Advancing digital societies in Asia Pacific: a whole-of-government approach

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Preface

This is the fifth report in the GSMA Digital Societies series, tracking the progress of countries in Asia Pacific on the path to becoming fully fledged digital societies. We evaluate the progress of 11 countries (Australia, Bangladesh, India, Indonesia, Japan, Malaysia, Pakistan, Singapore, South Korea, Thailand and Vietnam) against five key components of a digital society: connectivity, digital identity, digital citizenship, digital lifestyle and digital commerce.

The 2019 report introduced the concept of digital platforms, which brings the key components of a digital society together by facilitating interactions across all areas of the digital ecosystem, from networks and service providers to consumers and myriad connected things. Such platforms create value through network effects as more members participate; they also cut across traditional organisational structures, silos, policies and technologies to provide a seamless user experience.

The 2020s will be pivotal for Asia Pacific countries in the digital society journey. During this decade, the growing emphasis on intelligent connectivity means that digital technologies will play an even more crucial role in enhancing societies and economies. This period also coincides with the Covid-19 pandemic, which will in part be defined by the accelerated shift to digital platforms for work and social activities, and the realisation of the fourth industrial revolution (also known as Industry 4.0) as people, businesses and governments seek to curb the transmission of Covid-19 and hasten economic recovery following the slowdown caused by the pandemic.

In this context, the need to advance the digital society in a more coordinated way – to facilitate the efficient use of scarce resources and ensure inclusive participation – has never been more important. This year's report highlights the use of a whole-of-government approach (WGA) to accelerate progress on the digital society journey and better coordinate the development and implementation of digital transformation initiatives across the public sector, complemented by private sector investment and innovation.

As part of this research, the GSMA conducted an extensive survey of government agencies, mobile operators and other digital ecosystem players across the region to understand the role of WGA in advancing digital societies in Asia Pacific, especially in the implementation of Industry 4.0. The survey also helps to determine the underlying principles of WGA and how it can best be employed to advance digital societies in Asia Pacific. In the absence of empirical data on this topic, the results of our survey provide valuable on-the-ground evidence of the current status of WGA implementation, as well as insights into the challenges of implementing WGA and practical recommendations going forwards, from both government and industry perspectives. We draw insights from the GSMA Industry 4.0 survey for this report, which complements a separate upcoming report on the trends and outlook for Industry 4.0 in Asia Pacific.

Executive summary

Countries in Asia Pacific continue to make progress towards becoming fully fledged digital societies, helped by the rapid expansion of connectivity and the creation of innovative digital platforms and services. The GSMA Intelligence digital society index shows improvements across the five components of a digital society in all 11 focus countries during 2019. Connectivity and digital citizenship had the largest increases, reflecting the rise in 4G adoption and the concerted efforts of governments to enhance citizen engagement through online channels. In the last decade, more than 700 million people in the 11 focus countries connected to mobile internet for the first time, enhancing their ability to participate in the digital society. Today, 4G networks cover more than 95% of the population in 10 of the 11 focus countries.

The 2020s present a mixed bag of opportunities and challenges. As social distancing measures have been put in place around the world to mitigate the spread of Covid-19, there is a far greater need for universal access to fast and reliable connectivity and the availability of digital services. The pandemic has brought to light the risk of exclusion for people still unable or unwilling to access digital services and exposed weaknesses in existing digital transformation frameworks, even in advanced digital societies. Further, lockdown measures have taken their toll on economic output, resulting in record economic contractions and job losses in some markets.

Consequently, a top priority for governments in the coming years will be to help economies to recover and become more resilient to future shocks. While connectivity and digital services will remain fundamental to sustaining societies, countries in Asia Pacific will turn to Industry 4.0 in the 2020s to drive post-pandemic economic recovery and help build resilient economies for the future. Industry 4.0 will be of paramount importance to future digital societies as businesses reforge supply chains and seek new ways to operate amid continued disruption of global production lines and supply chains because of lockdown-related labour shortages and inactive logistics. For consumers, this will result in better quality and more timely products and improvements in user experience for a broad range of life-enhancing services, including healthcare, education, entertainment and retail.

Many countries in Asia Pacific have developed plans to facilitate Industry 4.0 in their markets, as evidenced by the government and industry responses to our survey. Additionally, the majority of respondents expect the key objectives of Industry 4.0 to be delivered by 2025. E-government, manufacturing and healthcare are among the top sectors expected to feel the immediate impact of Industry 4.0. A key enabler of Industry 4.0 will be intelligent connectivity, which can be described as the fusion of advanced networks, AI and the Internet of Things (IoT). The intelligent connectivity era has begun in Asia Pacific, and mobile operators are leading the way with investments in 5G infrastructure and various transformative technologies, including AI and IoT. 5G is now available in more than 10 countries in the Asia Pacific region, including Australia, Japan, Singapore, South Korea and Thailand. By 2025, the combined number of 5G connections in the 11 focus countries will reach 310 million.

The post-pandemic world is set to be shaped by the greater use of digital technologies for everyday activities, so it is essential for stakeholders to take a holistic approach in this process, considering the direct and indirect impacts it will have on societies – in other words, adopting a WGA for the advancement of the digital society and the delivery of Industry 4.0. This translates to taking a cross-sectoral and cross-organisational view of the formulation and implementation of digitalisation policies and frameworks in order to realise intrinsic collaborative efficiencies and therefore streamline decision-making processes. The benefits of this approach to governments and societies are significant; these include cost savings by avoiding duplication of efforts and a way to ensure inclusivity by taking into account the perspectives of different stakeholders.

Governments in Asia Pacific have committed to using a WGA to implement Industry 4.0 and the overall digital transformation of society, although the degree and process of WGA vary across countries. There is no one-size-fits-all system: local situations and unique circumstances, such as government structure and resource availability, need to be factored into the design and implementation of a WGA strategy. However, there are several underlying principles and enablers that can guide the development of an effective and sustainable strategy to advance the digital society, regardless of prevailing local situations.

In this report, we highlight five key principles:

- Provide effective leadership within government.
- Facilitate collaboration within the digital ecosystem.
- Build and sustain a supportive culture to implement policy on a WGA basis.
- Ensure that the workforce is equipped with the right skills and knowledge for the digital age.
- Communicate relevant information to all stakeholders.

1 Digital societies in Asia Pacific: a decade of progress

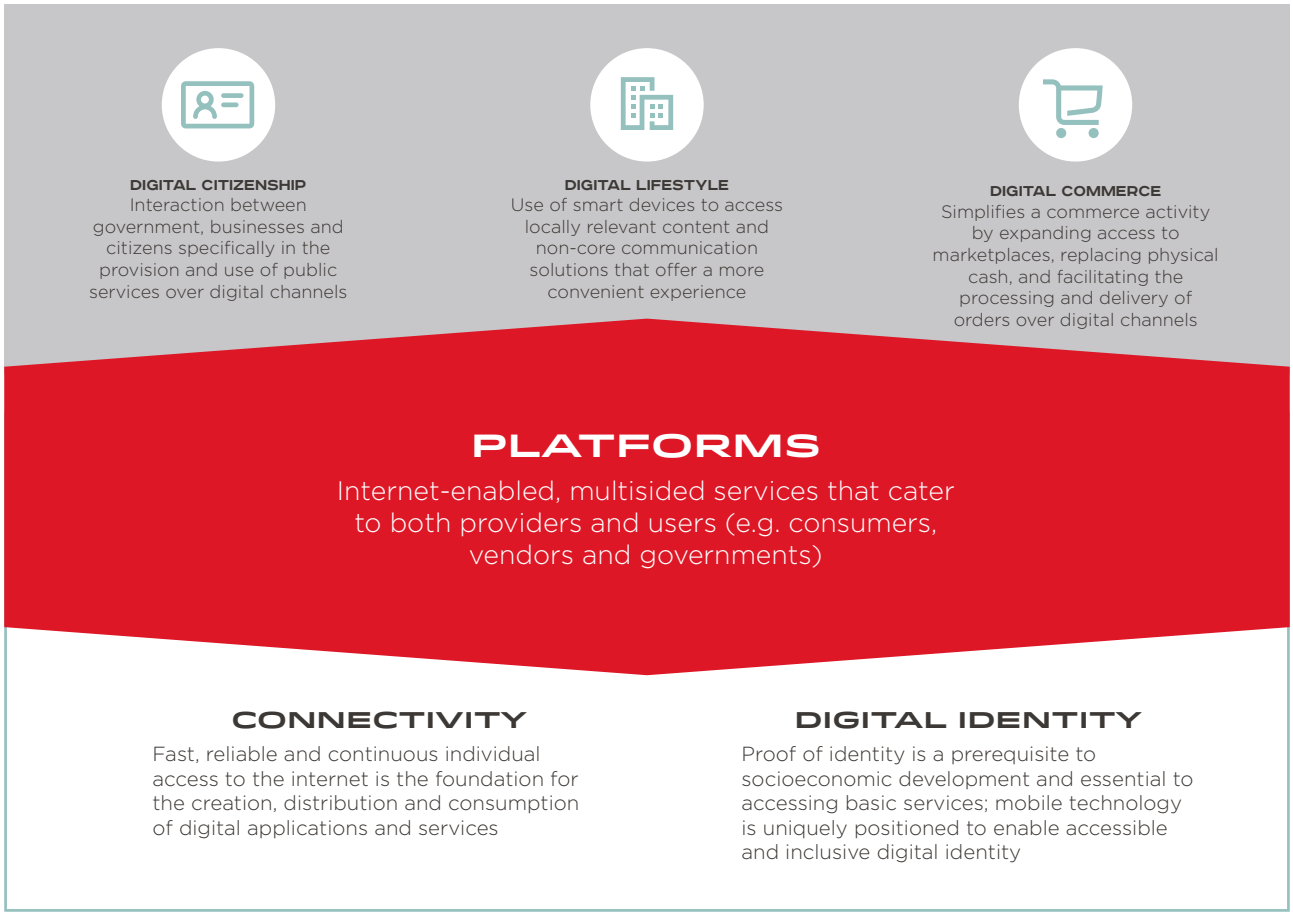
Digital technologies increasingly permeate every aspect of society. The impact of this trend is profound and, in many cases, measurable. For individuals and communities, digital technologies provide access to many life-enhancing services, some of which may be impractical to access by conventional means. Meanwhile, businesses and governments utilise digital technologies to increase productivity, drive value addition in economies, deliver services more efficiently and enhance the level of engagement with various stakeholders.

1.1 The key components of a digital society

Figure 1 shows the key components of a digital society, which countries have to make progress on to realise the full potential of digital technologies. These are digital citizenship, digital lifestyle and digital commerce as key services within a digital society, underpinned by the foundational elements of connectivity and digital identity.

Figure 1

Key components of a digital society



Source: GSMA Intelligence

Connectivity is a foundational element of a digital society. The significance of connectivity to the advancement of a digital society is demonstrated by the higher level of digitisation in countries with an established broadband infrastructure. The more people there are in a society that 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.

Digital identity can be defined as a collection of stored identity attributes, including biographic data (e.g. name, age, gender and address) and biometric data (e.g. fingerprints and facial photographs that are used for electronic transactions).[1] With half the global population now connected to the internet and many consumers taking a digital-first approach to economic and social activities, the ability to prove identity in a digital form is a fundamental component of economic, financial and social development.

1 Digital Identities: Advancing Digital Societies in Asia Pacific, GSMA, 2018

Digital citizenship describes the use of technology for two-way interactions between governments and citizens, with the potential to increase accountability, information sharing and mutual trust. It provides an opportunity to address multifaceted governance challenges, from ensuring inclusive and sustainable socioeconomic development to enabling the transparent and effective delivery of public services. It also means more convenient and timely access to public information and services for citizens and, at a higher level, the opportunity to perform certain civic duties online, such as voting and paying taxes.

Digital lifestyle describes the way people use digital technologies in everyday activities, including work, social interactions, learning, shopping, healthcare and entertainment. As digital societies advance, and urbanisation and the growing need to protect the environment impact traditional lifestyles, consumers are increasingly taking a digital-first approach to daily activities. Governments are implementing smart city solutions around key services to reduce waste, improve productivity and increase access to services for vulnerable people, such as the elderly and people with disabilities.

Digital commerce facilitates safe, efficient, transparent and prompt financial transactions in a digital society. Underpinned by digital payments, digital commerce has created new economic models and reshaped business processes across many industries, including public services, retail, transport, financial services and entertainment, allowing governments and businesses to engage with citizens in more dynamic and efficient ways. Future digital societies will be shaped by emerging trends in the digital payments landscape (see Figure 2).

Digital platforms bring together end users and producers in a digital society to transact with each other. The benefits of digital platforms are considerable: they enable faster and broader engagement with stakeholders; reduce entry barriers and drive scale for entrepreneurs and small businesses; enhance information sharing and collaboration; and bring consumers closer to service providers.

