how to set up accounts and make digital payments, are now experiencing how technologies can reshape their lives and contribute to better experiences with the society around them. This will be crucial to the continued use of these services and the sustained expansion of the digital economy.

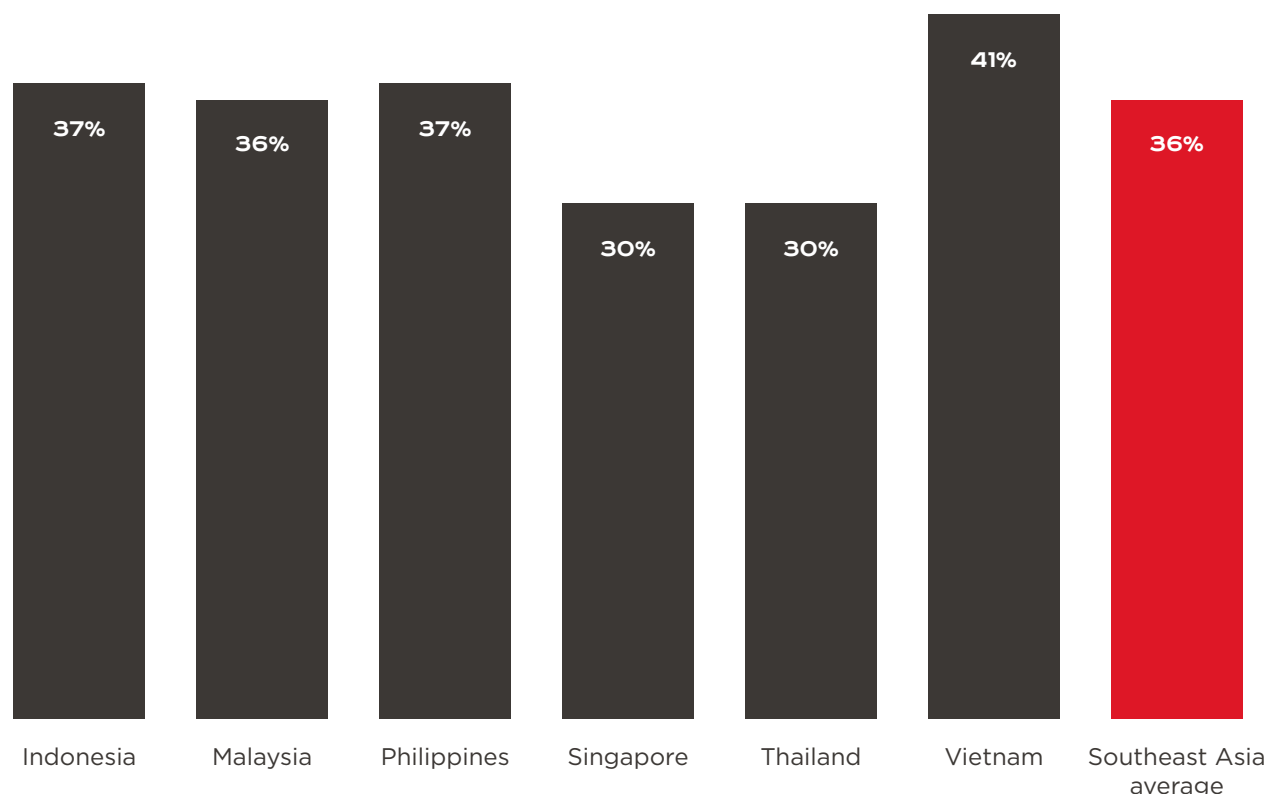4   The Mobile Economy Asia Pacific 2021, GSMA, 2021
5   "Indonesia e-wallet transaction to reach $18.5 billion in 2021 amid fierce competition", The Asian Banker, April 2021
6   "Thai digital payments double in Feb as outbreak spurs online activity", Reuters, May 2021

Figure 2

On average across Southeast Asia, around a third of all digital service consumers are new to the service due to Covid-19[7]

Percentage of new digital consumers out of total service consumers

Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	Southeast Asia average
37%	36%	37%	30%	30%	41%	36%

Source: Bain[8]

The impact of the pandemic on both demand (consumers' behavioural changes) and supply (increasing investment in connectivity and innovative digital services) strongly points towards faster digital transformation in the coming years. Consequently, governments across Asia Pacific have stepped up efforts and are implementing a number of measures to increase access to connectivity and the usage of digital services across society:

- Japan has established a digital agency under the direct supervision of the prime minister to streamline the use of digital technologies across government ministries.[9] The agency aims to digitise administrative procedures in 31 areas and standardise the different systems used by municipalities within five years. This is expected to help address the heavy reliance on legacy (and sometimes manual) systems and the siloed activities of many government ministries and agencies that constrained the overall response to the Covid-19 pandemic.

- The Vietnamese government is prioritising e-government as a central pillar of its ambitious national digital transformation strategy to increase digital infrastructure, solutions and capacity, and to emerge from the pandemic with all branches of government running in a digital technology environment.[10] From 2021, ministries and provinces will be ranked to measure the extent to which national and local authorities have developed online activities in all areas of society and the economy, with targets such as having 80% of public services accessible online, including through mobile devices, by 2025.

7   New digital services users are defined as consumers who were not already purchasing, signing up for or subscribing to digital services, but did so as a result of lockdowns.
8   e-Conomy SEA 2020, Bain, 2020
9   "COVID-19 and Japan's long-awaited digital transformation", East Asia Forum, September 2021
10 "Vietnam's Digital Transformation Plan Through 2025", Vietnam Briefing, September 2021

- In Malaysia, the government is implementing the Jalinan Digital Negara (Jendela) initiative, which aims to expand the reach of the internet to every corner of the country, as part of the 12th Malaysia Plan (2021–2025).[11] Phase 1, which includes the expansion of 4G network coverage from 91.8% of the population to 96.9% and the sunsetting of 3G networks, runs from 2020 until 2022; Phase 2, which involves using various technologies to achieve Malaysia's digital ambitions, will start from 2022 onwards.

- South Korea's Digital New Deal,[12] part of the government's KRW220 trillion ($191 billion) five-year Korean New Deal stimulus package, focuses on preparing the country for "surging demand for remote services and to pave the way to a digital economy". Some of the major projects under the Digital New Deal include creating industrial convergence with data, network and AI across the economy, promoting 'untact'[13] industries, and making cities and industrial complexes digital.

- In February 2021, the Indonesia government announced plans to extend 4G technology to the 3T (front, outermost, disadvantaged) areas of the country, through the Ministry of Communication and Information Technology (Kominfo) and the Indonesian Information and Accessibility Agency (BAKTI). In September, the government revealed that mobile operators XL Axiata and Telkomsel had won the tender to deploy 7,904 4G base stations by the end of 2022.[14]

It is estimated that by 2025, over 333 million people across the region will start using mobile internet for the first time.[15] Indeed, as people become more willing to intensify their digital interactions and digital technologies play an increasingly central role in efforts to restart economic activities and implement new service delivery models, the momentum for adoption and usage of digital services will continue to grow. For governments in Asia Pacific, this represents an important opportunity to harness the power of digital technologies to ensure inclusive development and build more resilient economies. In practice this entails making progress on the components of a digital society by reducing existing gaps and inequalities, and providing the right environment to foster innovation and drive investment in digital services.

11 "Malaysia to see greater digital connectivity through Jendela", MIDA, December 2020
12 "Government Announces Overview of Korean New Deal", Ministry of Economy and Finance, July 2020; "Moon says Korean New Deal investment to be expanded to W220tr", The Korea Herald, July 2021
13 A term used to describe services that minimise direct human interactions.
14 "Satelit Satria Ditargetkan Meluncur 2023", Kominfo, September 2020; "XL Axiata And Telkomsel Will Hold 4G Services At 7,904 BTS, This Is The Coverage Area!", VOI, September 2021
15 The Mobile Economy Asia Pacific 2021, GSMA, 2021

2 Asia Pacific advances on the digital societies path

GSMA Intelligence's digital society index uses five main components – connectivity, digital identity, digital citizenship, digital lifestyle and digital commerce – to measure the progress of a country along its path to becoming a full-fledged digital society.[16] Based on the aggregate scores, countries are grouped into three categories: emerging, transition and advanced digital societies.

16   A more detailed description of the methodology is provided in the Appendix, including an update on changes to this year's index versus previous iterations.

Figure 3

The components of a digital society

DIGITAL CITIZENSHIP	DIGITAL LIFESTYLE	DIGITAL COMMERCE
Digital citizenship interaction between government, businesses and citizens specifically in the provision and use of public services over digital channels. The use of technology for two-way interactions between governments and citizens, with the potential to increase accountability, information sharing and mutual trust.	Use of smart devices to access locally relevant content and non-core communication solutions that offer a more convenient experience. The pandemic has accelerated the use digital technologies in everyday activities, including work, social interactions, learning, shopping, healthcare and entertainment. The digital-first approach to many of these activities will be a defining feature of future digital societies.	Simplifying a commerce activity by expanding access to marketplaces, replacing physical cash, and facilitating the processing and delivery of orders over digital channels. Underpinned by digital payments, digital commerce will become more prevalent in future digital societies as business reshape their operating models to take advantage of the reach and resilience offered by online transactions.

WHOLE-OF-GOVERNMENT APPROACH (WGA)

WGA brings together multiple stakeholders and diverse resources to provide a common solution to a particular issue.

DIGITAL IDENTITY

Proof of identity is a prerequisite to socioeconomic development and essential to accessing basic services; mobile technology is uniquely positioned to enable accessible and inclusive digital identity.	As more transactions move online with little or no physical interaction, the ability to prove one's identity in a digital form will be essential to economic, financial and social inclusion.

CONNECTIVITY

Fast, reliable and continuous individual access to the internet is the foundation for the creation, distribution and consumption of digital applications and services.	The more people there are in a society who can access fast, reliable and affordable internet services on a regular basis, the more likely it is for governments and businesses to engage with them and deliver services over digital channels.

Source: GSMA Intelligence

Digital platforms are an increasingly prominent feature of digital societies. These internet-enabled, multi-sided services cater to both providers and users (e.g. consumers, vendors and governments). Platform-based models have disrupted traditional business models and linear value chains across many sectors by enabling interactions between two or more interdependent groups, helping to eliminate inefficiencies and extend the reach of services to a greater number of customers.

Changes to the digital societies index

This year's report uses the same analytical framework as in previous years. However, some changes have been made in its implementation to improve the robustness of the analysis and reflect the emerging trends and developments that will shape the digital landscape in the coming years. Consequently, the scores presented in this report are not directly comparable with previous iterations of the digital society index.

New indicators in some of the components include the following:

- **Connectivity:** Indicators measuring the share of population in the country covered by 5G networks and the spectrum assignments in bands above 3 GHz, which will be important in the rollout of 5G.

- **Digital identity:** Indicator analysing the use of biometric data for digital authentication.

- **Digital lifestyle:** Indicators analysing the cost of entry-level internet-enabled handsets, the gender gap ratio for mobile phone ownership and the use of the internet for entertainment purposes.

- **Digital commerce:** Indicators analysing the performance of national logistics networks and legislation on the acceptance of digital signatures.
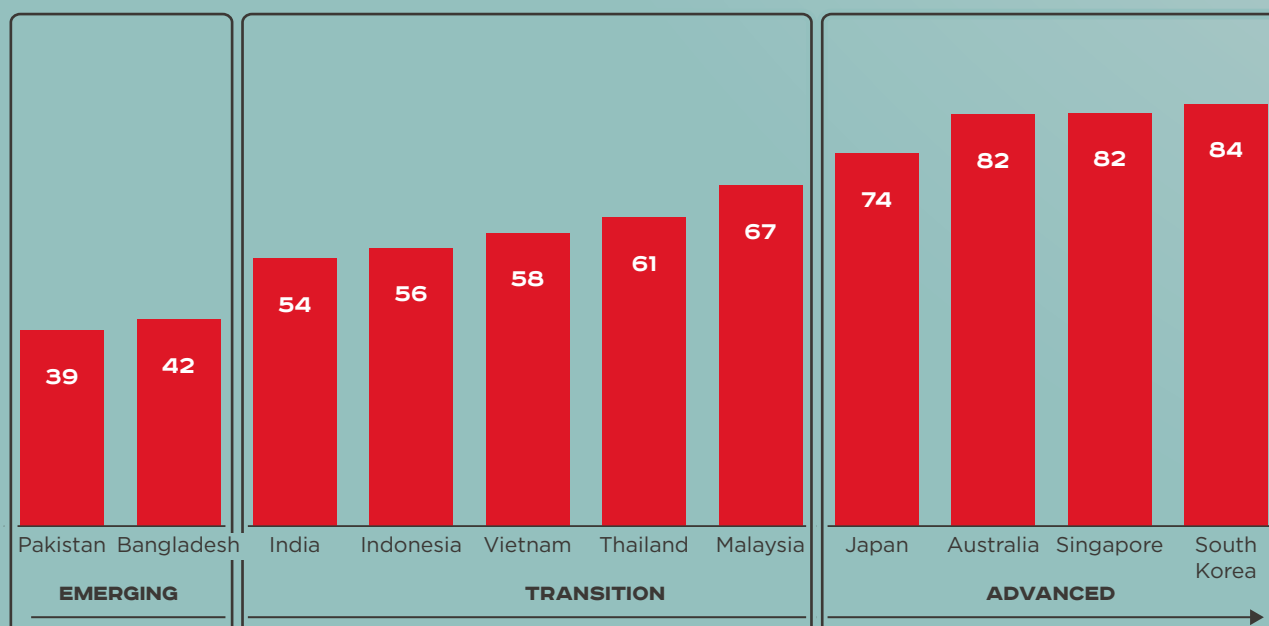
Several indicators have also been removed from the index, based on the evolution of digital services:

- **Connectivity:** Indicator measuring the number of years since 3G networks launched.