Figure 2

Emerging trends in digital payments that will shape commerce in a digital society

Source: GSMA Intelligence

1.2 Countries in Asia Pacific advance on the path to digital societies

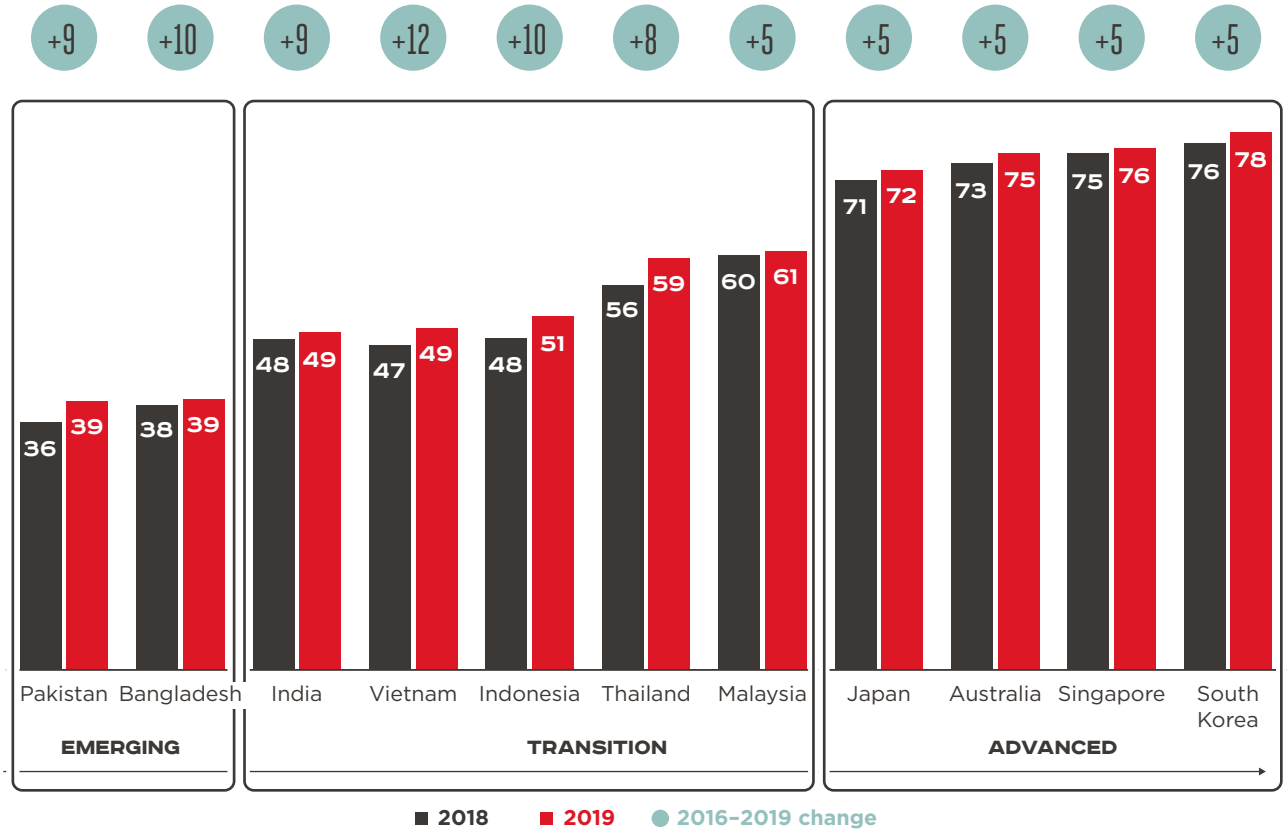
GSMA Intelligence's digital society index shows the progress of 11 focus countries, based on the following key components of a digital society:

- connectivity
- digital identity
- digital citizenship
- digital lifestyle
- digital commerce.

In recent years, countries in Asia Pacific have made considerable progress on the path to becoming digital societies. All countries on the index increased their aggregate score in 2019. Notably, countries in the emerging and transition categories continued to perform strongly on the index. These countries have recorded higher aggregate scores in 2019 and over the period 2016–2019, relative to countries in the advanced category; as such, the gap in the digital societies landscape in Asia Pacific has narrowed moderately in recent years. That said, the gap remains significant. This underscores the need for countries in the emerging category to do more to accelerate progress.

Figure 3

Overall digital society index scores



Source: GSMA Intelligence

The improvement in aggregate scores reflects the collective efforts of governments and digital ecosystem players, including mobile operators, working together to create supportive regulatory frameworks, invest in underlying network infrastructure (including high-performance mobile networks) and deploy innovative digital content and services. Below, we highlight some of the key developments that have underpinned the progress made so far (see Appendix C for detailed breakdowns of progress on the five components from 2016 to 2019).

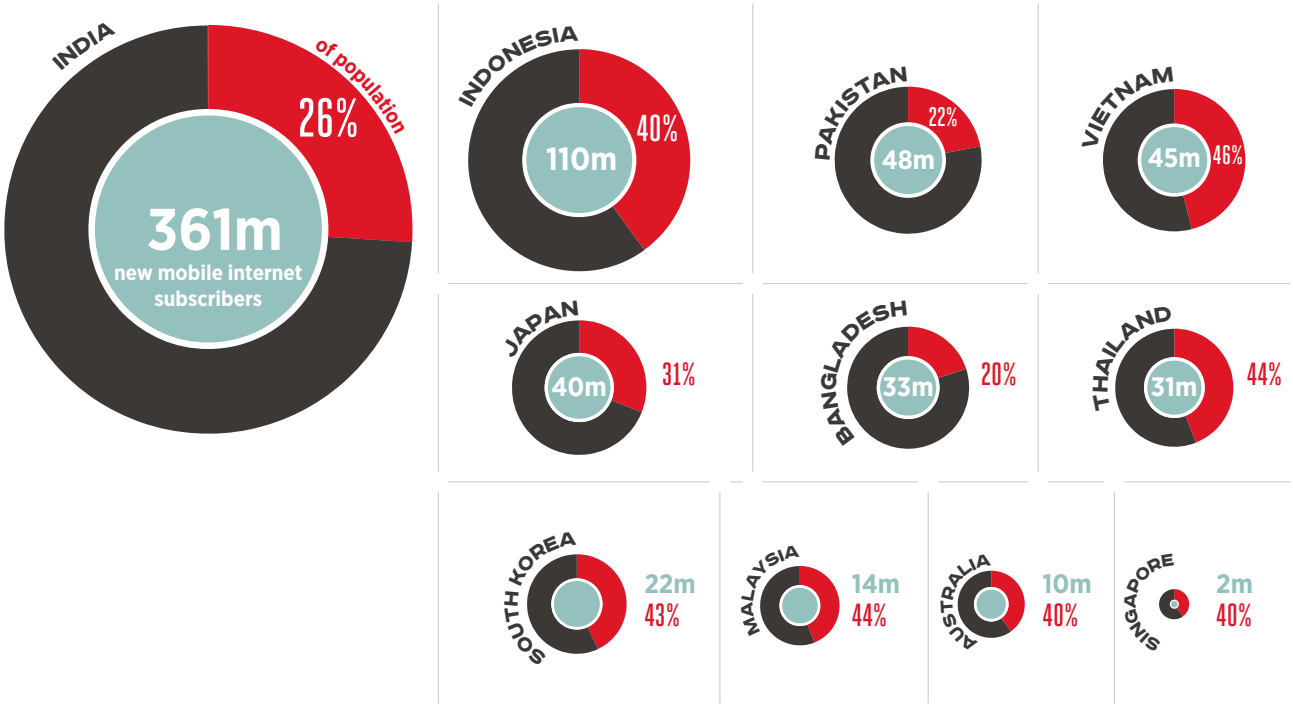
Connectivity

In the last decade, more than 700 million people in the 11 focus countries connected to mobile internet for the first time, enhancing their ability to participate in the digital society. Mobile internet adoption has in large part been driven by the deployment of mobile broadband networks, especially 4G.

Today, 4G networks cover more than 95% of the population in each of our focus countries except Pakistan (80% coverage). Over the next five years, an additional 350 million people will subscribe to mobile internet, taking the total number of mobile internet subscribers in our focus countries to 1.34 billion.

Figure 4

Number of new mobile internet subscribers, 2010–2019, and as a percentage of population



Source: GSMA Intelligence

Digital identity

The World Bank has reported that five of the 10 member states in the Association of Southeast Asian Nations (ASEAN) have now fully digitised their foundational identity systems (multi-purpose ID credentials that are universally available to their citizens).[2] These include Indonesia, Malaysia, Singapore and Thailand, which have established an associated public key infrastructure to help keep these systems secure. Vietnam, one of the other five ASEAN members, is currently piloting digitised foundational ID systems. Thailand's national digital ID platform is designed to also support citizens of other ASEAN countries, which means these citizens will be able to authenticate themselves for online transactions with Thailand-based firms and government agencies. Between 2016 and 2019, Thailand recorded the highest increase in the digital identity metric on the digital society index.

2 The Digital Economy in Southeast Asia, World Bank 2019

Digital citizenship

Asia Pacific countries have seen significant improvements in their digital citizenship scores, with their governments having taken steps to increase the level of engagement with citizens online. The use of e-government services in these countries and several others in Asia Pacific has increased in recent years, as governments are seeking new and more effective ways to engage with citizens. Bangladesh's government launched the MyGov mobile app in early 2020 to provide all government services under one platform. The app allows interactive communication among service providers, partners and users, and has incorporated key government services, including '999', 'ekSheba', 'Helpline 333' and 'ekPay'.[3] In India, the government launched MyGov, a citizen engagement platform, in 2014 to promote the active participation of Indian citizens in governance and development by crowdsourcing ideas. As of the end of September 2020, there were 13.8 million registered users on the platform.[4]

Digital commerce

Overall scores for digital commerce improved in 2019, building on increases in previous years. This has resulted from greater internet access, the proliferation of smart devices and the expansion of e-commerce services, which have together transformed how consumers buy and merchants sell. There has been a big shift to digital commerce in 2020 as people have sought greater safety, security and convenience during the Covid-19 pandemic. According to a Mastercard survey, 30% of people in Australia, 49% in India and 34% in Japan plan to make more purchases online as a result of the pandemic.[5] Meanwhile, digital payments/ services – a key enabler of digital commerce – continues to grow across Asia Pacific. A prime example of the digital payments boom can be seen in India. Since it launched in 2016, India's Unified Payments Interface (UPI) has helped propel the growth of digital payments in the country, allowing people to make instant transfers across bank accounts and pay for many goods and services online, mostly using their mobile devices. The UPI processed 10.8 billion transactions in 2019, representing a 191% increase compared to 2018.

Digital lifestyle

Digital literacy is crucial for citizens to function effectively in the digital society and enjoy digital lifestyle services. In most societies, older citizens are particularly at risk of marginalisation due to a lack of digital skills. Recognising this challenge, Singapore's Infocomm Media Development Authority (IMDA) has implemented several initiatives to provide senior citizens with access to digital skills training. These include the Mobile Access for Seniors scheme, the Silver Infocomm Initiative and the Seniors Go Digital programme. IMDA and the SG Digital Office aim to enhance the digital skills of 100,000 senior citizens by March 2021.[6]

3 "Launching of 'MyGov' app and seminar on 'Positive use of social media in building digital Bangladesh", a2i, January 2020
4 See www.mygov.in
5 "In stores or on the couch, Asia Pacific consumers shift rapidly to digital commerce and show no signs of turning back – Mastercard study", Mastercard, June 2020
6 "5 exciting new ways to go digital with IMDA", IMDA, July 2020

The mobile industry's contribution to progress towards advanced digital societies in Asia Pacific

Digital services in Asia Pacific function primarily through mobile technology. As such, the mobile industry has played a critical role in the improvement of the digital society enablers. Mobile technology has been fundamental to expanding connectivity across the region, particularly in emerging digital societies, such as India, Bangladesh and Pakistan and in remote areas of countries with advanced digital societies, such as Australia and Japan. In such places, mobile connectivity is typically the first, and often only, form of access to internet connectivity because of limited fixed broadband infrastructure.

Mobile networks also support new business models, by enabling access to a wide range of life-enhancing services, and facilitate network effects for interoperable digital platforms. Mobile allows users to connect on the go and accounts for a growing share of the consumption of digital lifestyle and digital commerce services. The arrival of 5G creates an opportunity for mobile to play an even more significant role in the advancement of digital societies: the technology can enable new services and use cases for consumers and businesses alike, thanks to key features such as lower latency and larger capacity.