- **Digital lifestyle:** Indicator measuring the index score for online services and an indicator analysing the number of generic top-level website domains per capita.

- **Digital commerce:** Indicators on the number of commercial bank branches and ATMs per capita.

For a more detailed view of the methodology, please see the Appendix.

Figure 4

Digital society: 2020 country index scores in Asia Pacific

EMERGING: Pakistan 39, Bangladesh 42
TRANSITION: India 54, Indonesia 56, Vietnam 58, Thailand 61, Malaysia 67
ADVANCED: Japan 74, Australia 82, Singapore 82, South Korea 84

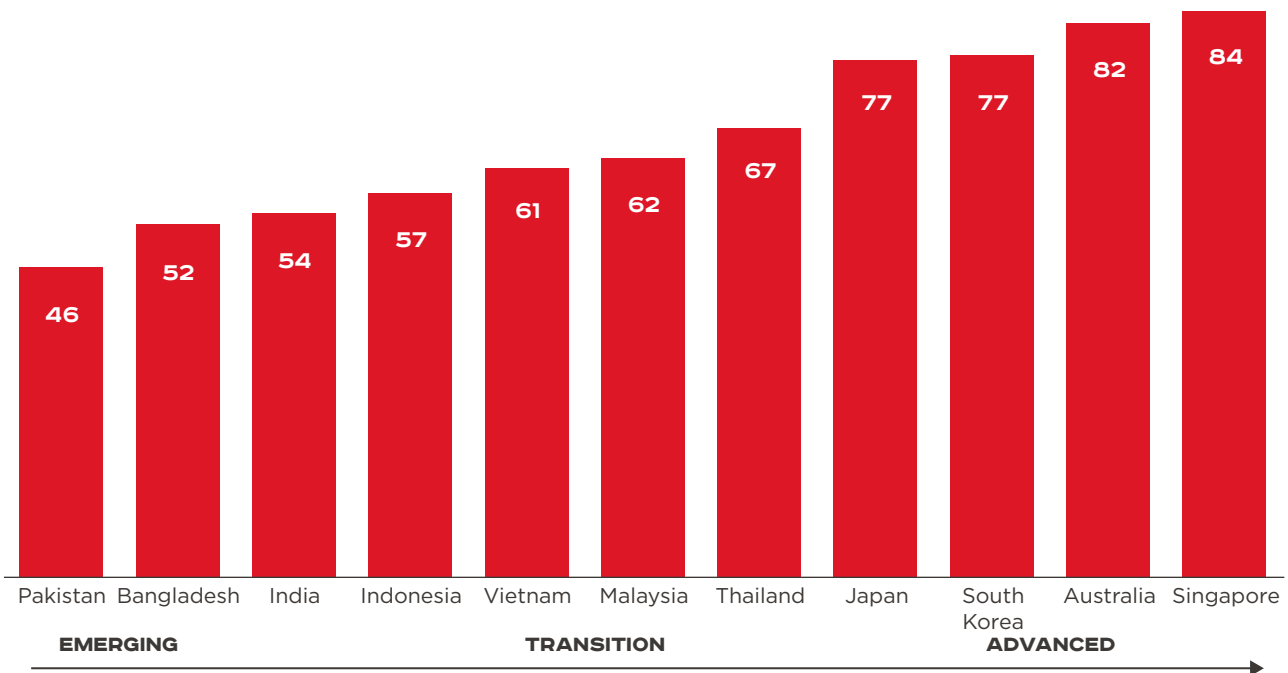**Source:** GSMA Intelligence

2.1 Connectivity

Connectivity is the bedrock upon which a full-fledged digital society is built. Singapore is the highest-scoring country on the connectivity pillar. Since 2013, the city-state has recorded 100% population coverage for both 3G and 4G networks, while 5G population coverage reached 71% at the end of 2020. The rollout of 5G networks, along with upgrades to existing 4G infrastructure, is having a notable impact on network performance. For example, average download speeds in Singapore increased by 15% in 2020, reaching 60 Mbps. Singapore is one of four countries in Asia Pacific (the others being Australia, South Korea and Thailand) with a commercial 5G standalone (SA) network.

Other 5G leaders in Asia Pacific have also advanced their rollouts of the latest network generation. For example, 5G population coverage in South Korea reached 98% at the end of 2020. This has supported the adoption of 5G services, with 5G now accounting for more than a quarter of total mobile connections in the country (higher than anywhere else in the world).

Figure 5

Connectivity: 2020 country index scores

Source: GSMA Intelligence

Access to spectrum is a key element of the connectivity score. As such, countries with a higher connectivity score tend to have better availability of spectrum. As is the case globally, most 5G launches in Asia Pacific have so far relied on mid-band spectrum. However, the region also leads in commitments and commercial deployments of 5G mmWave bands (24 GHz and above).[17] This is contributing to the improvement in connectivity scores in countries such as Japan, which is the first nation where all operators have deployed commercial 5G services using mmWave spectrum.

A second wave of 5G rollouts is already underway in Asia Pacific. Indonesia saw the launch of commercial 5G services in the middle of 2021, and several other countries, including India, Malaysia and Vietnam, are soon to follow. Malaysia, in particular, is moving forward with a unique 5G plan, opting to implement a government-owned single wholesale network.[18]

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17   As of June 2021, five countries in Asia Pacific – Australia, Japan, Singapore, South Korea and Thailand – had assigned mmWave spectrum to operators.
18   Safeguarding the road to 5G in Malaysia: An economic risk assessment of Malaysia's 5G plan, DT Economics, 2021

With the transition to 5G still in the early stages in these countries, improvements in their connectivity scores have been driven by the continued rollout of 4G networks. In India, for example, 4G population coverage increased from 73% in 2016 to 99% in 2020, surpassing both 2G and 3G coverage. 4G population coverage has also risen significantly in Bangladesh, reaching 97% in 2020, up from just 8% in 2016. These 4G networks will play a key role in digital transformation efforts, supporting new digital innovations and acting as a bridge to 5G networks in the future.

While 4G rollouts have advanced considerably in South Asia in recent years, there remains significant disparity with 4G take-up. In India, 4G accounted for 63% of connections at the end of 2020, compared with 27% in Bangladesh and 38% in Pakistan. Shifting to 4G is essential to improve the mobile internet user experience and to enable consumers to benefit from advanced digital lifestyle services.

2.2 Digital identity

The ability to prove you are who you say you are in digital form is a fundamental component of economic, financial and social development. Digital identity connects people to the platform economy and a broad range of services, including commerce, healthcare, electoral participation, education, social support and banking. There was minimal change in the latest update, reflecting the time it takes to bring new digital identify solutions to market and to drive uptake among the population.

South Korea remains the highest-scoring country on the digital identity pillar, thanks to its long-established national ID system and increasing use of digital solutions. South Korea's new Digital Signature Act took effect in December 2020.[19] It promotes the use of various technologies for electronic signatures, such as biometric authentication and blockchain, and prohibits restrictions on the use of particular electronic signature systems, except for specific cases involving laws and certain decrees. More recently, South Korea's three largest mobile operators (SK Telecom, KT and LG Uplus) have worked with the Korean National Police Agency and Road Traffic Authority (KoRoad) to introduce a digital driver's licence this year,[20] building on the identity authentication app PASS, which was launched in 2018.

In India, the national Aadhaar ID system continues to record strong progress; as of September 2021, the system had 1.31 billion enrolments, accounting for 96% of the population.[21] Moreover, the ID system has performed almost 60 billion authentications since it was launched in 2009, enabling the government to reduce distribution costs as well as fraud and data leakage.

Singapore has already rolled out its national digital identity platform, SingPass, and has recently become the first country in the world to introduce biometric facial verification for its connected services.[22] The biometric check will give Singaporeans secure access to both private and government services. For example, the facial verification system is already in use at kiosks in branches of Singapore's tax office, while commercial banks DBS and OCBC now allow customers to use it to open accounts and authorise transactions.[23]

In Thailand, the Electronic Transactions Development Agency (ETDA) is working on legislation that would replace physical ID cards with digital ID. This entails moving towards a 'self-sovereign' digital identity management system, using blockchain to verify identities more securely and quickly, and enabling users to control and manage their own identity by sending only the relevant aspects of their personal information to companies that request for data, rather than their entire record.[24]

19   "South Korea: New Digital Signature Act to Take Effect in December 2020", Library of Congress, August 2020
20   "On the Use of Digital Identity in Asia (3) – Digital Identity in Singapore & South Korea", The New Lens International, February 2021
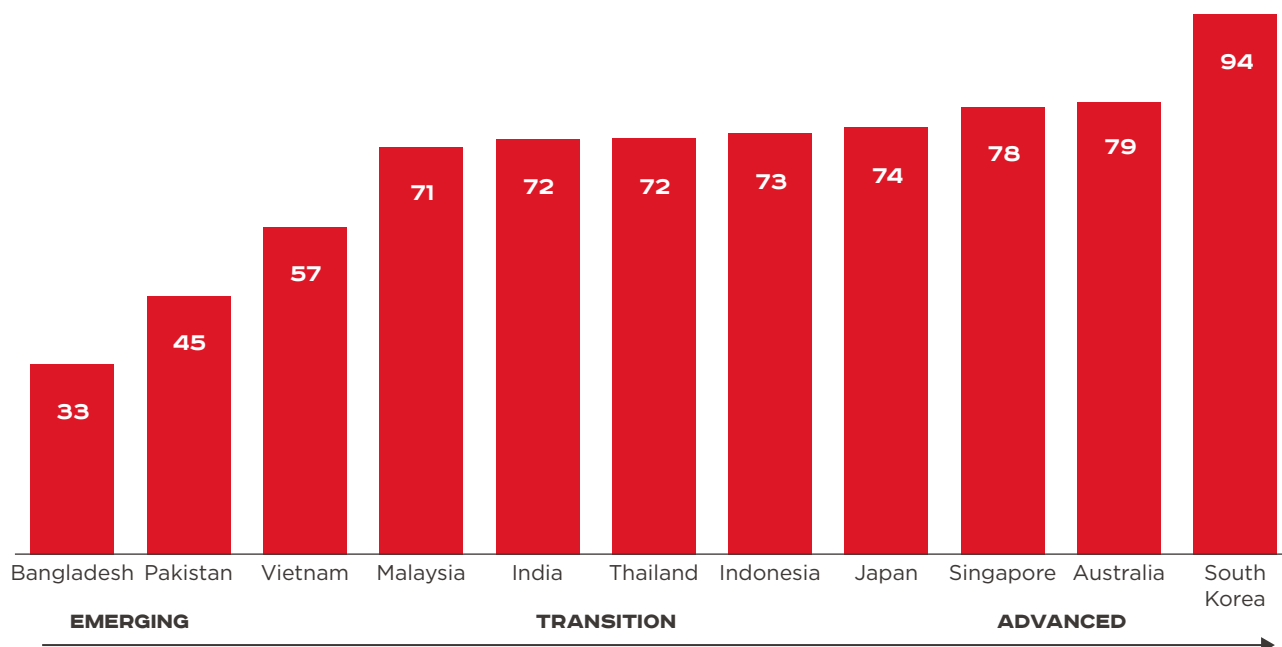21   See https://uidai.gov.in/aadhaar_dashboard/
22   "SingPass introduces biometric face verification, Kofax integrates digital signatures", Biometric Update, December 2020
23   "OCBC Bank Enables SingPass Face Verification at Singapore ATMs", FindBiometrics, March 2021
24   "Exclusive: Thailand's vision for trusted digital ID", GovInsider, August 2020

Figure 6

Digital identity: 2020 country index scores

Bangladesh	Pakistan	Vietnam	Malaysia	India	Thailand	Indonesia	Japan	Singapore	Australia	South Korea
33	45	57	71	72	72	73	74	78	79	94

EMERGING   **TRANSITION**   **ADVANCED**

Source: GSMA Intelligence

2.3 Digital citizenship

The digital citizenship component measures the availability and pervasiveness of e-government services. Most countries in Asia Pacific have made significant progress on this component, as observed on the Online Service Index (OSI)[25] and E-Participation Index.[26] Covid-19 has increased citizens' interaction with e-government platforms, mainly as users sought credible information about the pandemic and government response measures, as well as access to a variety of public services, such as social support, that moved online.

In South Korea, the top-ranked country on the index for digital citizenship, national e-government strategies are adopted every five years and are supported by sectoral development plans. The e-Government 2020 Master Plan ensures that national policy is evidence-based, grounded in science and focused on achieving open, innovative government for citizens.[27]

Indonesia is making strong progress in terms of online service provision and e-government development. An example of this advancement is the Unified Database for Social Protection Programmes, an electronic database used to deliver cash transfers and emergency assistance to the poorest households in Indonesia. It contains the names, addresses and socioeconomic data for the poorest 40% of the population and plays a significant role in poverty reduction programmes, including Covid-19 relief payments.[28] Systems such as this increase transparency and credibility in social protection programmes, improving trust in government and delivering long-term cost savings.