Over the next decade, it is critical that governments and policymakers in Asia Pacific ensure the sustainable growth of the mobile industry and leverage mobile platforms to advance the digital society. As a first step, governments need to address the regulatory, operational and financial issues that affect investments and innovation in the mobile ecosystem, as highlighted below:

- To deliver affordable and high-quality mobile broadband services, operators require fair and transparent access to sufficient and affordable radio spectrum. Governments and regulators should therefore provide sufficient internationally harmonised spectrum to ensure the quality that consumers and businesses require from mobile networks. Spectrum pricing also has a significant impact on investment and, ultimately, on mobile services.[7] Governments that seek to maximise state revenues from spectrum pricing, for example, risk undermining competition in the communications markets and stifling network investment, to the detriment of society.
- The telecoms industry depends on getting timely and affordable approvals for rights of way (RoW) from authorities to accelerate infrastructure rollout. As such, governments should put in place procedures for easier and more efficient and affordable RoW processes to expand fixed, fibre and tower infrastructure.
- In recent years, the telecoms industry has adapted to major changes from the convergence of technologies and services, and the emergence of internet platforms and services. In most countries, however, mobile operators are still subject to regulations designed for the 'voice era', which restrict their ability to innovate, invest and compete on equal terms in the digital ecosystem. Policymakers should strive to create a stable business environment that fosters competition, protects consumers and encourages sustainable investment without impeding commercial activity or economic progress. This will require a fresh look at regulations so that they can be revised to better reflect today's technologies and markets.
- The mobile industry is in a challenging position, as operators face rising costs and declining levels of ARPU and revenue growth: between 2010 and 2019, ARPU declined 50%, on average, across Asia Pacific, while annual revenue growth has fallen into the low single digits. Operators in some countries also face onerous fiscal burdens that further weigh on the sustainable growth of the industry. In some cases, government policies directly impact the prices paid by end users, and in other cases it inflates the upfront and recurring costs incurred by mobile operators that are ultimately passed on to the end user through higher prices. Financial incentives and the elimination of sector-specific taxes are some policy levers than can support continued growth and investment in the mobile industry.

7 See https://www.gsma.com/spectrum/resources/effective-spectrum-pricing/

2 2020 is a pivotal year in the digital society journey

Even before the Covid-19 pandemic, countries in Asia Pacific had been improving on GSMA Intelligence's digital society index. However, 2020 marks an inflection point on the digital society path. As a result of the pandemic, governments have to rethink their approach to digital transformation, given its potential to help society respond to the crisis in the short term, recover from the socioeconomic repercussions in the medium term, and achieve sustainable and inclusive growth in the long term.

2.1 The impact of Covid-19 on digital societies

With face-to-face interactions impossible or discouraged in many situations because of the Covid-19 outbreak, there is a far greater need for universal access to fast and reliable connectivity and the availability of digital services. Since the beginning of the pandemic, many everyday activities, including work, learning, shopping and social interactions, have moved online.

The shift to online channels for many social and economic activities resulted in sharp increases in mobile (and fixed) data traffic for operators in Asia Pacific. In South Korea, operators reported traffic increases of 13%, reaching 45–60% of their deployed capacity, while NTT Communications in Japan reported an increase in data usage of 30–40%.[8] In Indonesia, operators recorded a considerable rise in data traffic during the 2020 Idul Fitri celebrations compared to previous years because of large-scale social restrictions.[9]

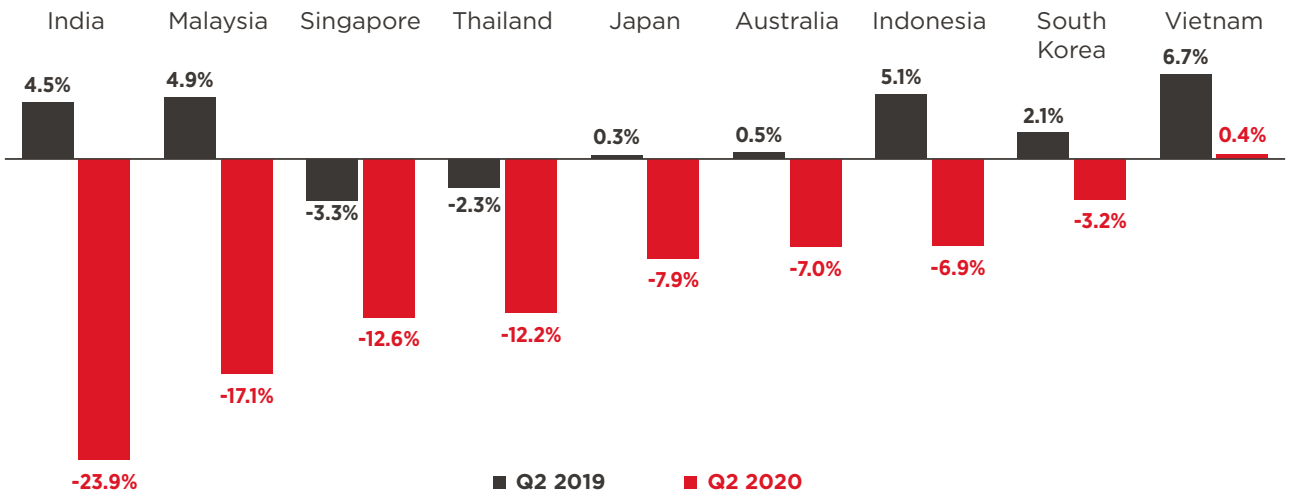
Despite the change in data consumption patterns, networks largely remained resilient throughout lockdowns, underlining the considerable investment made by operators in network infrastructure. Between 2010 and 2019, mobile operators in the 11 focus countries invested more than $330 billion in capital expenditure, building up capacity in their networks and expanding coverage to underserved areas. However, the increase in online traffic has not resulted in a commensurate increase in revenues. Mobile operators in Asia Pacific countries, including Bangladesh, India, Japan and South Korea, recorded a decline in revenues of between 2% and 8% during the second quarter of 2020, owing to several factors, including discounts on voice and data packages to help people stay connected during lockdowns, delayed recharges and fewer subscriber additions as a result of reduced consumer spending due to the economic impact of the pandemic.

Importantly, the pandemic has brought to light the risk of exclusion for people still unable or unwilling to access digital services and exposed weaknesses in existing digital transformation frameworks, even in advanced digital societies. In India, a lack of connectivity in many rural areas is reported to have hindered the ability of students to participate in online learning during lockdown.[10] In Pakistan, nine districts out of 32 in Quetta, the provincial capital of Balochistan, have no internet infrastructure, leaving students similarly unable to participate in online learning.[11] In Japan, a paper-driven culture in government ministries, despite ambitious digital government initiatives, has been blamed for undermining productivity during lockdown.[12]

Figure 5

Second quarter economic growth, 2019–2020

Change in GDP (YoY)



Note: Q2 2020 GDP figures not available for Bangladesh and Pakistan
Source: National statistics authorities, GSMA Intelligence

8 See https://www.oecd.org/coronavirus/policy-responses/keeping-the-internet-up-and-running-in-times-of-crisis-4017c4c9/
9 "Indonesia telecom companies enjoy data traffic surge during Idul Fitri", The Jakarta Post, May 2020
10 "Covid-19 impact: 4 major challenges faced by rural students of India", India Today, August 2020
11 "Pakistan's digital exclusion cripples life in the pandemic", TRT World, July 2020
12 "Twenty years on, Japan government's digital ambitions still stuck in piles of paper", Reuters, July 2020

Social distancing measures have had an adverse effect on economic output, resulting in record economic contractions and job losses in many countries. Against this backdrop, a top priority for governments in the coming years will be to help economies to recover and become more resilient to future shocks. Digital technologies will play a critical role in reviving economic output in a post-pandemic world and enable governments to deliver public services more widely and efficiently. Greater digitisation will lead to the unintended consequence of job losses, particularly for manual tasks. To mitigate this risk, governments and other stakeholders should identity the skills that will be required in the emerging digital world and invest in training the workforce to be gainfully employed in jobs of the future.

Covid-19 catalyses online learning in Bangladesh

At the start of 2020, most universities in Bangladesh lacked basic learning management systems and digital infrastructure. With the enforcement of lockdown measures during the Covid-19 pandemic, the University Grants Commission (UGC) introduced policies requiring all universities to go digital and to make admissions, teaching and learning activities accessible online. Within four months, digitisation was mainstreamed. Around 3,800 classes are now held online daily with more than 220,000 students in attendance. Mobile operators have been instrumental in providing the required connectivity for online learning. State-owned Teletalk Bangladesh provides connectivity to the students of 42 public and 68 private universities, who are using the Bangladesh Research and Education Network platform run by UGC, while Grameenphone has partnered with several universities, including East Delta University and Dhaka University, to facilitate online learning. By the end of July, around 203,200 classes had been delivered to more than 9.2 million attendees by 10,200 faculty members. [13]

Digital transformation plans accelerate in Vietnam because of the pandemic

In 2019, Vietnam's government set a target to become the leading digital economy in ASEAN by 2030, with the aim that digital economic activities account for up to 30% of GDP by this time, which would represent a substantial increase from the 5% in 2019. The pandemic has only served to speed this process up: in June 2020, the country's National Digital Transformation Roadmap 2025 (with a vision towards 2030) was approved, setting further targets and guidelines for Vietnam's digital transformation.[14]

Vietnam experienced the biggest improvement on GSMA Intelligence's digital society index between 2016 and 2019, with its aggregate score rising by 12 points (see Figure 3). This was mainly driven by notable improvements in the connectivity component of the index, following the launch and rapid expansion of 4G networks in the last three years. It was also driven by improvements to the digital identity, digital citizenship and digital lifestyle components. However, there are still challenges that need to be addressed to make further progress, particularly in the digital commerce component and with regard to policies to support innovative startups. Vietnam's government has already started moving in this direction: in July 2020, it unveiled a national e-commerce development plan, which is expected to stimulate a 25% annual growth in the e-commerce sector to reach a target of $35 billion in sales and half of the country's 96 million citizens shopping online within the next five years.[15]

13 "Covid-19 boosts digitization of higher education in Bangladesh", World Bank Blogs, August 2020
14 "Vietnam in the Post-Covid Era: Realizing a 'Digital Country'", Asia Pacific Foundation of Canada, July 2020
15 "Vietnam is ready to supercharge its e-commerce market", Tech Wire Asia, June 2020

2.2 Rebuilding for the future: spotlight on the Industry 4.0 opportunity

While connectivity and digital services will remain fundamental to sustaining societies, countries in Asia Pacific will turn to Industry 4.0 to drive post-pandemic economic recovery and help build resilient economies for the future. Industry 4.0 will be essential to future digital societies as businesses reforge supply chains and seek new ways to operate amid continued disruption of global production lines and supply chains because of lockdown-related labour shortages and inactive logistics. For consumers, this will result in better quality and more timely products and improvements in user experience for a broad range of life-enhancing services, including healthcare, education, entertainment and retail.

Defining Industry 4.0

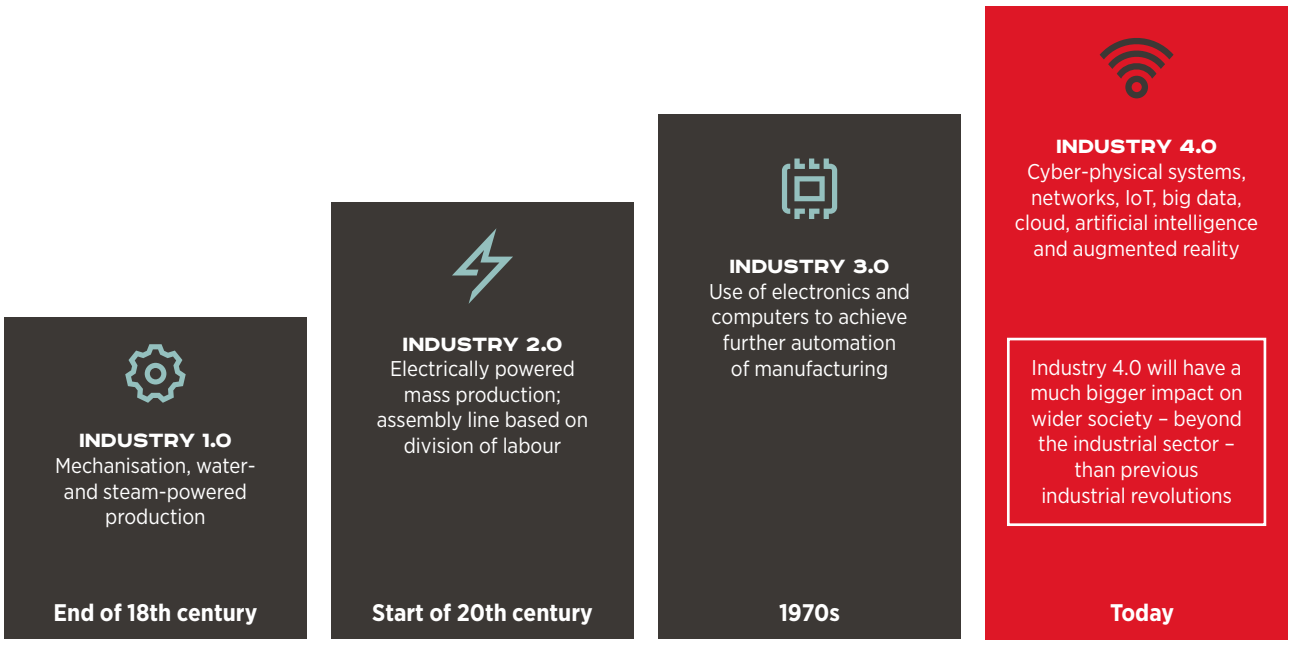
Specific definitions of what Industry 4.0 means in practice tend to vary. In all cases, however, the underlying principle remains the same: to use digital technologies, enabled by intelligent and interconnected networks, to improve the way people live and businesses operate. Below are two notable definitions:

> Industry 4.0 describes the exponential changes to the way we live, work and relate to one another due to the adoption of cyber-physical systems, the Internet of Things and the Internet of Systems.
>
> **WORLD ECONOMIC FORUM**

> Industry 4.0 is a hyper connectivity-based intelligent technology revolution triggered by the development of artificial intelligence, big data, and other digital technologies that is expected to give rise to innovative transformations in not only industries but also the national system, society, and people's everyday lives.
>
> **MINISTRY OF SCIENCE AND ICT, SOUTH KOREA**

Figure 6

The industrial revolutions



Source: GSMA Intelligence

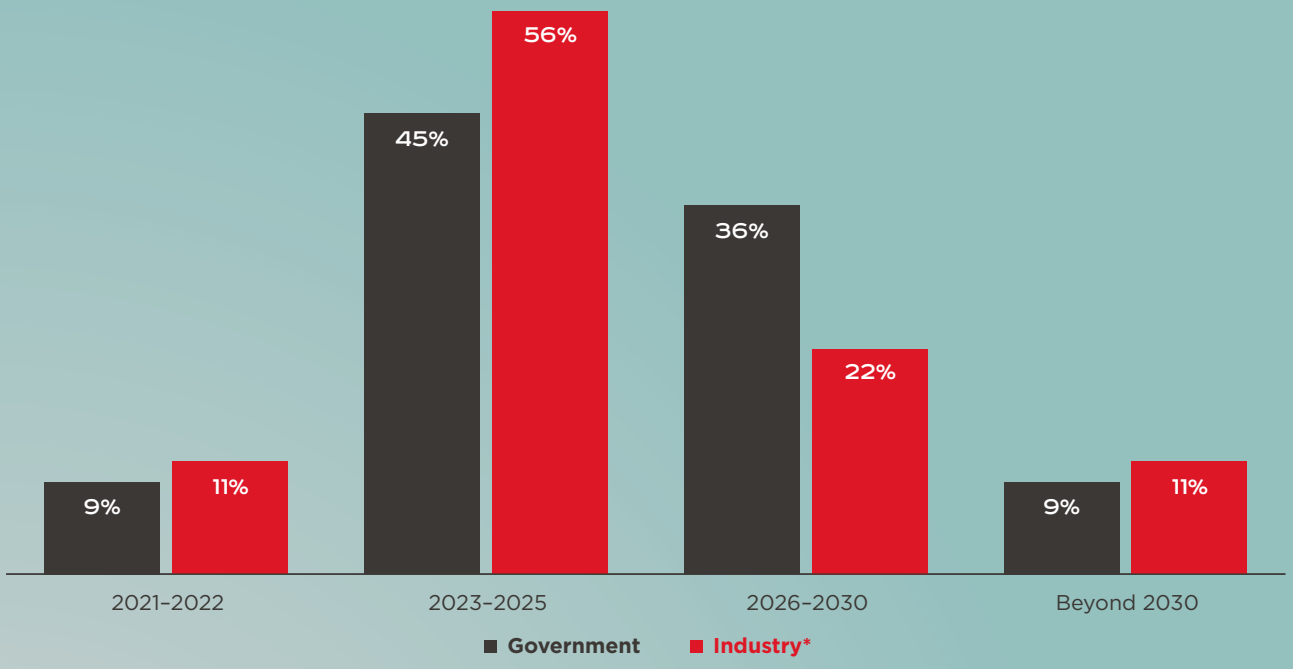
Many governments in Asia Pacific have outlined plans to deliver the objectives of Industry 4.0. In November 2019, ASEAN member states published a joint declaration on Industry 4.0, guided by the principles enshrined in the ASEAN Vision 2025 Community and the ASEAN Economic Community Blueprint 2025.[16]

Countries in Asia Pacific have also established frameworks on a national level, having recognised the potential of Industry 4.0 to help prepare economic structures for greater productivity and resilience. Below, we highlight the key elements of the Industry 4.0 vision of some countries in Asia Pacific.

Figure 7

Majority of government and industry respondents expect Industry 4.0 objectives to be delivered within the next five years

When do you expect to see the key objectives of Industry 4.0 delivered? (% of respondents)



*Includes mobile operators

Source: GSMA Industry 4.0 in APAC: Whole-of-Government Approach Survey 2020

Significant progress has been made on the delivery of Industry 4.0 objectives in Asia Pacific, especially with regard to connectivity. Mobile operators have played a critical role in this, having invested in widespread 4G deployment and currently doing the same for 5G. Beyond connectivity infrastructure, mobile operators will also provide Industry 4.0 solutions.

16 See https://asean.org/asean-declaration-industrial-transformation-industry-4-0/

India

India's Industry 4.0 vision is underpinned by four key principles: interconnection (how technologies such as AI, autonomous vehicles and IoT are merging with humans' physical lives), information transparency (to ensure efficient and effective collection of data), decentralised decision-making (which allows for the combination of global and local information to allow for better decision-making) and technical assistance (to ensure an effective transition to new technologies and addressing technical issues as they arise). The country's vision of Industry 4.0 is focused on implementing smart cities,[17] improving efficiency in resource utilisation and quality of life for citizens via MyGov, and helping the country's large number of small and medium-sized enterprises (SMEs) to take their businesses to a wider audience both domestically and globally via Samarth Udyog Bharat 4.0 (an Industry 4.0 initiative by the government's Department of Heavy Industry).[18] It will require considerable investments in underlying infrastructure, particularly connectivity, and the development of device manufacturing capabilities to realise India's Industry 4.0 vision. To achieve the underlying digital infrastructure, the government of India launched the National Infrastructure Pipeline[19] in December 2019 and Atmanirbhar Bharat Abhiyan ('self-reliant India') in May 2020.[20]

Indonesia

Industry 4.0 is integral to the Indonesian government's plans to revitalise the manufacturing sector and accelerate progress on its goal to become the 10th largest economy in the world. To achieve this, the government plans to apply Industry 4.0 technologies in five key sectors: food and drink, textiles and clothing, automotive, chemicals, and electronics. These sectors were selected based on an economic impact analysis and eligibility criteria around the size of GDP contribution, international trade, potential impact on other industries, investment requirement and time to market. The Ministry of Industry has designed Making Indonesia 4.0, an integrated roadmap for implementing a number of strategies to enter the Industry 4.0 era, which requires collaboration between multiple stakeholders, including government institutions, industry players and academia.

Japan

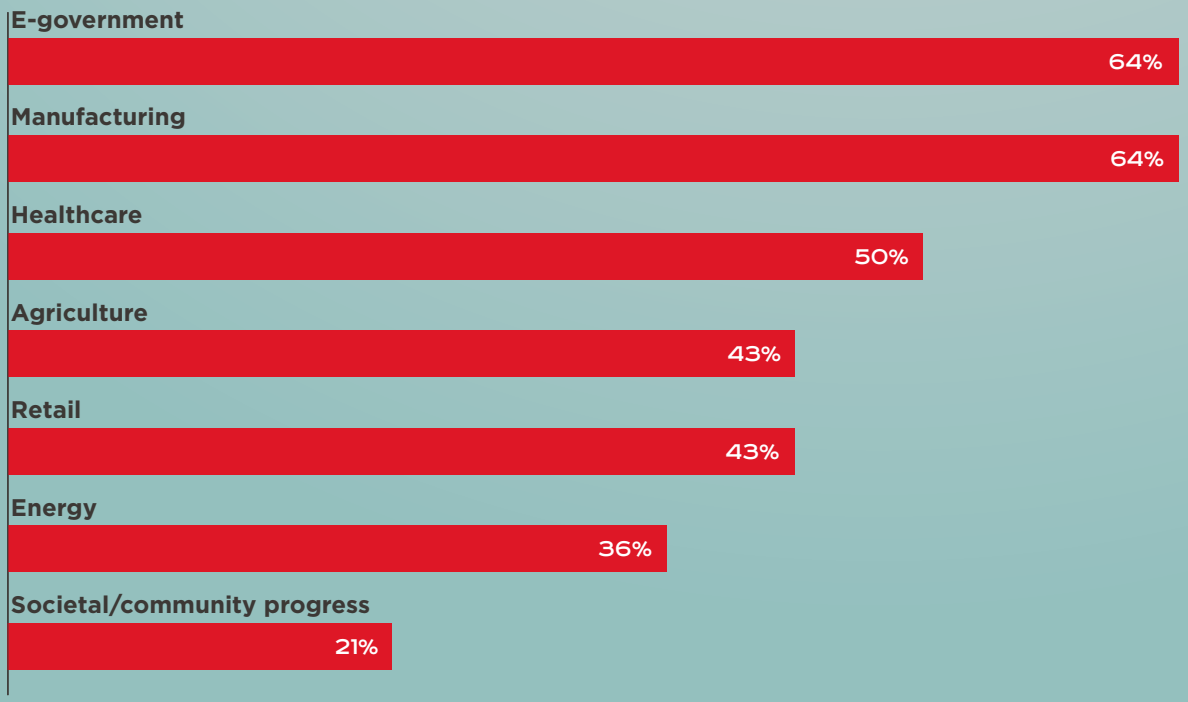
Japan has an aspirational vision to create 'Society 5.0', a new social contract and economic model, by fully incorporating the technological innovations of Industry 4.0. The term describes a human-centred society that balances economic advancement with the resolution of social problems through a system that integrates physical space and cyberspace. It envisions connecting all people by embedding transformational technologies such as IoT, AI, robotics and autonomous vehicles into every corner of society. This could be used to address problems such as the decreasing birth rate and ageing population, depopulation and social inequalities. Society 5.0 focuses on a number of key pillars, including infrastructure, fintech, healthcare and logistics.

17 http://smartcities.gov.in/content/
18 www.samarthudyog-i40.in/about-i40
19 See https://pib.gov.in/PressReleseDetail.aspx?PRID=1598055
20 "PM Modi's Atmanirbhar Bharat Abhiyan economic package: Here is the fine print", The Indian Express, May 2020

Figure 8

More than 60% of government respondents expect e-government services and manufacturing to benefit very significantly from Industry 4.0

To what extent will the following sectors benefit from Industry 4.0 in your country?
(% of government respondents who said "Very significantly")



Source: GSMA Industry 4.0 in APAC: Whole-of-Government Approach Survey 2020

The impact of Industry 4.0 on productivity and efficiency in the manufacturing sector has been well documented. Industry 4.0 could also have a profound impact on e-government services through the end-to-end digitisation of services provided by the different tiers of government and public institutions, creating value for enterprises and consumers.

Pakistan

The 2018 Digital Pakistan Policy outlines Pakistan's vision for Industry 4.0, specifically in the areas of IoT, AI, cloud computing, big data, fintech and robotics. The policy sets out objectives to establish innovation centres, promote local players and startups, build a local talent pool and adopt cross-sectoral collaboration. The policy also emphasises the need to establish national data centres, integrate provincial and national databases, develop cloud-based citizen-centric services and focus on capacity building for big data and cloud services.

Singapore

As part of a coordinated strategy on Industry 4.0, the Singapore government has earmarked significant resources for investment into research and development (R&D) projects, the development of industry transformation maps and the strengthening of workers' skill sets, to move industries towards quicker adoption of digital technologies. In November 2017, the Singapore Economic Development Board launched the Singapore Smart Industry Readiness Index (SIRI) to help companies harness the potential of Industry 4.0 in a systematic and comprehensive way. SIRI has three core pillars: technology (automation, connectivity and intelligence), process (operations, supply chain and product lifecycle) and organisation (talent readiness and structure and management).

South Korea

South Korea's government aims to "realise a people-centred Industry 4.0, participated in and enjoyed by all". It sees its role as that of a facilitator to enable public-private partnerships, respond to social changes, support the growth of people-centred innovation and create an enabling market environment to maximise the capacity of private innovation. The government's plans include the following:

1. To transform all areas of industry and society, and create new industries and jobs through convergence.
2. To strengthen intelligent technology capacity and simultaneously link it to growth engines to provide customised and concentrated support for innovative research.
3. To secure national technological competitiveness in the future through cooperation between the government and the private sector.
4. To establish key infrastructure and a dynamic industrial ecosystem to help SMEs and startups specialising in AI and other intelligent technologies.

The South Korean government set aside KRW4.7 trillion ($3.9 billion) to spend on key technologies, including 5G and AI, in its 2020 budget.[21]

Thailand

Thailand 4.0 is built on four objectives: economic prosperity (create a value-based economy that is driven by innovation, technology and creativity); social wellbeing (create a society that moves forward without leaving anyone behind); raising human values (elevate the development and education of Thai citizens); and environmental protection (become a liveable society that possesses an economic system capable of adjusting to climate change and being a low-carbon society).