25   The UN's Online Service Index (OSI) assesses a country's national website in the country's native language, including the national portal, services portal and e-participation portal, as well as the websites of the related ministries of education, labour, social services, health, finance and environment, as applicable.
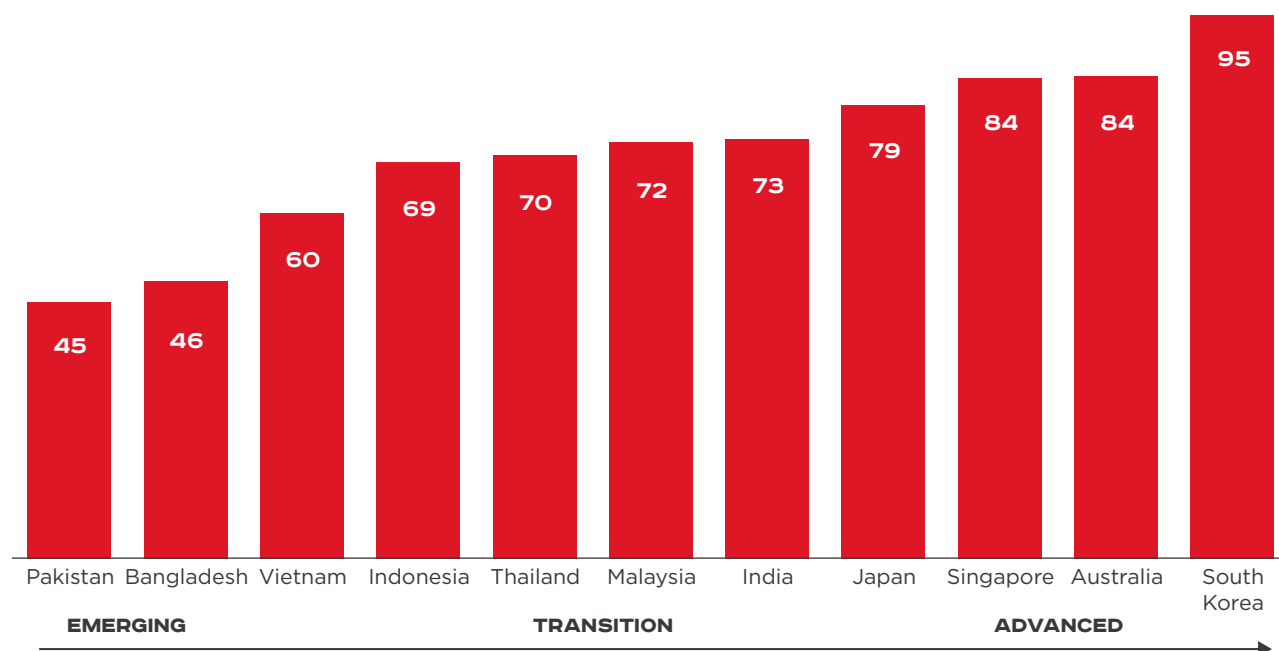
26   The UN's E-Participation Index (EPI) measures the use of online services to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision-making").

27   E-Government Survey 2020, United Nations, 2020

28   See http://tnp2k.go.id/data-and-indicator/unified-database

Figure 7

Digital citizenship: 2020 country index scores

Pakistan	Bangladesh	Vietnam	Indonesia	Thailand	Malaysia	India	Japan	Singapore	Australia	South Korea
45	46	60	69	70	72	73	79	84	84	95

EMERGING   **TRANSITION**   **ADVANCED**

Source: GSMA Intelligence

2.4 Digital lifestyle

The digital lifestyle component of the index looks at adoption of smart devices, the availability and usage of local content, and the growth in IoT connections across different verticals. Singapore, Australia and South Korea recorded the highest digital lifestyle scores in the latest update. The level of adoption of smartphones and other connected devices, including wearables and smart home appliances, is high in all three countries, with the range of services available to users also increasing rapidly.
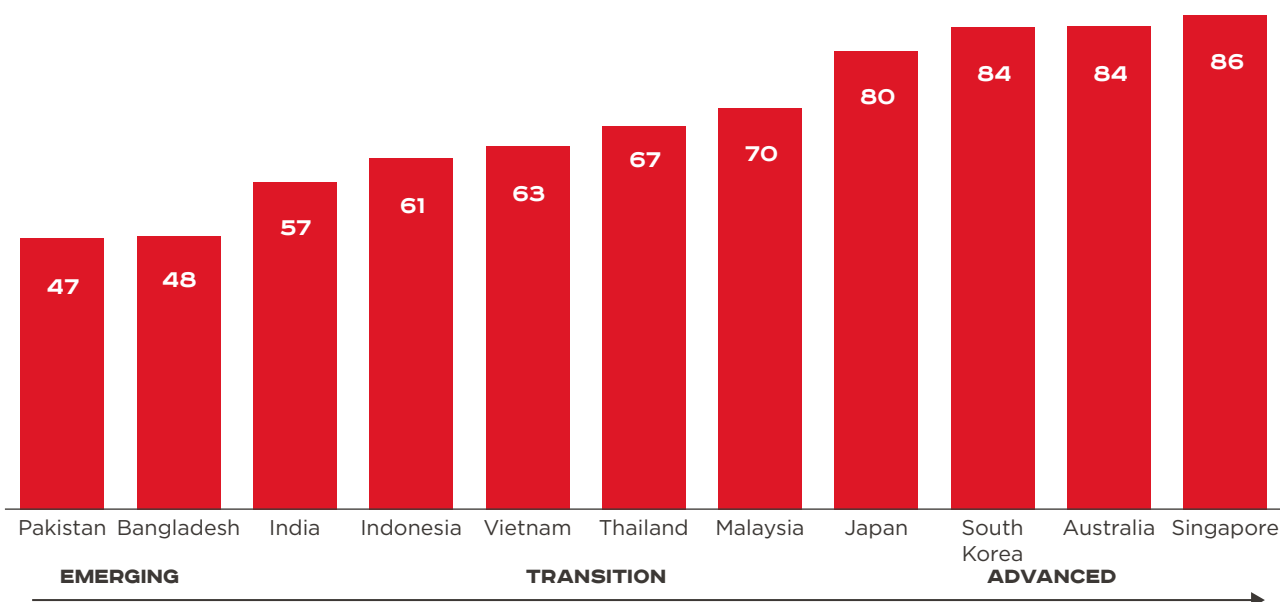
Transition and emerging economies are also seeing a rise in adoption of smartphones and increase in consumption of local content. For example, India's smartphone users are among the largest users of data worldwide, helped by the rise of affordable smartphones, such as the JioPhone (an LTE-enabled handset launched by Jio).

Two of the biggest barriers to digital lifestyle have been the lack of relevant services and a tepid attitude from consumers, mostly due to traditional behaviours, lack of trust and digital illiteracy. However, the Covid-19 pandemic has had a significant impact on these factors. The shift to online has seen the rapid development of services to enable remote work, social interactions, shopping and entertainment. Consumer attitudes towards digital services have also improved, with a significant proportion of new digital users keen to continue with those services post pandemic.

Figure 8

Digital lifestyle: 2020 country index scores

		57	61	63	67	70	80	84	84	86
47	48									
Pakistan	Bangladesh	India	Indonesia	Vietnam	Thailand	Malaysia	Japan	South Korea	Australia	Singapore

EMERGING   **TRANSITION**   **ADVANCED**

Source: GSMA Intelligence

Another obstacle that will require more concerted efforts by governments and other stakeholders to address is affordability of devices and data services required to go online. This barrier is particularly acute in the emerging, and some transitional, digital economies, where the cost of data and devices represents a significant share of average income.

This has been compounded by Covid-19, which has reduced average incomes and caused smartphone costs to increase due to component shortages. At the same time, the pandemic has highlighted the importance of the mobile internet to consumers, fuelling a rise in local content and services. For instance, Bangladesh saw a surge in demand for telemedicine during the pandemic, leading to the establishment of 15 digital healthcare providers.[29]

Such developments will help people use digital technologies in everyday activities – a fundamental aspect of a digital society.

Meanwhile, mobile operators have implemented several initiatives to support vulnerable individuals and communities during the pandemic, including the following examples:

- Mobile operators in Malaysia extended the offer of free internet (1 GB per day) to customers until the end of 2021.[30]

- Airtel provided benefits worth INR270 crore ($35 million) to help 55 million low-income customers on its network stay connected during the peak of the spread of the Delta variant of Covid-19.[31]

29   Health Systems, Digital Health and COVID-19: Insights from Bangladesh, Myanmar, Pakistan, Benin, Nigeria and Rwanda, GSMA, 2021
30   "Free 1GB daily Internet data extended until Dec 31", The Star, June 2021
31   "Airtel announces benefits worth Rs 270 cr to help 55 million low income customers to tide over the impact of Covid-19, Airtel, May 2021

2.5 Digital commerce

Digital commerce – where digital access to marketplaces, services and payments replaces physical cash – is an essential element of a digital society. The digital commerce component of the index looks at the advancement in financial inclusion, the level of development of the e-commerce ecosystem and the acceptance of electronic signatures.
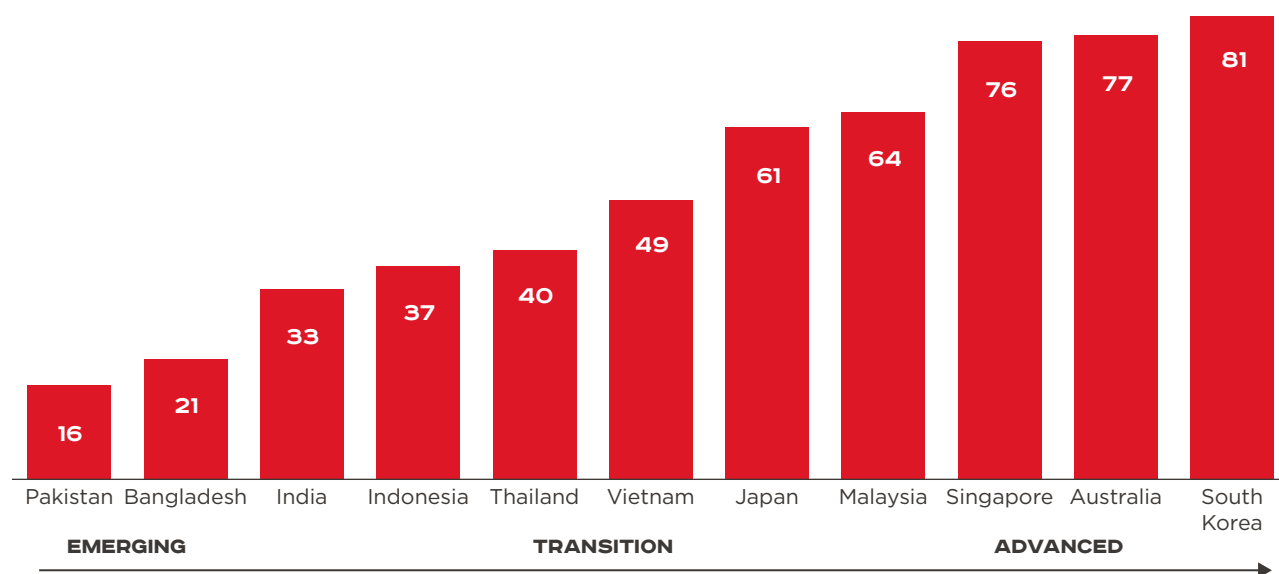
South Korea, Australia and Singapore remain the highest-scoring countries when it comes to digital commerce, driven by their high scores on the World Bank's Logistics Performance Index, which measures the ability of a country's logistics network to facilitate

the physical movement of goods. This has been put to the test in the last 18 months, as lockdowns and social distancing measures increased demand for e-commerce.

In Singapore, the proportion of people who shop 'mostly online' increased from 35% to 53% in the 12 months to May 2021.[32] Collaboration between the government and small and medium-sized enterprises (SMEs) is central to meeting this demand; the Singapore government introduced the E-commerce Booster Package to help SME retailers transform their offline business to an online channel.[33]

Figure 9

Digital commerce: 2020 country index scores

Source: GSMA Intelligence

Vietnam is one the fastest-growing market for mobile payments among the index countries. The rapid take-up of mobile payments is leading to increased investment in local players. For example, the country's biggest e-wallet company, Momo, raised over $100 million in early 2021 as part of plans to become a 'super app' and go public by 2025.[34] The rising usage of digital payments is supporting growth in e-commerce sales, which reached $11.8 billion in 2020, up 18% year on year.[35]

Looking ahead, the mobile payments landscape in Vietnam is set to become even more competitive with the launch of mobile money services. In March 2021, the country launched a mobile money pilot programme, attracting interest from mobile operators Vinaphone (VNPT), Viettel Telecom and MobiFone.[36] This could help extend the reach of mobile payments to the country's poorest customers.

32   "Southeast Asia, the home for digital transformation", Facebook and Bain & Company, 2021
33   See enterprisesg.gov.sg/industries/type/retail/e-commerce-booster-package
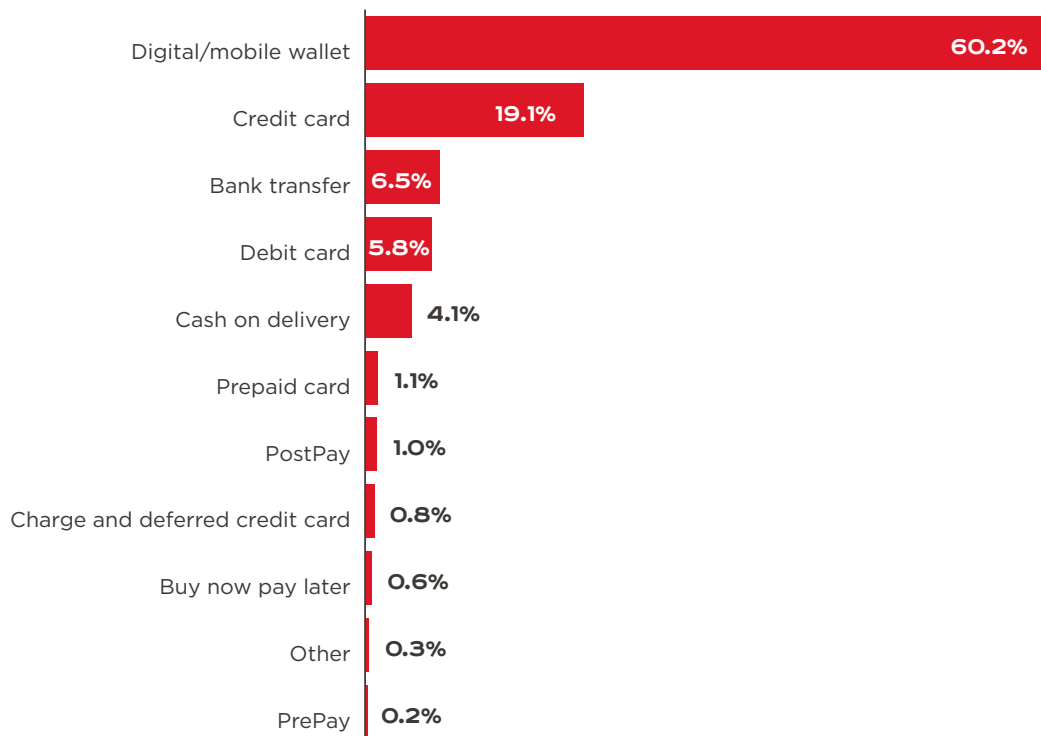34   "Vietnam mobile wallet MoMo raises about $100 million, aims for IPO", Reuters, January 2021
35   "Vietnam's e-commerce market generates $11.8 billion in 2020", VietnamNet, January 2021
36   "Mobile money services step into limelight for unbanked", Vietnam Investment Review, March 2021

Figure 10

Mobile is by far the most popular form of digital payments in Asia Pacific*

Share of total e-commerce transaction volume in Asia Pacific

Payment method	Share
Digital/mobile wallet	60.2%
Credit card	19.1%
Bank transfer	6.5%
Debit card	5.8%
Cash on delivery	4.1%
Prepaid card	1.1%
PostPay	1.0%
Charge and deferred credit card	0.8%
Buy now pay later	0.6%
Other	0.3%
PrePay	0.2%

Source: Statista

* Includes Greater China

Countries in Asia Pacific have started rolling out cross-border digital payment solutions. In August 2021, the State Bank of Pakistan changed foreign exchange instructions pertaining to commercial remittances in order to facilitate cross-border commercial payments. Several other central banks in the region have taken similar steps and formed partnerships to drive cross-border payments. This will be a major boost to digital commerce across the region, by offering users real-time and cost-effective payment solutions for cross-border transactions. Examples of cross-border partnerships announced in 2021 include the following:

- The Monetary Authority of Singapore and the Reserve Bank of India plan to link Singapore's PayNow and India's Unified Payments Interface real-time payment systems by July 2022.

- Bank Negara Malaysia and the Bank of Thailand have launched a cross-border QR payment linkage to enable consumers and merchants in both countries to make and receive instant cross-border QR code payments.

- The Monetary Authority of Singapore and the Bank of Thailand have launched a real-time payment systems link that would allow users of PayNow and PromptPay to send up to SGD1,000 or THB25,000 daily across the two countries using just a mobile number.

- The Monetary Authority of Singapore, the Reserve Bank of Australia, Bank Negara Malaysia and South African Reserve Bank have partnered to build and test the use of central bank digital currencies (CBDCs) for international transactions.

- Bank Indonesia and the Bank of Thailand have launched a pilot phase of cross-border QR payment linkage between Indonesia and Thailand, enabling consumers and businesses in both countries to make and accept instant cross-border QR payments.

- The Bank of Thailand and State Bank of Vietnam have launched a cross-border interoperable QR code payment linkage.

- Thunes, a Singapore-based Fintech company and provider of cross-border payments, has partnered with Bank Alfalah, a leading bank in Pakistan, to enable real-time, affordable cross-border payments to consumers in Pakistan.

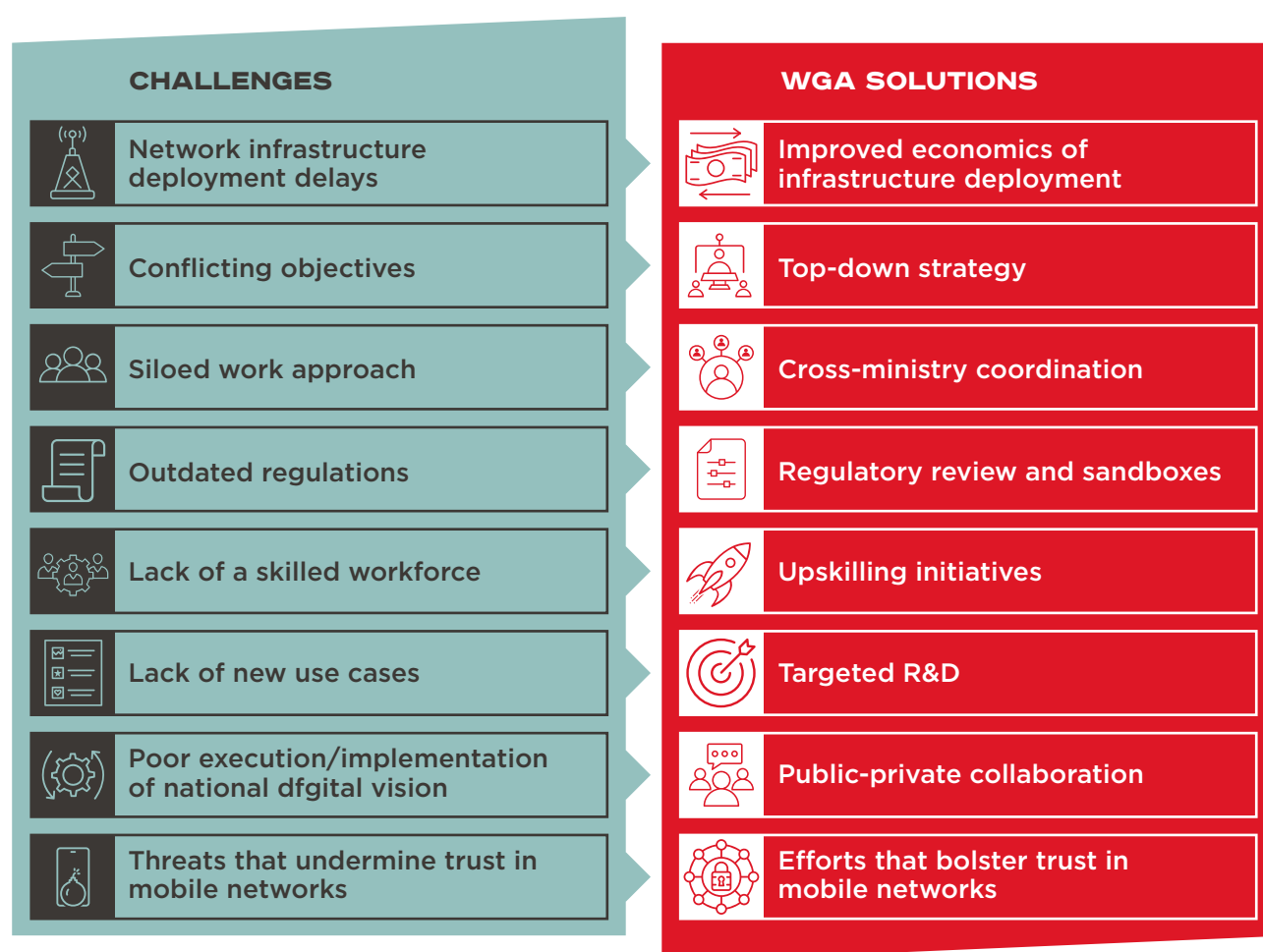# 3 Accelerating progress on the path to digital societies

Over the last decade, Asia Pacific countries have advanced on the path to becoming full-fledged digital societies, as evidenced by the GSMA Intelligence digital society index. However, Covid-19 has highlighted the urgent need to accelerate progress to ensure inclusive growth and development as digital technologies reshape the way people live and transact with the society around them, as well as the way businesses operate and governments address social, economic and environmental challenges in a post-pandemic world.

The task of becoming a digital society is multi-dimensional and involves many different actors from the public and private sectors and non-state institutions. In this context, a WGA is essential to streamline efforts and realise efficiencies in the formulation and implementation of digital society initiatives. A WGA brings together multiple stakeholders and diverse resources to provide a common solution to a particular issue.

The previous report[37] in the GSMA Digital Societies series details the measurable benefits that a WGA can bring to digital societies, particularly around productivity gains and cost savings. It also highlights five key principles for developing and implementing an effective WGA strategy, based on evidence from our survey of government agencies and private sector players across Asia Pacific.

Figure 11

Using WGA to tackle key challenges around digital society initiatives

CHALLENGES	WGA SOLUTIONS
Network infrastructure deployment delays	Improved economics of infrastructure deployment
Conflicting objectives	Top-down strategy
Siloed work approach	Cross-ministry coordination
Outdated regulations	Regulatory review and sandboxes
Lack of a skilled workforce	Upskilling initiatives
Lack of new use cases	Targeted R&D
Poor execution/implementation of national dfgital vision	Public-private collaboration
Threats that undermine trust in mobile networks	Efforts that bolster trust in mobile networks

Source: GSMA

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37   Advancing digital societies in Asia Pacific: a whole-of-government approach, GSMA, 2020

3.1 Refining the components of a digital society – the role of collaboration

How quickly countries progress on the path to full-fledged and inclusive digital societies will be a function of the level of collaboration, from a WGA perspective, across government, the private sector and other non-state institutions. Collaboration is critical in an environment of rapid innovation and ecosystem-oriented businesses; digital services today permeate virtually all industry verticals and can be impacted by policies and activities in multiple sectors of the economy. With 5G and other digital technologies set to shape the emerging post-pandemic world, the case for collaboration in efforts to advance the impact of connectivity on society has never been stronger.

In the context of digital societies, collaboration can bring a number of benefits. Notably, this includes ensuring the interoperability of digital services and platforms, avoiding fragmentation and duplication of efforts, and ensuring inclusivity in the development of digital solutions. Collaboration also ensures stronger results as different players within the ecosystem pool their resources and unique attributes to tackle a particular issue. For example, mobile operators can offer network solutions to quickly deliver digital services to consumers, while high confidence level in governments can help build trust among users in government-backed initiatives. Here, we consider the role that collaboration can play in improving the components of a digital society.

Connectivity

Collaboration is important between public authorities at various levels and network operators to develop and implement a uniform policy around infrastructure deployment, fibre and small cells. The goal here will be to provide access to street furniture and expedite the approval process for their use in order to keep deployment costs in check. In addition, the capital requirements for 5G densification and rural coverage emphasise the need for collaboration between industry players and the right regulatory support to ease the burden of infrastructure deployment. The benefits of voluntary network sharing are well recognised and should be encouraged, along with other regulatory measures such as access to spectrum and fiscal incentives, to ensure the cost-effective rollout of high-performance mobile networks.

Historically, getting timely and affordable right-of-way (RoW) permissions has been the primary concern in the expansion of telecoms infrastructure across many countries in Asia Pacific. This includes India and Pakistan, but recent developments underline efforts by governments in both countries to address this issue:

- In August 2021, The Telecom Regulatory Authority of India (TRAI) released recommendations on broadband connectivity, including the creation of a national portal for RoW permissions, exemption of RoW charges for the next five years and setting up a centrally sponsored scheme to incentivise states for RoW reforms. TRAI released a consultation paper to address issues of small cell deployment and access to street furniture, suggesting the need for a proper regulatory framework to support the deployment of small cells, which will pave the way for 5G deployment.

- In January 2021, the Pakistan Cabinet Committee for Disposal of Legislative Cases approved the Public and Private Right of Way Policy Directive, with the potential to ease the installation and maintenance of telecoms infrastructure throughout the country.