21 "South Korea's Budget Puts $3.9 Billion Into Industry 4.0", BloombergNEF, August 2019

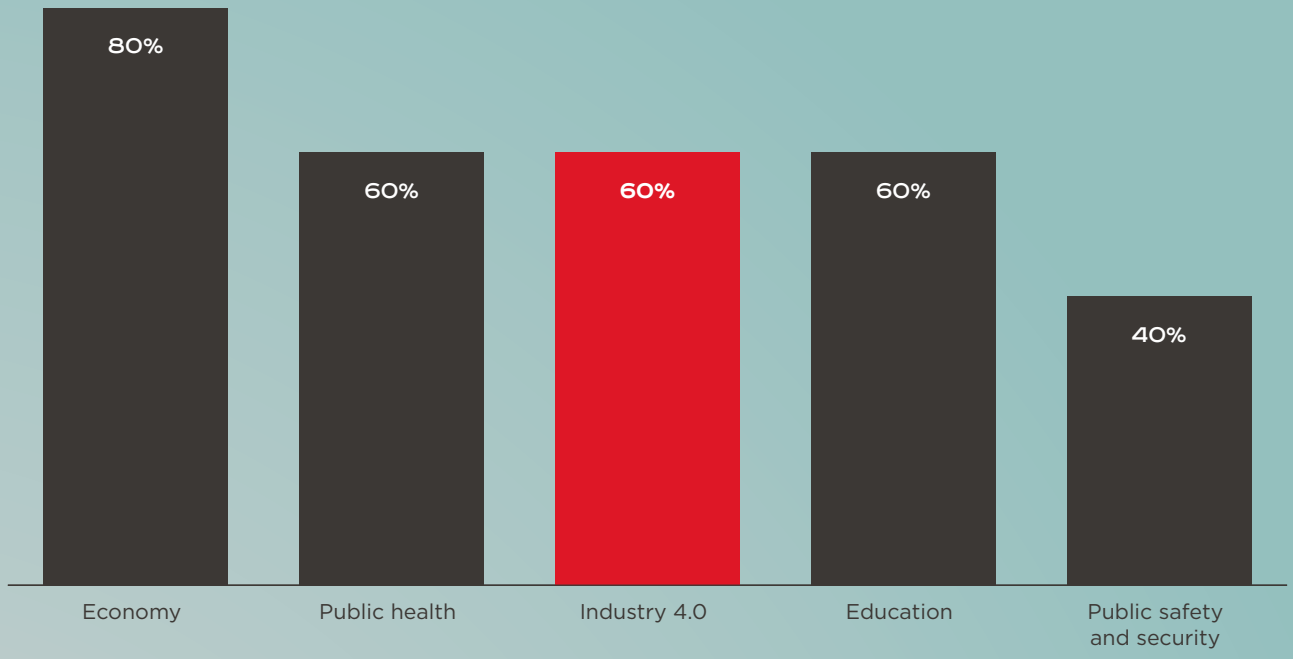
Vietnam

The government of Vietnam has embraced the Industry 4.0 opportunity to help restructure the economy, which falls in line with the implementation of the country's modernisation strategy. The current draft of the National Strategy for Industry 4.0, developed by the Ministry of Planning and Investment, focuses on six areas: heightening the quality of institutionalisation and capacity for policy formulation; developing infrastructure for interconnection and database usage; human resource development; developing e-government and digital government in the long term; enhancing national innovation capability; and investing in selected technologies for Industry 4.0.

Figure 9

Industry 4.0 is a top priority for many governments in Asia Pacific, ranked at the same level as public health and education

Is Industry 4.0 a top priority in your country?
(% of respondents who said "Yes", compared to other priorities)



Source: GSMA Industry 4.0 in APAC: Whole-of-Government Approach Survey 2020

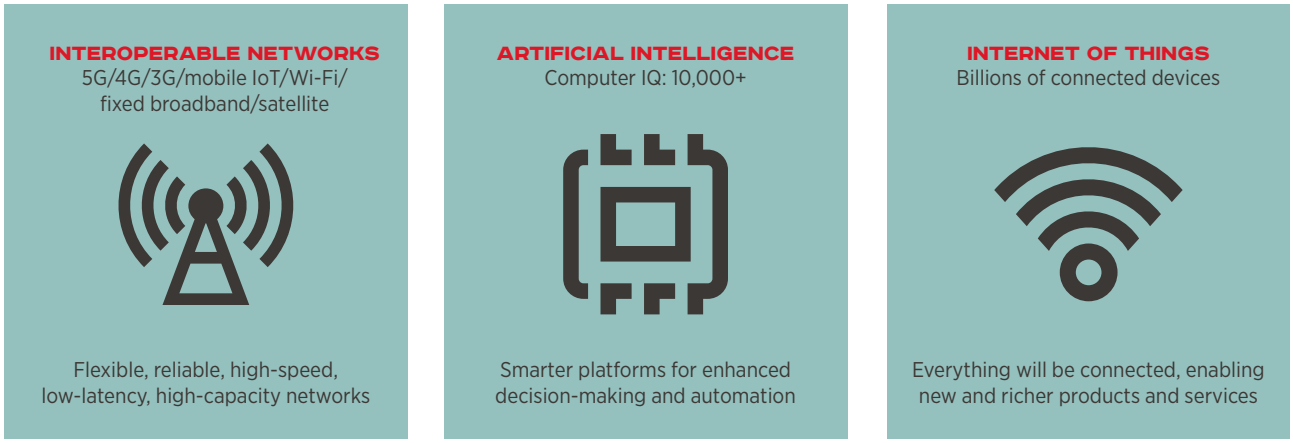
According to our survey, digital economy leadership (70%) was the top-ranked economic reason for the prioritisation of Industry 4.0 in Asia Pacific, followed by improved productivity and efficiency (64%) and lower entry barriers for SMEs to participate in the digital economy (50%). Digital inclusion and access to basic services (e.g. health, education and social security) were the joint top-ranked social factors, with 60% of respondents saying they are essential reasons for the implementation of Industry 4.0. Many governments have prioritised public health in the wake of Covid-19 pandemic.

2.3 Intelligent connectivity enabling Industry 4.0 in Asia Pacific

Building on the foundation of connectivity and digital services, mobile operators are increasingly enhancing their capacity to deliver intelligent connectivity, defined as the combination of high-speed low-latency networks, cutting-edge AI and the linking of billions of devices through IoT to enable transformational new capabilities across different sectors of a digital society, including public services, industry, transport and entertainment.[22] Intelligent connectivity will be key to realising Industry 4.0, with potential application across a broad range of sectors.

Figure 10

Intelligent connectivity: the fusion of advanced networks, AI and IoT



Source: GSMA Intelligence

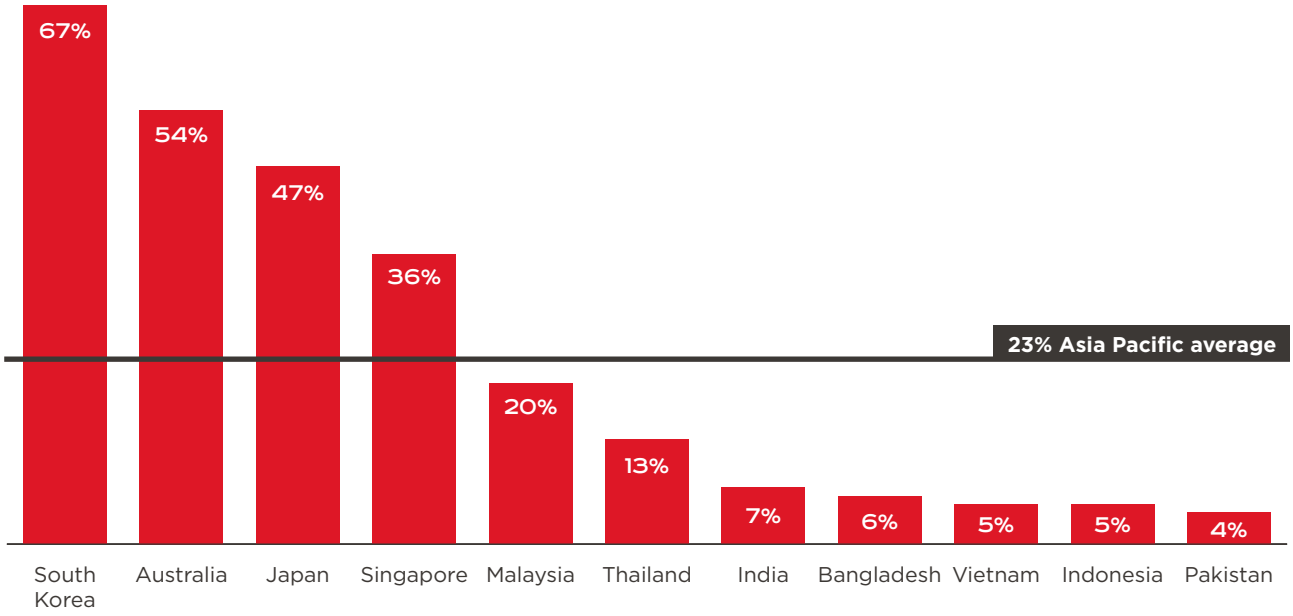
The intelligent connectivity era has begun in Asia Pacific and will build momentum in the 2020s, facilitating the delivery of Industry 4.0 in the region. Today, 5G is available in more than 10 countries in Asia Pacific, including Australia, Japan, Singapore, South Korea and Thailand. 5G will impact communications, productivity and human-machine interactions, enabling new capabilities in multiple industries and sectors. In June 2020, South Korea operator KT partnered with Hyundai Robotics to speed up collaboration for digital transformation based on 5G, AI and smart factory.[23] In Thailand, the National Broadcasting and Telecommunications Commission (NBTC) partnered with Huawei and Siriraj Hospital to test an unmanned vehicle that provides contactless delivery of medical supplies using 5G.[24]

22 GSMA
23 "KT to acquire stake in Hyundai Robotics", Mobile World Live, June 2020
24 "NBTC joins forces with Siriraj Hospital and Huawei", Bangkok Post, June 2020

Figure 11

5G will be widely available across Asia Pacific, including the 11 focus countries, by 2025

5G as a % of total connections in 2025 (excluding licensed cellular IoT)



Source: GSMA Intelligence

The AI landscape is also evolving rapidly, with Asia Pacific countries exploring the opportunities that AI can bring to society. AI has the potential to create large productivity gains, particularly in low-skilled sectors, and could help economies recover post-Covid-19. In November 2019, Singapore launched its National Artificial Intelligence Strategy and committed over SGD500 million ($370 million) to fund activities related to AI under the Research, Innovation and Enterprise 2020 Plan.[25] In March 2019, Malaysia's National Applied R&D Centre established the Centre of Artificial Intelligence for Future Industry to help Malaysian industries move to Industry 4.0 through the use of AI.[26] In June 2020, Australia, India, Japan, South Korea and Singapore joined the EU, the UK, the US and several other countries as founding members of the Global Partnership on Artificial Intelligence, a multi-stakeholder initiative to guide the responsible development and use of AI, grounded in human rights, inclusion, diversity, innovation and economic growth.[27]

In October 2018, the GSMA launched the Asia Pacific IoT Partnership Programme, bringing together mobile operators and other ecosystem players. This has grown to become the largest IoT community in the region, with 60+ mobile operators in the Asia Pacific and Middle East and Africa regions, and over 500 partners, including consultants, developers, manufacturers, system integrators and vertical solution providers. There are more than 5 billion IoT connections in Asia Pacific today, which is expected to rise to nearly 12 billion connections by 2025. In Bangladesh, Robi Axiata has launched an IoT-based smart factory solution for the country's ready-made garment sector, while in Pakistan the government has launched 'safe city' projects in various cities, using IoT, machine learning and big data analytics to prevent accidents and keep the public safe.

25 National Artificial Intelligence Strategy, Smart Nation Digital Office, 2019
26 http://www.mimos.my/paper/intelligence-for-future-industry/
27 See Joint Statement from founding members of the Global Partnership on Artificial Intelligence

Airtel India and Nokia team up to deliver Industry 4.0 applications to enterprises[28]

Airtel India has partnered with Nokia to offer private LTE-based Industry 4.0 solutions to enterprises. By connecting machines and platforms in the factory using a private mobile broadband network, the solutions aim to deliver higher resource efficiency, faster and more agile operations, better visibility of resources, reduced human errors and improved trend predictions. These will use cloud, IoT, AI and edge computing technologies to help enterprises across banking, financial services and insurance, information-technology-enabled services, media, manufacturing and distribution. Airtel and Nokia have plans to explore the development of 5G use cases for enterprises.