The implementation of these policies and recommendations will require collaboration at all levels of government, including local municipalities, and other stakeholders in the communities where infrastructure will be deployed.

Digital identity

Digital ID is fundamental to a digital society; individuals without a set of validated digital attributes and credentials are at risk of exclusion from a host of public and private services. New technologies, such as blockchain and facial verification, are increasingly being used to develop more efficient and secure digital ID solutions. As digital identity holds the power to unlocking digital services, it can be a target for cyber threats and threats to data privacy. As digital transformation plans continue, it will be incumbent on public and private stakeholders to collaborate and address the new and evolving threats. Collaboration among government agencies and stakeholders in the rollout of digital ID solutions is essential to ensure universal adoption and usage by people and businesses, the development of the underlying technologies and devices, and measures to address various forms of cyber threats.

In South Korea, mobile operators SK Telecom, KT and LG Uplus have jointly launched a driving licence on a mutually available mobile app. The operators collaborated with the Korean National Police Agency and KoRoad to link the service to the country's licence authentication system.[38]

In Singapore, GovTech has driven digital government operations to be integrated in the everyday lives of people in Singapore. GovTech, in conjunction with the Ministry of Health, developed the TraceTogether programme, which supports contact tracing and identification of Covid-19 clusters. Past collaborative efforts include the development of TreesSG, an online map showing the locations and biodata of 500,000 trees in Singapore, and the development of the GoBusiness licensing portal, created by GovTech, the Ministry of Trade and Industry, Smart Nation and Digital Government Office.[39]

To date, most digital identity initiatives have been local in scope. However, a number of initiatives have emerged to implement cross-border digital ID solutions, including in Asia Pacific. For example, Singapore and Australia have signed a memorandum of understanding on digital identity, which could reduce processing time on applications for bank accounts or visas.[40] The use of cross-border digital IDs, which would rely on extensive collaboration, could unlock new opportunities for international trade in the future, even without face-to-face interactions, and help shape global supply chains in a post-pandemic world.

Digital citizenship

As more people warm up to the option of assessing public services and engaging with governments remotely, there is a case to expand the scope, reach and functionality of government services online. In a digital society, e-government services go beyond a government website, which is mainly used for information dissemination, to include open data and a suite of interoperable services and applications from a broad range of public agencies that can be accessed from multiple devices, including mobile.

Singapore's e-government platform SingPass now boasts access to more than 1,400 services from more than 340 organisations in both private and public sectors. Around 4 million local residents have a SingPass account, while transactions processed on the platform doubled during the first year of the pandemic to more than 170 million as people turned to digital platforms.[41] SingPass is a prime example of a digital society initiative based on a WGA. GovTech, the lead agency driving Singapore's Smart Nation initiative and public sector digital transformation, with direct supervision from the Prime Minister's Office, has been empowered to support public agencies to manage enterprise IT operations and develop new digital products for citizens and businesses.

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38 "On the Use of Digital Identity in Asia (3) – Digital Identity in Singapore & South Korea", The News Lens, February 2021; "Korea operators push digital ID with driving licence", Mobile World Live, June 2020
39 See tech.gov.sg
40 "Singapore and Australia economic pact to support cross-border digital ID", Biometric Update, May 2020
41 "Singapore spruces up e-government platform, touts service portfolio", ZDNet, March 2021

Digital lifestyle

The availability of relevant applications to run on internet networks is a key element of digital lifestyle. Covid-19 has spurred the development of applications across a wide range of sectors, notably healthcare, education and entertainment. As mobile operators invest in 5G networks, there is a need for new applications across various use cases to maximise the potential of the technology. Mobile operators have spearheaded collaborative efforts in this regard, mostly through 5G labs that bring together stakeholders from across the digital ecosystem to develop innovative 5G applications for the consumer and enterprise segments.

In Thailand and several other countries in Asia Pacific, cloud gaming and e-sports are a key use case for 5G, leveraging the technology's high-bandwidth and low-latency capabilities. In September 2021, the Thai E-Sports Federation, a body established to manage e-sports in Thailand, revealed that e-sports will be recognised as a professional sport in the country. This development has the potential to unlock mutually beneficial partnership opportunities for various stakeholders, including mobile operators, content developers, clubs and associations, and device vendors.[42]

Digital commerce

Digital commerce has been one of the biggest beneficiaries of the pandemic; e-commerce has experienced a big boost, driven by existing and new users, in virtually every country around the world. It is also one area where the pandemic-induced growth will largely be sustained as the shift in consumer behaviour continues and retailers ramp up investments in their e-commerce services. For example, two of the largest e-commerce companies in the world, Amazon and Alibaba, have recently been expanding their footprint and services across Asia Pacific. Given this trend, collaboration across the public and private sectors will be required to put in place the necessary infrastructure and consumer protections to help build trust and extend access to rural users.

In September 2021, Bangladesh's Ministry of Commerce formed a technical committee to help formulate draft laws in the interest of e-commerce entrepreneurs, buyers and suppliers.[43] Representation from across relevant government agencies and the private sector would help ensure that the process produces enabling regulators to foster the growth of e-commerce services in Bangladesh. The Ministry of Commerce has also initiated a standard operating procedure (SOP) to further improve the e-Commerce system in collaboration with local administrations, using digital labs to train up to 5,000 entrepreneurs.

There is also an opportunity to take a collaborative approach to other enabling factors in a digital society. Two such factors with significant implications for the implementation of digital technologies across society are digital skills and cybersecurity. Addressing the main issues around these factors requires collaboration among multiple stakeholders across the entire digital ecosystem. For example, the government and private sector players in Indonesia have announced a collaborative initiative to train 9 million digital professionals by 2030 as part of the country's digital society ambitions.[44] Meanwhile, building on regional efforts, including ASEAN's establishment of an ASEAN CERT information exchange mechanism,[45] Microsoft has launched the Asia Pacific Public Sector Cyber Security Executive Council, bringing together policymakers from several countries, including Brunei, Indonesia, Malaysia, the Philippines, Singapore, South Korea and Thailand, to combat cyber threats in the region.[46]

42 "Thai government recognises esports as official sport", Esports Insider, September 2021
43 "Bangladesh govt forms 16-member committee for e-commerce sector", Tech Observer Bangladesh, September 2021
44 "Govt, private sector team up to train 9 million digital professionals by 2030", The Jakarta Post, August 2021
45 "1st ASEAN Digital Ministers' Meeting approves Singapore-led initiatives on ASEAN Data Management Framework, ASEAN Model Contractual Clauses for Cross Border Data Flows and ASEAN CERT Information Exchange Mechanism", Ministry of Communications and Information, January 2021
46 "Microsoft pulls together Asian nations to fight regional cyber threats", Channel Asia, May 2021

3.2 CASE STUDIES
Collaborative initiatives to advance digital societies in Asia Pacific
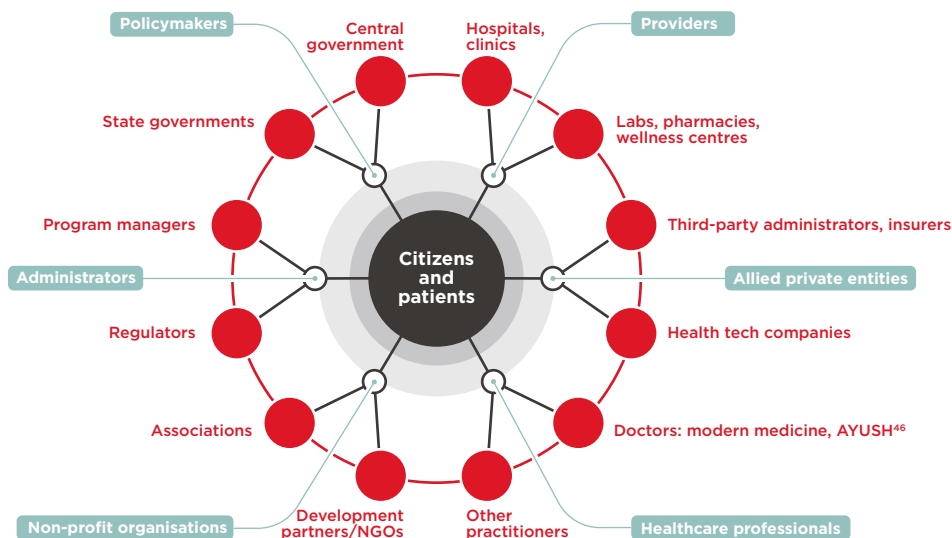
India: using digital technologies to improve healthcare delivery

Background

India's National Health Policy 2017 highlights a 'Health for All' approach to provide assured healthcare for all at an affordable cost. However, with a population of nearly 1.4 billion, ensuring universal access to affordable healthcare poses a major challenge for the government. Prior to Covid-19, healthcare facilities in India had been stretched by large patient loads, a situation that has been exacerbated by the pandemic. This underscores the opportunity to leverage digital technology wherever possible to streamline the operational and clinical processes for healthcare facilities in order to manage the delivery of healthcare services efficiently.

Approach

In September 2021, India's Prime Minister launched the Ayushman Bharat Digital Mission (ABDM) to create a seamless online platform that will enable interoperability within the digital health ecosystem (see below). It seeks to bridge the existing gap among different stakeholders in India's healthcare ecosystem through digital highways. The National Health Authority (NHA) will implement the programme, a task that will require a WGA and collaboration across the entire healthcare ecosystem and beyond.

The ABDM has four components, all relying on digital technology for efficient operations:

- **Health ID** enables users to access and share health records digitally.
- **Health Facility Registry** is a comprehensive repository of all the health facilities of the country across different systems of medicine.
- **Health Records** is a digital application through which patients can maintain and manage their health information (and that of others for whom they are authorised) in a private, secure and confidential environment.
- **Healthcare Professionals Registry** is a comprehensive repository of all healthcare

professionals involved in the delivery of healthcare services across both modern and traditional systems of medicine.

Impact

The ABDM was successfully piloted in six union territories for one year, ahead of the nationwide rollout in September 2021. As of 14 October 2021,[48] the system had registered:

- 130.2 million health IDs
- 1,538 approved health facilities
- 3,212 approved doctors
- 131,965 Health Records app downloads.

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47 The Ministry of Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy (AYUSH) is purposed with developing education, research and propagation of indigenous alternative medicine systems in India.
48 See https://ndhm.gov.in/

Malaysia: building a world-class drone industry

Background

Malaysia's drone industry has been growing for several years, with applications across a range of use cases, including security, remote monitoring, industry inspection, safety and logistics. Between 2015 and 2019, 46,876 drones registered with SIRIM, a state-owned corporate organisation under the Ministry of International Trade and Industry. Another 10,000 units were registered in 2020 alone.[49]

To take advantage of the opportunities in a rapidly growing market, the government is accelerating a strategy to become a centre for drone research and development through the activities of several ministries and agencies, including the Malaysia Digital Economy Corporation (MDEC), the National Technology and Innovation Sandbox (NTIS), and the Malaysia Technology Development Corporation (MTDC).

Approach

In view of the technical requirements, scope of applications, and implications for the aviation sector, Malaysia's drone ambition is based on a WGA, with collaboration among key stakeholder groups in the following areas:

- **Research and innovation:** MDEC partnered with Futurise Sdn Bhd, a government-owned company under the Ministry of Finance, to build Malaysia's first Deregulated Drone Testing Zone in Cyberjaya. MDEC is also working closely with local businesses and AirMap, an unmanned aircraft systems (UAS) software provider, to build a UAS traffic management platform for the Malaysian drone ecosystem.

  In December 2020, Iskandar Investment Berhad launched DRZ Iskandar, the first drone and robotics zone in Southeast Asia, which brings together 46 local and international companies to jointly grow and develop the Malaysian drones ecosystem. Researchers, innovators, startups and high-tech entrepreneurs will be able to test their products, services, business models and delivery mechanisms in a live environment. This controlled sandbox is led by the Malaysian Global Innovation and Creativity Centre as the lead secretariat of NTIS, with the support of MTDC. DRZ Iskandar is projected to attract up to MYR351 million ($84 million) in investment and generate over 1,000 high-value jobs in drones and robotics by 2025.

- **Use cases:** Local entrepreneurs and SMEs are being encouraged to explore opportunities in several industrial verticals, including agriculture, construction, energy, healthcare, infrastructure and public safety.

- **Safety and regulations:** In March 2021, the Civil Aviation Authority of Malaysia issued civil aviation directives (CADs) covering three areas: remote pilot training organisations; agricultural unmanned aircraft system operations; and special unmanned aircraft system projects. Additionally, the establishment of a multi-agency committee consisting of all national and state-level stakeholders to process applications received in accordance with the new CADs are expected to support the sustainable development of the industry by streamlining the requirements of each agency and reducing the application processing time.

- **Connectivity:** In August 2021, the GSMA and DRZ Iskandar co-hosted a workshop to explore opportunities for collaboration between the mobile, aviation and drone industries. 5G holds the promise of enabling faster deployment of drones at far larger scales, and supporting an increasingly diverse number of applications.

Impact

Malaysia's collaborative WGA in the advancement of drone services has facilitated the implementation of new applications across sectors, particularly during the Covid-19 pandemic, such as the following:

- Police in Malaysia are using drones to detect people with high temperatures in public spaces as part of Covid-19 prevention measures;

- Two companies based at DRZ Iskandar – MATA Aerotech and Garuda Robotics – have developed innovative solutions for the agriculture and healthcare sectors. MATA Aerotech's smart agricultural solution uses aerial imagery and AI in agriculture management and operations to enhance national food security, while Garuda Robotics is working on rapid drone delivery of automated external defibrillators from the hospital to a heart-attack victim as a first responder to emergency calls.

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49   "New unmanned aircraft systems directives to take effect March 1, says minister", Malay Mail, February 2021

Pakistan: closing the gender gap in digital skills

Background

The Digital Pakistan Policy[50] outlines the broad vision for digital technologies to become a strategic enabler for a knowledge-based economy and to spur socioeconomic growth in the country. One of the key objectives of the policy is to initiate specific ICT programmes for women and girls for imparting digital skills to reduce inequalities, provide decent work and promote economic growth in line with relevant UN Sustainable Development Goals (SDGs). To meet this objective, the government of Pakistan has embarked on several initiatives to increase the participation of women and girls in the digital economy, including the launch the ICT for Girls programme in 2018, which trains women and girls in computing skills.[51]

Approach

The ICT for Girls programme has been implemented by the Ministry of IT and Telecommunications, through the Pakistan Universal Service Fund (USF), in collaboration with the Federal Directorate of Education (FDE), an agency under the Ministry of Federal Education and Professional Training, and Pakistan Bait-ul-Mal (PBM). The USF provided funds for the project, the FDE provided space, infrastructure and facilitation to implement the programme, and PBM recruited ICT teachers for the labs. Private contractors Analytical Solutions Ltd and Computer Marketing Company were selected to provide computers and other equipment.

The implementation of the programme has led to the three partners working together in the following areas:

- **Establishing computer labs in women empowerment centres:** ICT model labs have been established in 144 women empowerment centres and other educational institutions, with the capacity to train over 15,000 girls annually.

- **Establishing computer labs in government institutions for girls in Islamabad Capital Territory:** 226 schools of Islamabad have been provided with ICT model labs, with the capacity to train over 110,000 female students annually.

- **Providing qualified teachers:** Over 200 teachers have also been provided to these institutions.

- **Training teachers:** In partnership with Facebook, UN Women and Microsoft Pakistan, the teachers were trained in the following areas:

  - Microsoft: ICT skills under Microsoft's Train the Trainer course.

  - UN Women: training on various aspects of entrepreneurship.

  - Facebook: training on digital safety and entrepreneurship under its SheMeansBusiness initiative.

Impact

The ultimate goal of the programme is to decrease gender disparity, reduce exclusion and increase the ICT-literate workforce. Findings from a report[52] assessing the initial impact of the programme show that, among other findings, the use of computers and internet has made a positive impact on the students and has equipped them with knowledge and confidence. Students have also shown a higher interest in an IT-focused career, which would help in broadening their career choices.

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50 See Digital Pakistan Policy
51 See https://usf.org.pk/projects/detail/special-project/ICTforGirls
52 Establishment of computer labs in 226 FDE schools for Girls, USF, 2020

Singapore: aiming for global leadership in 5G applications and services

Background

Back in 2019, the Infocomm Media Development Authority (IMDA) shared its vision for Singapore to be a global 5G leader with the deployment of 5G SA networks. This would be achieved by facilitating early 5G deployment, based on SA networks, and supporting innovation in secure 5G applications and services. Singapore's 5G deployment strategy was designed to achieve four policy objectives: maximising value of 5G for the economy and citizens' welfare; facilitating efficient allocation of scarce spectrum resource; designing trusted and resilient 5G networks; and supporting the growth of a vibrant telecoms sector.

Approach

Singapore has adopted a multi-pronged and collaborative approach to realise its 5G objectives, with a notable focus on the following areas:

- **Regulatory framework to drive timely, cost-effective and robust 5G network rollout:** The IMDA adopted a call for proposal (CFP) approach to award 5G spectrum instead of a typical spectrum rights auction approach, with a focus on resilient and secure full-fledged 5G SA networks. In May 2020, it awarded 5G licences to Singtel and a joint venture set up by StarHub and M1. They were each allocated 100 MHz of spectrum in the 3.5 GHz band, with a commitment to achieve nationwide coverage by 2025.

- **5G skills development:** The IMDA partnered with mobile operators to hire and reskill 1,000 professionals to support the 5G rollout. The collaborative effort aims to equip 5,000 professionals with the required 5G skills over a three-year period.

- **Innovation and ecosystem development:** The IMDA launched two support programmes to develop the 5G innovation ecosystem in Singapore. In 2019, trial projects with a $40 million fund were launched in the areas of maritime operations,

cloud gaming, smart estates and urban mobility. In January 2021, a $30 million programme was launched to accelerate the adoption and commercialisation of 5G applications and solutions. A number of government- and industry-led 5G testbeds have been set up across Singapore to support research and innovation work by research institutes and industry verticals, and to develop and build manpower capability in 5G.

- **Leadership and communication:** The IMDA has set up a 5G programme office to drive and orchestrate its 5G communications and connectivity programmes to ensure holistic, coordinated development. At Asia Tech x Singapore 2021, the IMDA and the National Research Foundation announced a $50 million investment to support cutting-edge communications and connectivity research through the Future Communications Research and Development Programme (FCP). The aim is to translate communications and connectivity research into innovative products, services and companies.

Impact

In 2021, Singtel and M1 successfully launched 5G SA networks, with plans to ramp up network coverage and develop innovative use cases across consumer, enterprise and government sectors. For example, M1 plans to extend coverage of its 5G SA network to about 75% of the country by the end of the 2021, with the rest to be covered by the end of 2022. Singtel has announced collaborations with a variety of enterprises to develop 5G-enabled solutions, including:

- a partnership with Formula Square to deliver an immersive, lag-free remote racing experience
- a partnership with S.E.A. Aquarium for an underwater 5G livestream in 4K resolution
- a partnership with the National Gallery Singapore and the Esplanade to deliver cultural and art experiences over 5G.

South Korea: leveraging 5G for smart manufacturing

Background

Covid-19 has had a significant impact on the manufacturing sector, with factories having to close due to social distancing measures and disruptions to global supply chains. As a result, many advanced digital societies view smart manufacturing – which refers to fully integrated, collaborative manufacturing systems that respond in real time to changes in demand, the supply network and customer needs – as a way to build resilience in the manufacturing sector.

Before the pandemic, South Korea's Ministry of Trade, Industry and Energy had outlined plans to extend smart factory technology to SMEs, which make up 99% of companies in the country, with a target of 30,000 smart factories by 2025. Meanwhile, the Ministry of SMEs and Startups has launched an initiative to encourage companies to reshore production because of the disruptions to manufacturing during the pandemic.

Approach

The South Korean government has demonstrated leadership through a WGA to realise its targets for smart manufacturing, such as in the following areas:

- **R&D:** In 2020, the government injected $414.4 million into R&D projects to incentivise SMEs to advance and upscale automated technologies. The government is also sponsoring research and testbed projects in several technologies, including big data, cyber physical systems, smart sensors, wireless networks and collaboration robots.

- **Infrastructure support:** South Korea's Institute of Science and Technology Information has developed a cloud-based facility to allow Korean manufacturing SMEs' access to online high-performance computing-powered computer-aided design, computer-aided engineering and other modelling and simulation software tools.

- **Skills:** The government has committed to providing support to help train 40,000 skilled workers to operate fully automated manufacturing sites through various educational programmes.

- **Fiscal incentives:** The South Korean government is offering to increase assistance from KRW300 million ($253,000) to KRW500 million for reshoring firms that build smart factories or utilise industrial robots.

Beyond government initiatives, mobile operators in the country are leading collaborative efforts with enterprises across different sectors to develop smart factory solutions, using their 4G and 5G networks, such as the following:

- SK Telecom has introduced a subscription-based smart factory service for SMEs running on its 5G network, providing local manufacturing companies with customised big data analysis. The solution is expected to reduce costs by 15%, while AI-based predictive maintenance could extend the lifespan of equipment by over 20%.

- KT Corp is supplying a 5G-controlled industrial robot for packaging processes which can cut down packaging times by 28%. It is also developing a 5G-based smart factory management solution with American computer vision firm Cognex, which will offer real-time product monitoring, a cloud platform, deep-learning analysis and production process notification alarms.

- LG Uplus has partnered with the township of Gumi to fully deploy its 5G coverage across the city's industrial manufacturing hub. It will offer its own smart factory solutions to SMEs in the area.

Impact

A survey of 5,003 companies conducted in 2019 by the Korea Smart Manufacturing Office found that smart factories improved productivity by 30%, reduced the defect rate by 43.5%, cut manufacturing cost by 15.9%, improved delivery date compliance rate by 15.5% and reduced industrial accidents by 18.3%. 5G and the enhanced capabilities it brings offer the opportunity to accelerate progress on South Korea's smart manufacturing ambitions.

4 Building collaborative partnerships to advance digital societies in Asia Pacific
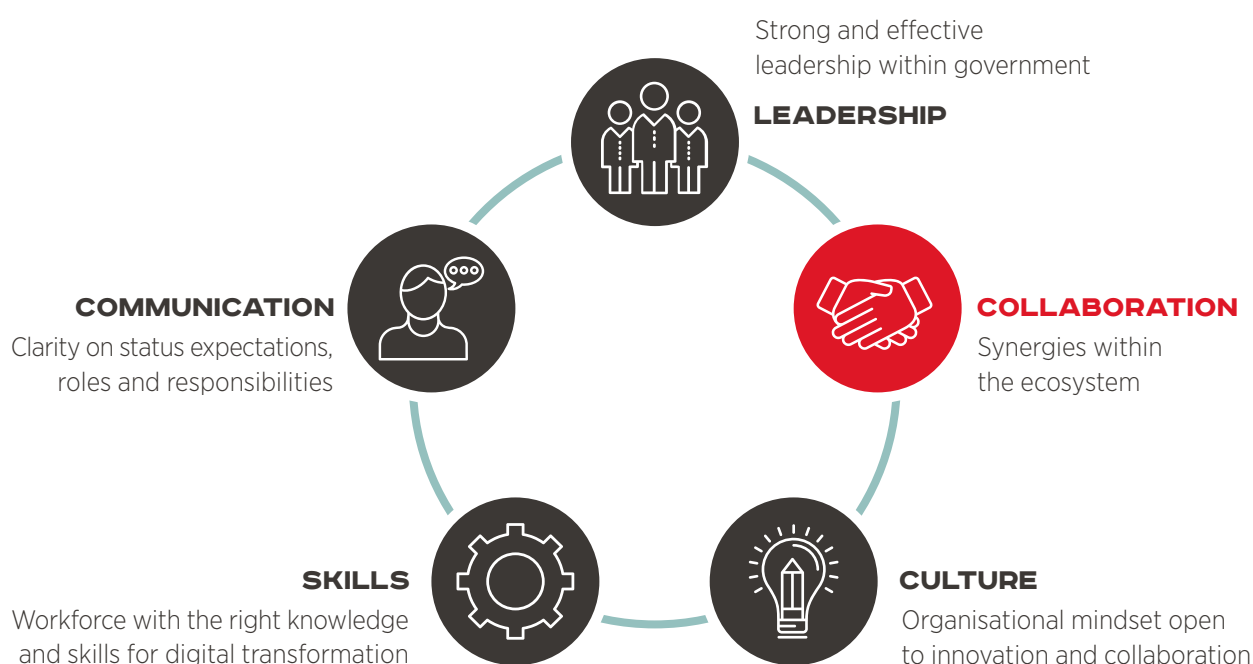
The global response to the Covid-19 pandemic has demonstrated the importance of cooperation in tackling big issues in society. United by a shared mission to address the pandemic, governments and policymakers, private sector players, academia, NGOs, and multilateral organisations exhibited agility amid the crisis by forging new partnerships to achieve an effective response in controlling the spread of the virus and in developing vaccines. The task of advancing the digital society calls for similar levels of collaboration, given the critical role of digital technologies to society's wellbeing.

Collaboration is one of five principles for developing and implementing an effective WGA strategy. The importance of collaboration to a WGA is further established by its impact on the other four principles: collaboration within organisations and among organisations is essential to deliver effective leadership, to move away from siloed work cultures, to drive reskilling and upskilling initiatives, and to ensure an open channel of communication among stakeholders.

Figure 12

Collaboration is a vital principle of WGA and one that impacts the other principles

Strong and effective leadership within government
LEADERSHIP

COLLABORATION
Synergies within the ecosystem

CULTURE
Organisational mindset open to innovation and collaboration

SKILLS
Workforce with the right knowledge and skills for digital transformation

COMMUNICATION
Clarity on status expectations, roles and responsibilities

Source: GSMA Intelligence

The expectation for greater collaboration within the digital ecosystem is widely shared among key stakeholders. This bodes well for future efforts to build new partnerships and expand existing ones. Here, we highlight five key ingredients that can facilitate the development of effective collaborative partnerships around digital society initiatives.