SKT provides a smart factory solution

SKT commercialised an innovative smart factory solution, known as 5G-AI Machine Vision, in 2019 and provided the solution to Myunghwa Industry, an auto parts manufacturer in South Korea. The solution verifies product quality in an automated manner by sending high-resolution, multi-angle photos of auto parts on conveyor belts to the multi-access edge-computing (MEC) platform over a 5G network, allowing the server's AI to instantly scan the photos and check for defective parts. By processing all data at the MEC platform located within the factory, Myunghwa was able to detect defective products in less than 30 seconds, doubling productivity and achieving cost savings of around 30%.

CAT Telecom deploys smart mailboxes[29]

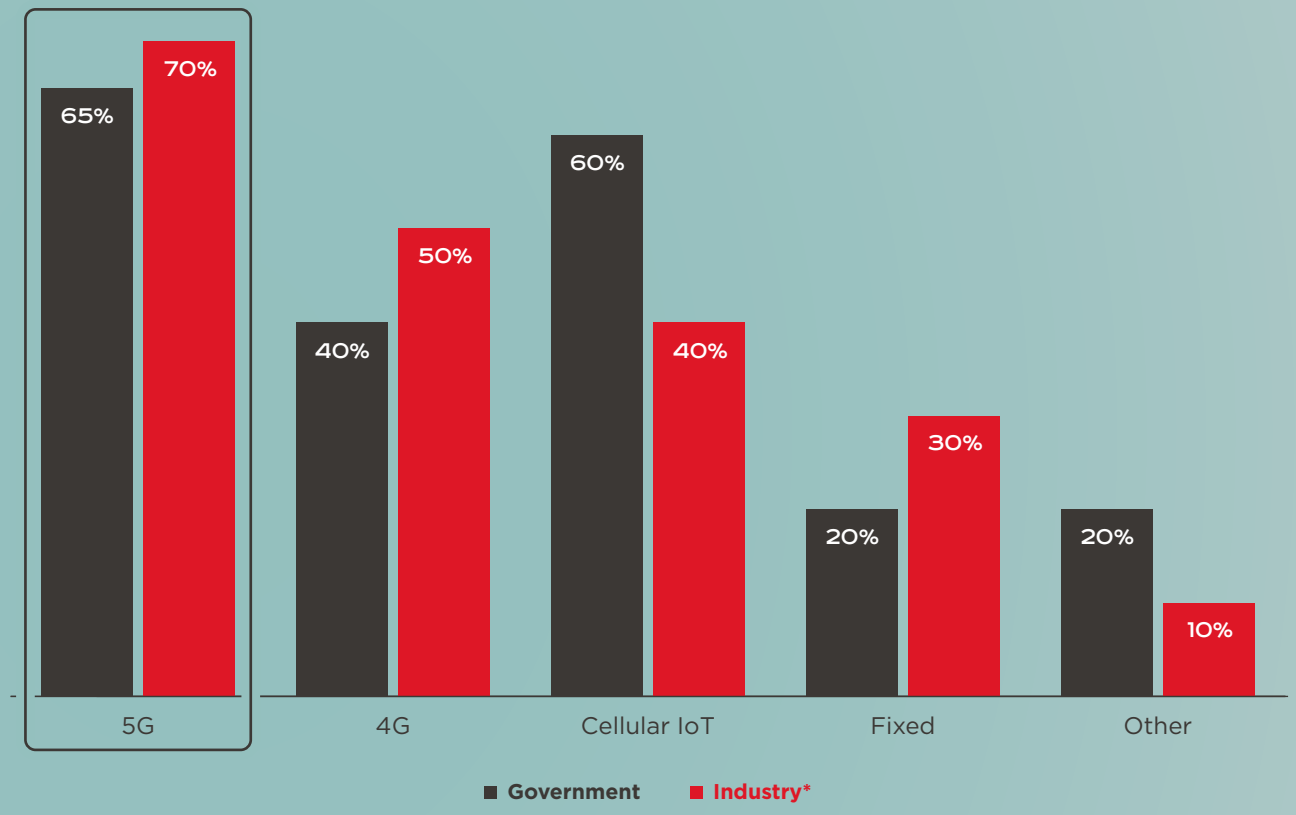
CAT Telecom has partnered with Thailand Post, a state enterprise under the Ministry of Digital Economy and Society, to develop smart mailboxes for more efficient service provision. The boxes will be fitted with IoT-enabled sensors that can detect when parcels are deposited and transmit this data to the nearest post office. Staff monitor the platform on PCs, smartphones and other mobile devices. Thailand Post handles over 1.6 billion items each year and the new initiative will result in up to 22,000 smart mailboxes being installed around the country by 2021.

28 "Airtel and Nokia to collaborate on Industry 4.0 applications for enterprises", Nokia, February 2020
29 "Thailand Post plans Smart Mailboxes using IoT", OpenGov Asia, July 2020

Figure 12

The use of 5G connectivity will be critical for future Industry 4.0 solutions

In the medium term (2025), which access technologies do you believe will be the most important in delivering your country's Industry 4.0 vision? (% of respondents)



*Includes mobile operators

Source: GSMA Industry 4.0 in APAC: Whole-of-Government Approach Survey 2020

4G will continue to expand the reach of mobile, making it an important driver for wider digital inclusion. 5G will serve as a complement, rather than a substitute, to 4G. Standalone 5G will enable new features such as network slicing and ultra-reliable low-latency communication (URLLC) to support new consumer and enterprise use cases. More advanced Industry 4.0 use cases, such as autonomous driving, smart factory, VR/AR and AI, need to be delivered by URLLC and edge computing, for which 5G is best suited.

3 Realising the Industry 4.0 opportunity with a WGA

The post-pandemic world will be shaped by the greater use of digital technologies across society. Everyday activities will increasingly move online, and governments and enterprises will further leverage digital platforms to increase productivity and efficiency. It is essential for stakeholders to take a holistic approach in this process, considering the direct and indirect impacts it will have on society. This means adopting a WGA to the advancement of the digital society. Industry 4.0 is a case in point, given the vital role it will play in future digital societies in Asia.

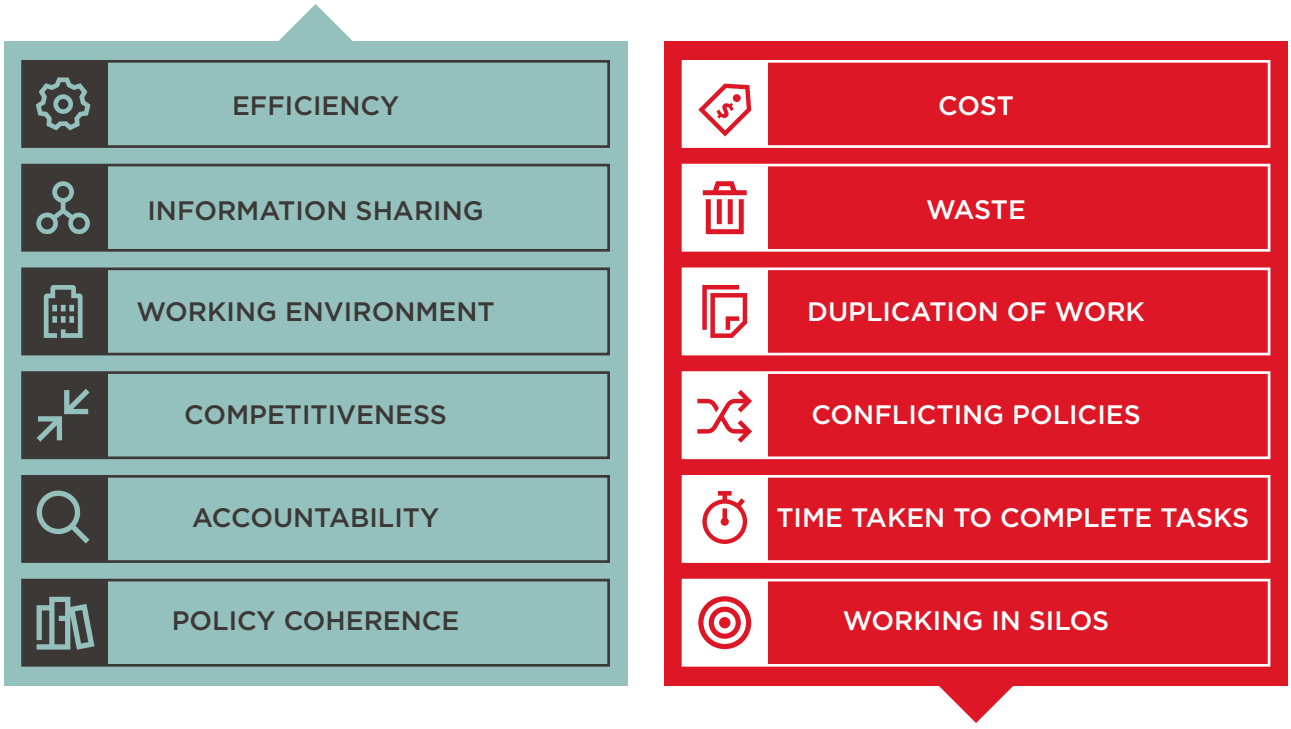
3.1 Rationale for WGA

In practice, a WGA means taking a cross-sectoral and cross-organisational view of the formulation and implementation digitalisation policies and frameworks in order to realise intrinsic collaborative efficiencies and therefore streamline decision-making. The benefits of this approach to governments and wider society are significant. Such benefits include productivity gains, large cost savings by avoiding duplication of efforts, and a way to ensure inclusivity by taking into account the perspectives of different stakeholders.

For example, in June 2019, 284 websites and 91 agencies from all tiers of the Australian government were using the same content management system, GovCMS. A model by Deloitte was commissioned by the Digital Transformation Agency to determine WGA cost savings, which showed that the operating cost for the 284 sites would exceed $73 million if hosted independently. Since the total cost of operating GovCMS in 2018–2019 was $5.9 million, this amounted to an overall saving of $67.1 million.[30]

Figure 13

Rationale for a WGA



Source: GSMA Intelligence

A WGA is essential for advanced digital societies to maintain their competitiveness and provides an opportunity for emerging and transitioning digital societies to leapfrog bureaucratic pain points on the digital societies path. A report by India's Ministry of Electronics and Information Technology suggested that a business-as-usual approach in India would create $500–650 billion in economic value from digital services by 2025. However, this is significantly less than the potential $1 trillion that could be generated in the scenario where digital technologies are fully utilised to unlock productivity, savings and efficiencies through a cross-sector collaborative approach across more diverse sectors, including agriculture, education, energy, financial services, government services, healthcare, logistics, manufacturing, trade and transportation.[31]

30 Annual Report 2018 Part 2: Performance, Australia Government Department of Finance
31 India's Trillion-Dollar Digital Opportunity, Ministry of Electronics and Information and Technology, Government of India, 2019

Figure 14

Around two thirds of government and industry respondents believe that a WGA is extremely important to deliver Industry 4.0

To what extent do you think a WGA is required for the successful implementation of Industry 4.0? (% of respondents who said "Extremely important")

*Includes mobile operators

Source: GSMA Industry 4.0 in APAC: Whole-of-Government Approach Survey 2020

Insights from our survey show that governments and industry players in Asia Pacific acknowledge the importance of a WGA in deliver Industry 4.0. The case for a WGA hinges on the premise that collaboration across public service agencies to achieve a mutual goal and unified government response is key to the successful implementation of Industry 4.0.

Another important factor to consider is the impact that Industry 4.0 will have on people's everyday lives, beyond industrial processes, and the need to ensure positive outcomes for society at large. Coordinated efforts within governments will ensure that overall targets are met through the alignment of policies and regulations that support the Industry 4.0 vision. Without a holistic approach Industry 4.0 will not successfully deliver benefits to society.

In the implementation of Industry 4.0, policy issues transcend agency boundaries, such as tax and fiscal policies, data protection and privacy laws, foreign investment and trade policies, and education and training policies (so-called 'wicked' problems).[32] This means that mobile operators who provide end-to-end services for consumers and enterprises across many economic sectors often come across multiple agencies in the process, giving rise to the potential of increased complexity and costs where there are no holistic responses to policy issues across government department and agencies.

For example, RoW permissions on public lands for rolling out telecommunications infrastructure (fibre and towers) are granted at municipal levels. In many cases, the process is complex (involving coordination among various local departments), time-consuming and expensive. The relatively low level of fibre infrastructure deployment in many countries in Asia Pacific can in part be attributed to difficulties in obtaining RoW permissions.

32 A 'wicked' problem is one that is difficult or impossible to solve because of incomplete, contradictory and changing requirements that are often difficult to recognise.

3.2 Using WGA to address challenges in the delivery of Industry 4.0

One of the first steps in delivering Industry 4.0 is to set out a national vision to provide guidance for key stakeholders. Many governments in Asia Pacific have already done this (see Section 2.2) but now face the challenge of implementing their vision in a manner that maximises the impact of Industry 4.0 on the economy and wider society. Below, we highlight the top challenges identified by respondents to our survey and map them to WGA-based solutions.

Challenge	WGA solution
Network infrastructure gaps	Traditionally, communications/ICT ministries oversee issues relating to network infrastructure deployment. While significant progress has been made overall in providing coverage in urban areas, many rural areas remain underserved due to unfavourable cost-benefit realities. A WGA bringing together relevant government departments, including the finance department and local municipalities, can help to improve the economics of rural infrastructure deployment through various initiatives, such as tax reliefs, enabling RoW policies and public-private partnerships for network rollout. The e-society pillar of Vietnam's National Digital Transformation Roadmap intends to address the 'digital gap' by boosting access to fibre-optic broadband network to 80% by 2025 and to 100% by 2030, in addition to supporting the deployment of 5G nationwide.
Conflicting objectives from cross-ministerial functions and different stakeholders	Policy changes in one sector of the economy can have a knock-on effect in several other adjacent sectors. A WGA can facilitate cross-ministerial coordination to streamline government policies. In Indonesia, the implementation of the government's Industry 4.0 vision is led by the Ministry for Economic Affairs, with participation from several other ministries, including those of industry, finance, communication and informatics, and national development planning.
Lack of ownership, responsibility and accountability on investment and other requirements	A lack of ownership and accountability can make multi-stakeholder coordination difficult. Some countries have adopted a top-down strategy (from the office of prime minister or president) for setting national policies to facilitate collaboration across government and increase engagement with non-government stakeholders. In Japan, the prime minister's office is responsible for the delivery of Society 5.0. There is also a focus on including only relevant ministries in the process to avoid potentially counterproductive outcomes from having too many bodies involved.
Outdated rules and regulations not fit for Industry 4.0	Industry 4.0 relies on cutting-edge technology; outdated rules and regulations can impede progress. For example, Singapore's government is reviewing the Personal Data Protection Act to ensure that it keeps pace with growing digitisation, strengthens the accountability of organisations and consumer trust, and supports the growth of Singapore's digital economy. Where possible, a regulatory sandbox approach can support inclusive policy development, which reflects the perspectives of a broad range of technical specialists (people who are familiar with the technology), policymakers (people who are familiar with pre-existing law and policy) and experiential experts (people who are living the experience or stakeholder groups close to such people). In India, the National Health Authority launched the National Digital Health Mission Sandbox, an initiative bringing together healthcare providers, healthcare software providers and startups to co-develop tech products for the digital health ecosystem.[33]

33 https://sandbox.ndhm.gov.in/

Lack of a sufficiently skilled workforce	Getting the workforce ready and properly skilled for the digital era is a high priority for most governments, as highlighted by responses to our survey. In India, the Skill India initiative aims to train over 400 million Indian citizens and create an empowered workforce by 2022. In its 2020 budget, India's government allocated INR3000 crore ($407 million) for skills development to help bridge a sizable technological skills gap in the country and enhance the global competitiveness of SMEs throughout the country. In addition, the National Institution for Transforming India (NITI Aayog), a policy think tank of the government of India, has set up the Atal Innovation Mission to establish and promote the Small Business Innovation Research and Development programme for SMEs and startups, and rejuvenate science and technology innovations in major research institutions across the country.[34] In Pakistan, the Presidential Initiative for Artificial Intelligence and Computing provides courses on AI, cloud native and mobile web computing, blockchain, IoT, 5G, and software-defined networking and quantum computing to prepare the workforce for Industry 4.0.
Lack of innovation in new services and use cases for consumers and enterprises	A WGA will allow countries to fully harness the power of transformational technologies, such as 5G, AI, big data, IoT, cloud computing and robotics, through targeted R&D. South Korea has one of the highest R&D to GDP ratios in the world.[35] To support the delivery of Industry 4.0, South Korea's Ministry of Trade, Industry and Energy plans to increase R&D spending on five key industries, including autonomous cars, IoT-fitted electronics, and semiconductors and displays, to 50% of the total R&D budget by 2022, from the 30% in 2018.[36]
Tensions between government and the private sector (e.g. culture, business processes and priorities)	To maximise the potential of Industry 4.0, public-private collaboration is required across critical areas, including policy formulation, investment and capacity building. Singapore's Pro-Enterprise Panel (PEP) has business leaders and senior public officers as members. The PEP serves as an internal advocate for businesses within the government with the aim of creating a more pro-enterprise environment that helps businesses to grow. It also works closely with public agencies to provide timely, effective and practical solutions to address the regulatory concerns that businesses face.
Cyber threats and data privacy breaches	A safe, secure and trusted digital ecosystem and network of devices and services is necessary to engender trust in the digital society. Governments have identified cybersecurity risks, treatment of sensitive personal data and companies' internal risk control systems as some of the key issues that need to be addressed by WGA. The Australian Cyber Security Centre (ACSC) leads the Australian government's effort to improve cybersecurity, providing support for individuals and families, large and small organisations, and other government agencies. In August 2020, the ACSC released a voluntary code of practice for securing IoT services, covering all IoT devices that connect to the internet to send and receive data in Australia.[37] The Cyber Security Agency of Singapore has developed a masterplan to help secure operational technology systems in critical sectors, among other measures, to secure cyber-physical systems and IoT services.[38]

34 https://niti.gov.in/aim
35 "S. Korea's R&D spending to GDP Ratio Highest in the World", Business Korea, November 2018
36 "South Korea Boosts R&D Investment For Industry 4.0 Technologies", Asia Pacific Metalworking Equipment News, June 2018
37 "Australian government releases voluntary IoT cybersecurity code of practice", ZDNet, September 2020
38 "Singapore outlines initiatives to tackle OT and IT security", Computer Weekly, October 2019

Uncertainties around investment and business models, causing delays to investment decisions (e.g. high tax, unpredictable tax policies and high cost of network build-out)	Industry 4.0 and the underlying technologies require long-term investments. For example, mobile networks rely on the spectrum to provide high-quality services. Therefore, a WGA on spectrum that creates certainty for operators will be based on assigning a sufficiently large amount of spectrum at an affordable price and publishing future spectrum roadmaps for at least the following five years, detailing how much is planned to be made available in which bands and when. In Singapore, the Infocomm Media Development Authority has issued the 26 and 28 GHz spectrum (also known as mmWave spectrum) without an upfront payment, to support the deployment of 5G, although operators have to pay the same annual usage fee as the winners of the localised 5G licences.

3.3 Using WGA to advance the digital society enablers

In addition to supporting the delivery of Industry 4.0, a WGA is necessary to accelerate progress on the five key digital society enablers. This will be particularly important to create more value for citizens and ensure that no one is left behind in a digital-centric world post Covid-19. As people and businesses increasingly rely on digital platforms and services to interact and operate while socially distancing, there is now a greater urgency than before to ensure that every citizen has the tools they require to participate effectively in a digital society. Below are examples of WGA-based initiatives contributing to the advancement of digital societies in Asia Pacific.

Connectivity: India

The Digital India programme considers access to digital infrastructure a core utility to every citizen[39] and uses Common Services Centres in rural and remote areas to deliver various government and community services. The programme aims to achieve broadband connectivity for all by 2022 through BharatNet,[40] a flagship project that is expected to connect 600,000 villages (under nearly 250,000 gram panchayats,[41] of which already nearly 144,000 are connected) to a fibre network. The government envisages providing a minimum of 100 Mbps bandwidth at each gram panchayat so that online services, including e-governance, e-learning, e-banking, e-commerce and e-health services can be accessed by everyone, particularly those in rural India. A project of this magnitude requires a WGA, with collaboration between government agencies, including state governments, the Department of Telecommunications, the Ministry of Electronics and Information Technology, the Ministry of Finance, NITI Aayog and private telecoms service providers.

Digital identity: South Korea

Mobile operators SK Telecom, LG UPlus, and KT – along with Samsung Electronics, KEB Hana Bank, Woori Bank and Koscom – are jointly developing a blockchain network to allow individuals to identify themselves and control their personal information.[42] The group intends to establish a system for 'self-sovereign identity', a form of digital identification that will remove the involvement of intermediaries and allow individuals to store and use personal information, including resident registration and bank account numbers. Potential use cases include the certification of academic records, diplomas, treatment and compensation records, as well as automatic discounts at amusement parks and films. South Korea has several decentralised identity projects and a WGA will be crucial for integration and interoperability across platforms and services.

39 See https://digitalindia.gov.in/content/vision-and-vision-areas and https://digitalindia.gov.in/content/programme-pillars
40 http://bbnl.nic.in/index.aspx
41 Village council
42 "News Flash: Self-Sovereign Identity Push in South Korea", GSMA, July 2019

Digital citizenship: Vietnam

In August 2020, Vietnam's Ministry of Information and Communications launched a national data portal in collaboration with the Ministry of Natural Resources and Environment, the Ministry of Science and Technology, Ministry of Health, Ministry of Education and Training, Vietnam Social Security, the Vietnam National University and the Vietnam Post Corporation. The data portal[43] was developed under the prime minister's guidelines, with a view to build a digital platform that helps governmental agencies manage, connect and share open data with the public, who can use the data for research, inventions and product development, and to provide feedback to state agencies on how to improve operating efficiency. As an indication of a WGA, relevant government ministries, agencies and local authorities have committed to publishing updated data openly on the portal to improve data transparency and support efforts towards developing a stable infrastructure for Vietnam's digital government.

Digital lifestyle: Australia

In 2017, the Council of Australian Governments Health Council approved Australia's national digital health strategy (2018–2022).[44] The strategy, titled 'Safe, seamless and secure: evolving health and care to meet the needs of modern Australia', identifies seven key priorities for digital health in Australia: i) Health information that is available whenever and wherever it is needed; ii) Health information that can be exchanged securely; iii) High-quality data with a commonly understood meaning that can be used with confidence; iv) Better availability and access to prescriptions and medicines information; v) Digitally enabled models of care that drive improved accessibility, quality, safety and efficiency; vi) A workforce confidently using digital health technologies to deliver health and care; vii) A thriving digital health industry delivering world-class innovation. Using a WGA, the national digital health strategy was developed by all the governments of Australia in close partnership with patients, carers and the clinical professionals who serve them, together with leaders in industry and science.

Digital commerce: Indonesia

In 2017, the government of Indonesia launched an e-commerce roadmap, which established a policy framework and action plans across a host of relevant areas, including taxation, consumer protection, human resource development, communications, management, logistics and startup funding. It also set targets and deadlines for various government entities that are expected to play an important role in future e-commerce growth. Following the implementation of the roadmap through a WGA, Indonesia has become one of the fastest growing e-commerce markets in the world today. According to a GlobalWebIndex report in 2019, 90% of Indonesia's 152 million internet users between the ages of 16 and 64 had purchased online goods or services before.[45] The advancement of digital commerce in Indonesia proved to be especially helpful during the Covid-19 pandemic, as it allowed citizens to shop online with confidence amid the enforcement of social distancing rules in the country.

43 data.gov.vn
44 "Australian Ministers approve Australia's National Digital Health strategy", Australian Digital Health Agency, August 2017
45 See https://datareportal.com/reports/digital-2019-ecommerce-in-indonesia

4 Implementing an effective WGA strategy to advance digital societies in Asia Pacific

The Covid-19 pandemic has reinforced the urgency to deliver affordable and reliable connectivity to all, and to ensure the accessibility of life-enhancing services over digital platforms. At the same time, digital technologies will play a central role in revitalising economic output and reshaping supply-chains, following disruptions caused by the impact of Covid-19, in addition to enabling Industry 4.0 and other digital-centric concepts. The growing complexity of issues that need to be addressed necessitates collaborative responses, delivered in a timely and efficient manner, and for the benefit of wider society.

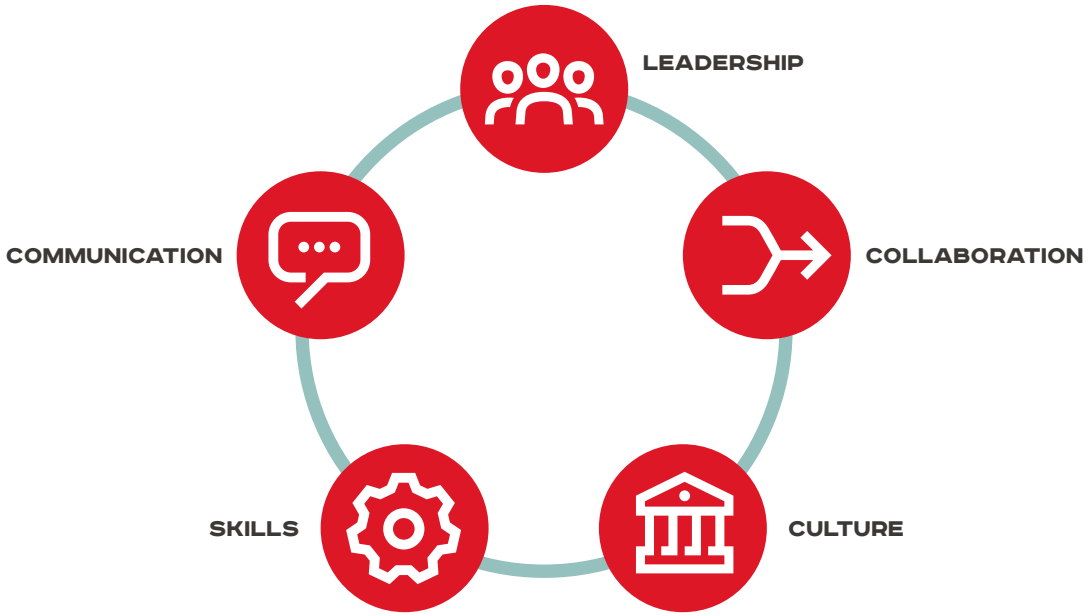
Governments in Asia Pacific have committed to using WGA to implement Industry 4.0 and the overall digital transformation of society, but the degree and process of WGA vary across countries. There is no one-size-fits-all system: local situations and unique circumstances, such as government structure and resource availability, need to be factored into the design and implementation of a WGA strategy.