Government leadership

Within a successful WGA, government leadership is essential. Governments and policymakers have a responsibility to create an enabling environment that encourages collaboration. This could include formulating policies that allow collaboration (within the boundaries of competition laws) and incentivising collaboration through fiscal and non-fiscal means. The ASEAN Digital Masterplan 2025, which was adopted by member states in January 2021, highlights the need to strengthen collaboration with relevant sectoral bodies to work out pan-ASEAN arrangements to foster digital trade and consumer trust.[53] Governments can take the lead or actively participate in collaborative partnerships involving multiple stakeholders. Such a show of commitment can boost investor confidence as well as help build public trust. For example, South Korea's Ministry of Science and ICT has facilitated enabling conditions for mobile operators SK Telecom, KT and LG Uplus to share their 5G networks in remote coastal and rural towns across the country with the aim of accelerating the rollout of 5G networks.[54]

Clarity on shared purpose and objectives

Partners must be aligned on their purpose and objectives, and the right expectations must be established from the outset to ensure effective collaborations. This is essential to create and sustain the momentum required to move forward, create energy and engagement, and foster the emergence of collective intelligence. Given the significant impact of digital technologies on society's wellbeing, there are compelling reasons for stakeholders across the ecosystem to collaborate. Within the last two years, Covid-19 has driven many collaborative efforts to leverage the power of connectivity and digital applications. For example, Thailand's Department of Medical Services has outlined an objective to introduce enhanced smart services that apply integrated digital technologies using 5G infrastructure, artificial intelligence, big data and cloud edge computing. The agency has partnered with Huawei to jointly explore the benefits of 5G in the healthtech field, working with the National Cancer Institute and Rajavithi Hospital to increase the efficiency of medical services and operations.[55]

Measurable benefits for all partners

One of the main drivers of collaborative partnerships is the potential to create synergies. This could be around producing a greater effect from the combination of efforts as well as realising greater efficiencies in resource utilisation. These benefits should be measurable, made explicit and spread widely among the various partners. Ensuring mutual benefits is the basis for building enduring commitments from the partner organisations. For example, the Australia–Malaysia Tech Exchange, which was launched in May 2021 by the Australian Trade and Investment Commission and MDEC, outlines mutual benefits for organisations in Australia and Malaysia from the partnerships on digital transformation. These include strengthening the tech ecosystems in both countries for shared success, promoting upskilling opportunities to meet increasing demand for digital solutions and facilitating two-way investment opportunities.[56]

53   "ASEAN Digital Master Plan 2020", ASEAN, 2021
54   "Korean carriers ink deal to share 5G infra in remote areas", RCRWireless, April 2021
55   "Huawei in 5G partnership with hospitals", Bangkok Post, September 2021
56   "Malaysia and Australia enhance technology collaboration", Austrade, May 2021

Low entry barriers for new partners

Given the multidimensional nature of digital technologies, there should be scope for collaborative partnerships to welcome new members to add value and share risks in the partnership. This can help produce further synergies and avoid a duplicated and fragmented approach to tackling a common problem. For example, Singapore's Housing and Development Board and Agency for Science, Technology and

Research have partnered to develop and adopt 5G-enabled smart construction technologies and to facilitate partnerships and commercialisation of the research outcomes developed by agencies under the Ministry of National Development for operational use. A key focus of the partnership is to facilitate more public sector collaboration with industry, with the potential to bring in new partners.[57]

Diversity of ideas

Collaboration has the potential to bring together organisations from diverse backgrounds, such as the public sector, the private sector and the development community. The differing viewpoints of stakeholders on a particular issue of common interest can produce a net positive outcome and lead to better and more inclusive decision-making. For example, to maximise the potential benefits of 5G, collaboration between

a wide range of stakeholders – including mobile operators, public-sector agencies, cloud providers, large and small enterprises, venture capitalists, device vendors, and startups – is crucial to create a scalable 5G ecosystem. Diverse stakeholders working together on an issue of common interest has the potential drive innovation and produce better outcomes for society.

Looking ahead

Digital transformation was already well underway in Asia Pacific, and it has been greatly accelerated due to the effects of Covid-19. Collaboration, a key component of a WGA, has the potential to encourage deployment and uptake of connectivity, develop new ecosystems, and drive adoption among consumers and businesses. The inherent power of connectivity is its ability to overcome obstacles such as distance and time, bringing people, places and things together in a way never seen before. A culture of collaboration is therefore key to fully harnessing the benefits offered by a digital society. Stakeholders who understand and adopt this will continue to push forwards, while those who do not risk being left behind.

Governments and the broader digital ecosystem must work together to identify and tackle emerging threats to the full realisation of digital society ambitions. These include a growing digital skills gap, especially among older populations, as new applications and solutions come to market, and concerns around trust in the internet, in large part driven by issues around cybersecurity, data privacy and misinformation.[58] Continuous multi-stakeholder engagement to address these issues can enhance trust in the online environment in the hopes that no one is left behind on the journey to becoming full-fledged digital societies.

57 "HDB and A*STAR ink collaborations to advance smart construction technologies and facilitate partnerships in technology transfer", A*STAR, March 2021
58 Exploring online misinformation and disinformation in Asia Pacific, GSMA, 2021

Appendix:
Index methodology

Digital society metrics

The index uses the five main components of a digital society – connectivity, digital identity, digital citizenship, digital lifestyle and digital commerce – to show the progress of a country along its path to becoming a full-fledged digital society. The metrics of the digital society index rely on 49 indicators across the five main components. Each component consists of the following dimensions, number of indicators and corresponding weighting of indicators:

1 **Connectivity:**
   a Mobile infrastructure – 4 indicators (25% weighting)
   b Network performance – 3 indicators (25% weighting)
   c Spectrum – 4 indicators (25% weighting)
   d Other enabling infrastructure – 4 indicators (25% weighting)

2 **Digital identity:**
   a Availability and usage of identity and digital identity – 4 indicators

3 **Digital citizenship:**
   a Provision of public services through digital channels – 4 indicators

4 **Digital lifestyle:**
   a Access and use of smart devices – 4 indicators (30% weighting)
   b Solutions beyond core communications into consumer IoT – 5 indicators (20% weighting)
   c Solutions beyond core communications into enterprise IoT – 7 indicators (20% weighting)
   d Locally relevant content online – 5 indicators (30% weighting)

5 **Digital commerce:**
   a Financial inclusion – 1 indicator (45% weighting)
   b Online commerce – 3 indicators (45% weighting)
   c Digital trade – 1 indicator (10% weighting)

Connectivity is measured across four dimensions:

1 **Mobile infrastructure:** 2G, 3G, 4G and 5G network coverage.

2 **Network performance:** Average mobile upload/download speeds and latency.

3 **Spectrum:** Digital dividend from the release of 700 MHz spectrum for mobile use, and the amount of sub-1 GHz, 1–3 GHz and above-3 GHZ spectrum used for mobile services per operator.

4 **Other enabling infrastructure:** Access to electricity, international bandwidth per internet user, the number of secure[59] internet servers per capita and internet exchange points per 10 million people.

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59   Secured by publicly trusted TLS/SSL certificates

Digital identity is measured across one dimension:

1 **The existence of formal identity systems and digital identities:** Assessed on whether there is a national identity system in the country and the number of people registered. This dimension also considers whether a country's citizens use their digital identities, if available, to access online services, and whether the country has a framework for data protection and/or data privacy.

Digital citizenship is measured across one dimension:

1 **The provision of public services through digital channels:** The availability and quality of online and e-government services, as well as the extent to which citizens use them.

Digital lifestyle is measured across four dimensions:

1 **Access and use of smart devices:** The rate of smartphone adoption, the share of licensed cellular IoT connections as a percentage of total connections, the cost of entry-level internet-enabled handsets and the gender gap ratio for mobile phone ownership.

2 **Solutions beyond core communications into consumer IoT:** IoT connections per capita (or per vehicle/household where relevant) in the following categories: consumer electronics (smart TV, home entertainment, personal entertainment and set-top box); smart home (home appliances, home infrastructure, home security and energy monitoring); wearables (fitness trackers and smart watches); smart vehicles (connected cars, connected bikes and insurance telematics); and other (drones, robots and trackers for children, the elderly and pets).

3 **Solutions beyond core communications into enterprise IoT:** IoT connections per capita in the following categories: smart city (public transport, surveillance, electric vehicle charging, street lighting, parking and waste management); smart utilities (energy, water and gas smart metering, and smart grids); smart retail (points of sale, digital signage, vending machines and ATMs); smart inventory (inventory tracking, monitoring and diagnostics and warehouse management); smart buildings (heating and air conditioning, security, lighting, hot desks and office equipment); health (remote monitoring of medical devices and emergency vehicle infrastructure); and other (fleet management and applications in agriculture, oil, mining and construction).

4 **Locally relevant content:** The proportion of the population who are active users of social media, the use of internet for entertainment purposes, the number of apps developed per internet user, the number of apps available in the first language of a country and the proportion of the country's population with accessible apps in their first language.

Digital commerce is measured across three dimensions:

1 **Financial inclusion:** The percentage of mobile subscribers that use mobile financial services (mobile banking and/or mobile money).

2 **Online commerce:** The preparedness of an economy to support online shopping, the share of adults that have ordered or purchased goods online and the performance of national logistics networks.

3 **Digital trade:** This dimension analyses legislation on the acceptance of digital signatures in index countries.

Building the index

The process for building the index consisted of determining the relevant data for the five components, identifying the 49 indicators, normalising the data, addressing missing data and calculating the composite of the measures. For all the indicators, the index used the latest data available at the time of research and took the values for each indicator from the same year.

The creation of the index required a complete dataset, so the imputing of variables used a 'hot-deck' method of imputation to imply a value for a country by taking the value of a similar country.

The indicators had different units and scales, so the index normalised any indicator that did not use a 100-point scale to make the indicator values comparable and to construct aggregate scores for each country. For indicator values that required normalisation, the process set minimum and maximum values to transform the indicators into indices between 0 and 100 using the following formula:

Normalised value = ((actual value – minimum value) / (maximum value – minimum value)) × 100

After normalisation of the necessary values, the index became a composite of the five components on a 100-point scale, according to the weights in the indicator table above, with 1 representing the worst situation and 100 the best. This normalisation allows comparison of the countries' scores for each category. To calculate the overall score, the index used the sum of the indicators within each component while taking into consideration each indicator's weighting.

The data for the index came from a variety of sources, including the World Bank, United Nations, World Economic Forum, Economist Intelligence Unit, the creative agency 'We are Social', the automotive trade association Organisation Internationale des Constructeurs d'Automobiles (OICA), Tarifica, app analytics company Appfigures and GSMA Intelligence. The majority of the datasets consists of factual data such as rates of smartphone adoption; some data sources rely on more subjective inputs, such as from the UN E-Government Index, which assesses different aspects of e-government services.

Changes to the index

To ensure the digital society index continues to reflect the latest technological developments, the model is reviewed each year before being updated. New indicators were added to this year's index, including the following:

- Within the connectivity pillar, indicators measuring the share of population in the country covered by 5G networks and the spectrum assignments in bands above 3 GHz.

- Within the digital identity pillar, an indicator was revised to include analysis on the use of biometric data for digital authentication.

- Within the digital lifestyle pillar, indicators analysing the cost of entry-level internet-enabled handsets, the gender gap ratio for mobile phone ownership and the use of the internet for entertainment purposes.

- Within the digital commerce pillar, indicators analysing the performance of national logistics networks and legislation on the acceptance of digital signatures in index countries.
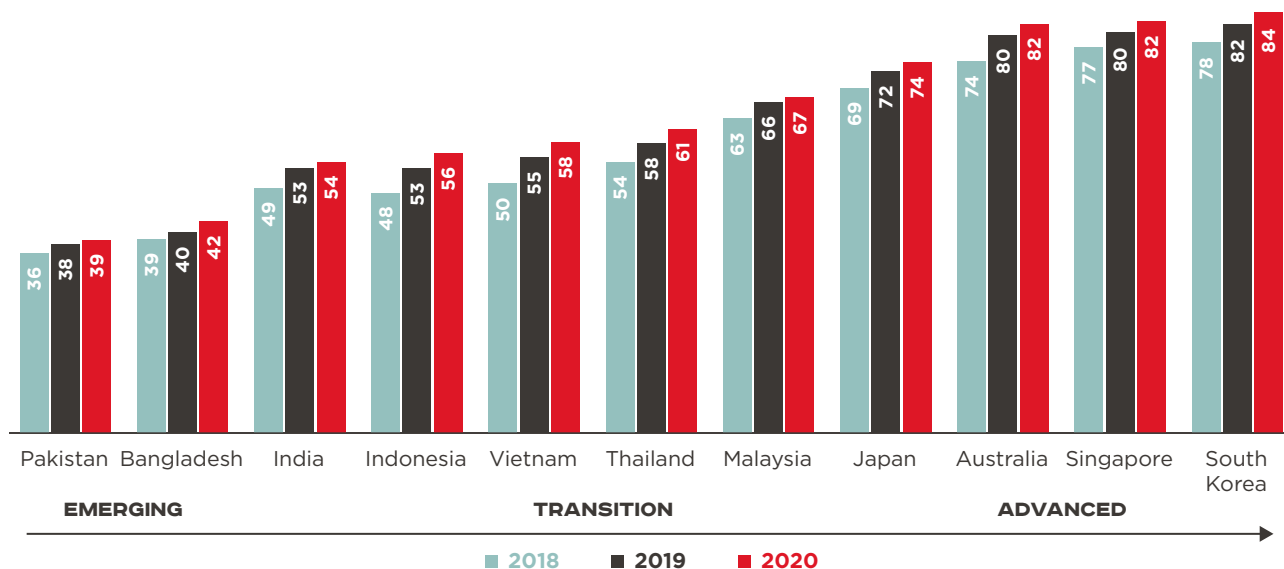
Several indicators have also been removed from this year's digital society index, as they have become less relevant to the actualisation of digital societies. Indictors removed include the following:

- Within the connectivity pillar, an indicator measuring the number of years since 3G networks launched.

- Within the digital lifestyle pillar, an indicator measuring the index score for online services and an indicator analysing the number of generic top-level website domains per capita.

- Within the digital commerce pillar, indicators looking at the number of commercial bank branches and ATMs per capita, as well as the degree of ownership for credit cards and debit cards. Indicators looking at the share of the adult population that has sent or received the following online: domestic remittances, utility bills, wages, government transfers of benefits and taxes, and payments for agricultural products.
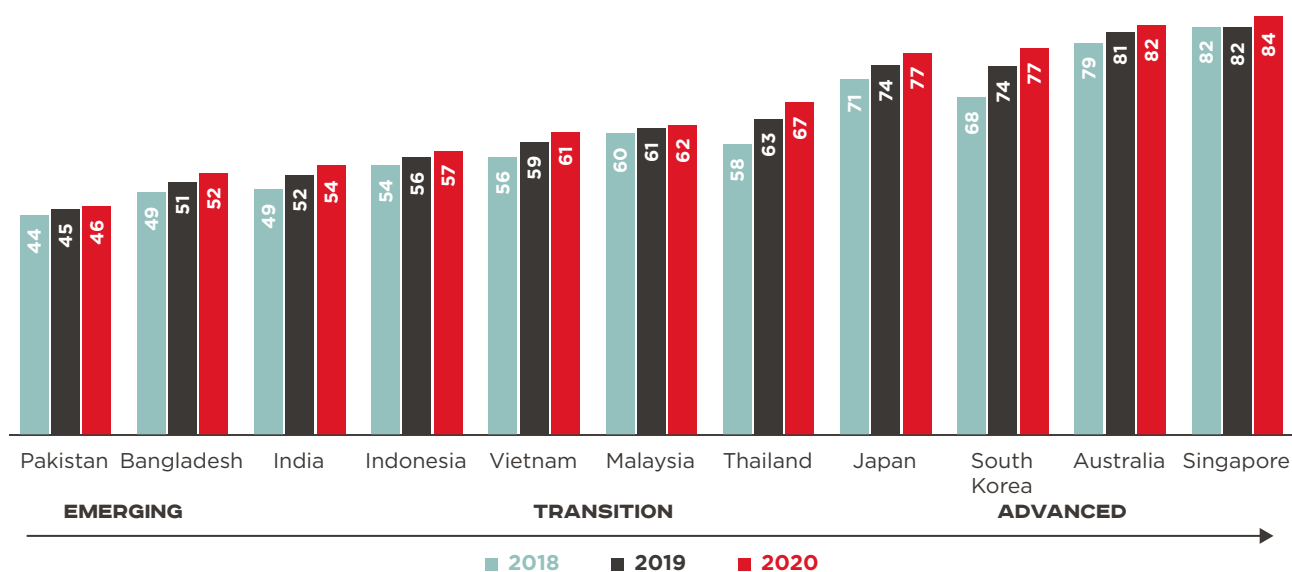
2018–2020 scores[60] for the digital society index

Digital society scores

	2018	2019	2020
Pakistan	36	38	39
Bangladesh	39	40	42
India	49	53	54
Indonesia	48	53	56
Vietnam	50	55	58
Thailand	54	58	61
Malaysia	63	66	67
Japan	69	72	74
Australia	74	80	82
Singapore	77	80	82
South Korea	78	82	84

EMERGING · TRANSITION · ADVANCED

■ 2018 ■ 2019 ■ 2020

Source: GSMA Intelligence

Figure A2

Connectivity scores

	2018	2019	2020
Pakistan	44	45	46
Bangladesh	49	51	52
India	49	52	54
Indonesia	54	56	57
Vietnam	56	59	61
Malaysia	60	61	62
Thailand	58	63	67
Japan	71	74	77
South Korea	68	74	77
Australia	79	81	82
Singapore	82	82	84

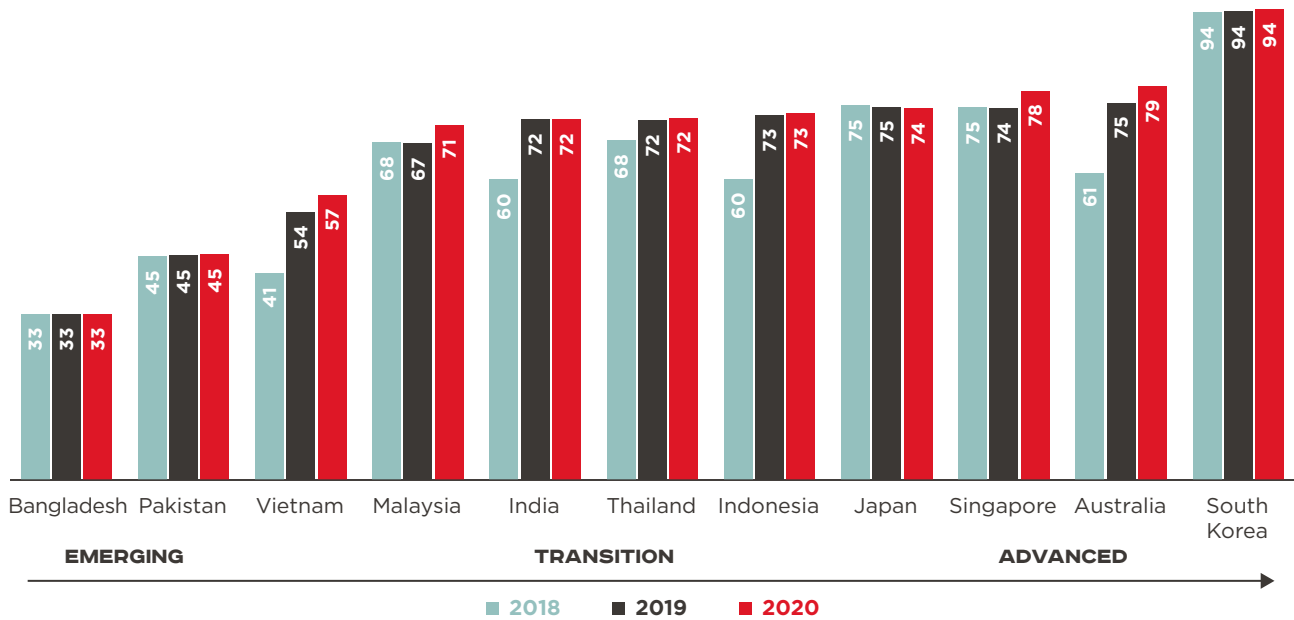EMERGING · TRANSITION · ADVANCED

■ 2018 ■ 2019 ■ 2020

Source: GSMA Intelligence

60   No data is available for some indicators of the revised index for earlier years.

Figure A3

Digital identity scores
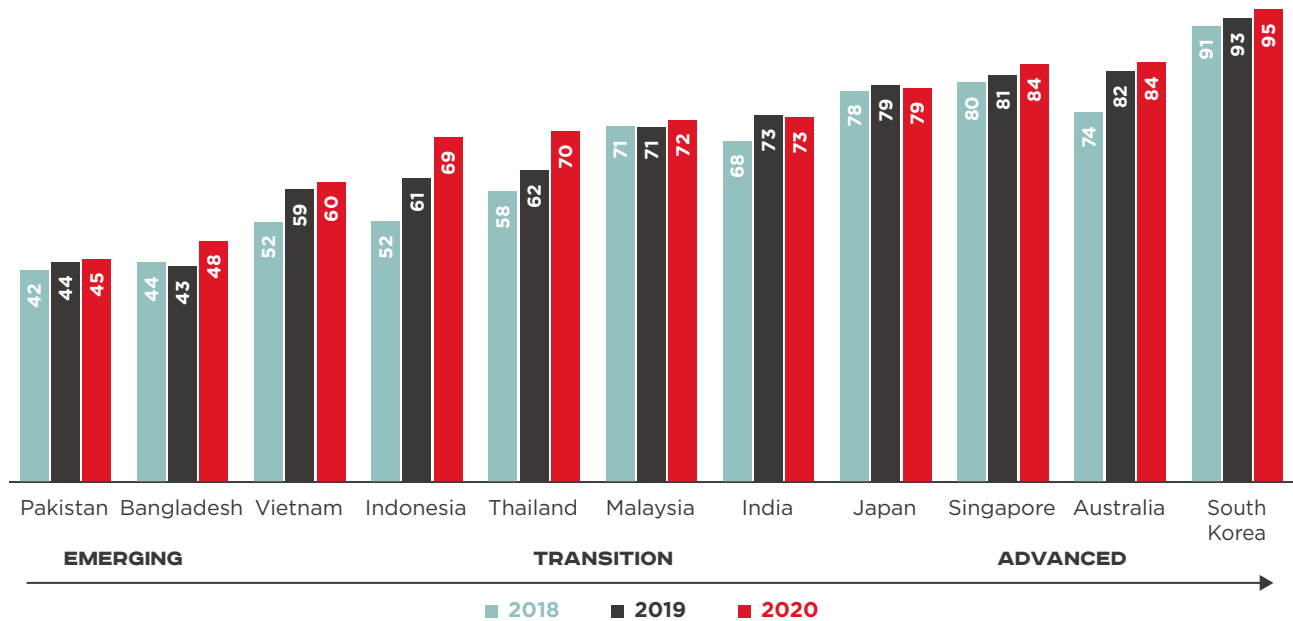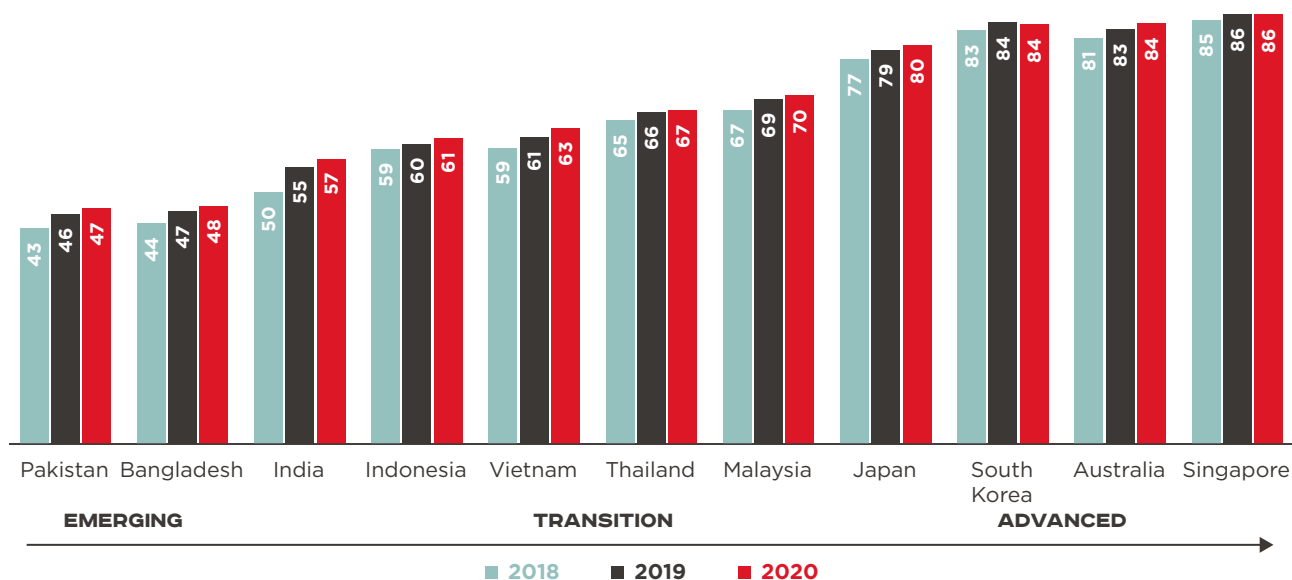

EMERGING   TRANSITION   ADVANCED

■ 2018   ■ 2019   ■ 2020

Source: GSMA Intelligence

Figure A4

Digital citizenship scores

EMERGING   TRANSITION   ADVANCED

■ 2018   ■ 2019   ■ 2020

Source: GSMA Intelligence

Figure A5

Digital lifestyle scores

	EMERGING			TRANSITION				ADVANCED		
	Pakistan	Bangladesh	India	Indonesia	Vietnam	Thailand	Malaysia	Japan	South Korea	Australia	Singapore

2018 ■ 2019 ■ 2020

Source: GSMA Intelligence

Figure A6

Digital commerce scores

	EMERGING			TRANSITION				ADVANCED		
	Pakistan	Bangladesh	India	Indonesia	Thailand	Vietnam	Japan	Malaysia	Singapore	Australia	South Korea

2018 ■ 2019 ■ 2020

Source: GSMA Intelligence

gsma.com