However, there are several underlying principles and enablers that can guide the development of an effective and sustainable strategy to advance the digital society, regardless of prevailing local situations.

We highlight five key principles below, based on evidence from our survey of Asia Pacific countries and best practice examples from countries in other regions where a WGA has been successfully implemented.

Figure 15

Five key principles for developing and implementing an effective WGA strategy



Source: GSMA Intelligence

Provide effective leadership within government

To implement a WGA strategy to advance the digital society, strong leadership within government is required. In many instances, this is provided from the highest level of government, such as the office of president or prime minister. In other cases, a government ministry could be tasked with the responsibility and given the powers needed to coordinate other government ministries. Effective leadership on WGA should:

- set a clear strategic direction and take ownership of the implementation of that strategy
- bring together diverse stakeholders across government ministries and agencies and other non-government stakeholders for a common objective
- define shared needs and identify potential gaps and redundancies in implementing strategic goals
- quantify the economic value than can be created from cross-sectoral collaboration
- steer process redesign efforts, remove unnecessary regulatory barriers, and harmonise policies and regulations horizontally across sectors
- strengthen governance systems across government and re-engineer businesses operations to eliminate complicated processes and silos within government.

Facilitate collaboration within the digital ecosystem

Digital services permeate virtually all industry verticals and can be impacted by policies and activities in multiple sectors of the economy. Connectivity is the horizontal layer that cuts across all economic sectors and activities. In Asia Pacific, mobile connectivity is typically the first, and sometimes only, form of access to internet connectivity. Consequently, a WGA to the provision and application of digital services should revolve around collaboration among ecosystem stakeholders, as opposed to imposition. In the digital ecosystem, key stakeholders that need to work together include government agencies and policymakers, mobile operators and equipment vendors, enterprises in other industry verticals, entrepreneurs and startups, and consumers and the civil society groups representing them.

Collaboration ensures that:

- every perspective is taken into account and that solutions produce an inclusive outcome
- stakeholders identify synergies and put in place practical steps to leverage those synergies to create value for everyone
- innovation and product developments are relevant for the intended audience
- differences of opinion or perspective can be addressed more swiftly and constructively
- interoperability, which is essential to scale digital platforms and services for consumers and businesses, is easier to implement, as players will be used to collaborating.

Build and sustain a supportive culture to implement policy on a WGA basis

An organisational culture is integral to the successful implementation of WGA. For many stakeholders, WGA may be a novel idea and one that goes against entrenched and siloed ways of doing things. Shifting to a more collaborative mindset and prioritising shared benefits is a necessary step to achieving organisational culture change. For example, culture change in a finance ministry may mean prioritising the shared objective of enhancing digital inclusion among underserved population groups in the formulation of fiscal and tax policies for the telecoms industry. It could also involve issuing additional affordable spectrum (rather than maximising the fees paid by operators), reducing the levies charged by local and municipal governments for RoW to reduce the cost and time to deploy networks, and introducing flexible regulations to encourage B2B partnerships that are needed to implement Industry 4.0 solutions.

Key cultural capacities include:

- the ability to work horizontally across departmental boundaries and build strategic alliances and relationships
- a mindset that embraces innovation and new technologies as opportunities to drive societal growth and progress
- transparency and openness, adaptability to flexibility to accommodate change, and inclusivity of diverse views and opinions.

Ensure that the workforce is equipped with the right skills and knowledge for the digital age

Outside the core ICT ministries and agencies, an understanding may be lacking of the important elements of digital transformation, from the provision of basic connectivity and cybersecurity risks to the trends and application of transformative technologies such as AI and IoT. As such, governments need to ensure adequate training and capacity building of personnel across government ministries and agencies to equip the workforce with the right knowledge and skills to implement WGA for digital transformation initiatives. Some of the mechanisms that have been employed to enhance skills and capacities for WGA include joint training and networking initiatives, greater staff mobility, and access to a panel of learning and development support.

Communicate relevant information to all stakeholders

Communication is essential to highlight best practices and leverage shared solutions, as well as to provide and receive feedback on policies and activities. Lack of clarity and communication is often blamed for the poor implementation of lofty visions and policies. The impact of communication is particularly significant in fast-moving scenarios, such as sudden policy changes to cope with the fallout following the Covid-19 outbreak, and in situations where relevant stakeholders on a given issue have different perspectives that need to be reconciled to achieve a positive outcome. A WGA therefore requires a communications plan that provides clarity on status, expectations, roles and responsibilities, in addition to ensuring that all of the key stakeholders involved or affected by a given policy or action are kept informed about progress.

Appendix A

Asia Pacific country members and sub-regions

Shading indicates focus countries of this report

North-East Asia

- Japan
- Mongolia
- North Korea
- South Korea

Oceania

- American Samoa
- Australia
- Cocos (Keeling) Islands
- Cook Islands
- Fiji
- French Polynesia
- Guam
- Kiribati
- Marshall Islands
- Micronesia
- Nauru
- New Caledonia
- New Zealand
- Niue
- Norfolk Island
- Northern Mariana Islands
- Palau
- Papua New Guinea
- Samoa
- Solomon Islands
- Tokelau
- Tonga
- Tuvalu
- Vanuatu
- Wallis & Futuna Islands

South Asia

- Bangladesh
- Bhutan
- Diego Garcia
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka

South-East Asia

- Brunei Darussalam
- Cambodia
- Indonesia
- Laos
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Timor-Leste
- Vietnam

Appendix B

Industry 4.0 in Asia Pacific: Whole-of-Government Approach Survey

GSMA received responses from 14 government organisations from 11 nations and 17 local and global industry players present in Asia Pacific. Government and industry respondents were from the following countries: Bangladesh, Cambodia, India, Indonesia, Japan, Malaysia, Pakistan, Singapore, South Korea, Thailand and Vietnam.

Based on the assumption that a WGA is required for the successful implementation of Industry 4.0 and that governments adopting this approach are laying down the foundations for future economic growth, we sought to understand how policymakers, regulators and the mobile ecosystem are organised to deliver Industry 4.0 plans and objectives in selected Asia Pacific countries. The survey explored the following four areas:

1 **The key digital foundations that need to be in place to deliver the Industry 4.0 vision, including:**
- high-speed mobile networks (4G and 5G in particular)
- policies/regulatory frameworks in place that enable the safety and security of data within and across borders
- digital talent (leaders, data scientists, technologists and engineers).

2 **The current approach by policymakers to deliver Industry 4.0:**
- Which government body is accountable for delivering the Industry 4.0 plans?
- Who are the key government stakeholders (i.e. ministries, quasi-government agencies and regulatory bodies) that have responsibility for delivering the Industry 4.0 plans?
- Are there any formal mechanisms (e.g. MoU, committees, processes) with government stakeholders? Are there any informal mechanisms (e.g. personal networks, discussions at other meetings)?
- Who are the non-government bodies that are critical to the delivery of the Industry 4.0 plans (e.g. telecoms industry, ICT businesses, manufacturing companies, educational bodies)? Is there a formal process between government and non-government stakeholders to ensure the Industry 4.0 plans are delivered? If so, describe the process.

3 **The pinch points in the delivery of the Industry 4.0 vision:**
- What are the main obstacles that are preventing the delivery of Industry 4.0 objectives?
- What is the impact of these obstacles for different agencies and organisations?
- What changes can be made to overcome these obstacles?

4 **New approaches to address roadblocks:**
- What measures would agencies consider to improve the success of meeting their Industry 4.0 vision?
- How are agencies working with partners across the globe to reduce regulatory barriers to trade in innovative products and services?

Appendix C
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 fully fledged digital society. The metrics of the digital society index rely on 62 indicators across the five main components, with the index giving equal weight to each of the five 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: 3 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: 5 indicators
4. **Digital lifestyle:**
   - **a** Access and use of smart devices: 2 indicators – 25% weighting
   - **b** Solutions beyond core communications into consumer IoT: 5 indicators – 25% weighting
   - **c** Solutions beyond core communications into enterprise IoT: 7 indicators – 25% weighting
   - **d** Locally relevant content online: 8 indicators – 25% weighting
5. **Digital commerce:**
   - **a** Traditional banking: 4 indicators – 25% weighting
   - **b** Financial inclusion: 3 indicators – 25% weighting
   - **c** Transactions: 5 indicators – 25% weighting
   - **d** Online commerce: 5 indicators – 25% weighting

Connectivity is measured across four dimensions:

1. **Mobile infrastructure:** 2G, 3G and 4G network coverage, as well as the number of years since 3G networks launched.
2. **Network performance:** Average mobile upload/download speeds and latency.
3. **Spectrum:** Digital dividend from release of 700 MHz spectrum for mobile use, sub-1 GHz and above-1 GHz spectrum used for mobile services per operator.
4. **Other enabling infrastructure:** Access to electricity, international bandwidth per internet user, the number of secure[46] internet servers per capita, and internet exchange points per 10 million people.

46 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 and share of licensed cellular IoT connections as a percentage of total connections.
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 others (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:** Local relevance and availability of content. Local relevance captures the proportion of the population that are active users of social media, the number of apps developed per internet user, the index score for online services and the number of generic top-level website domains per capita. Availability of content captures accessibility of top mobile apps in the Apple and Google Play stores, 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.

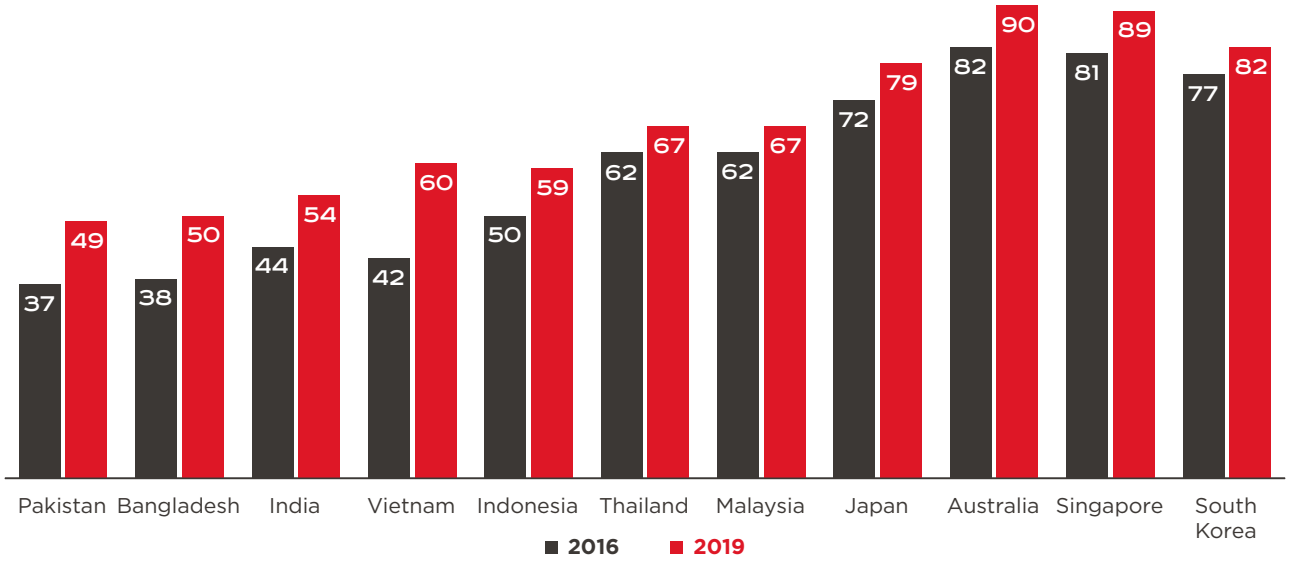
Digital commerce is measured across four dimensions:

1. **Traditional banking:** The number of commercial bank branches and ATMs per capita, as well as degree of ownership for credit cards and debit cards.
2. **Financial inclusion:** The percentage of adults that have a mobile money account or an account at a financial institution, and the percentage of population using online banking.
3. **Transactions:** 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.
4. **Online commerce:** The percentage of the population that has made or received digital payments, the share of adults that have ordered or purchased goods online and the share of online shoppers. Additionally, this dimension measures the availability of electronic content in a country.

2016–2019 scores for the five components of the digital society index

Figure 16

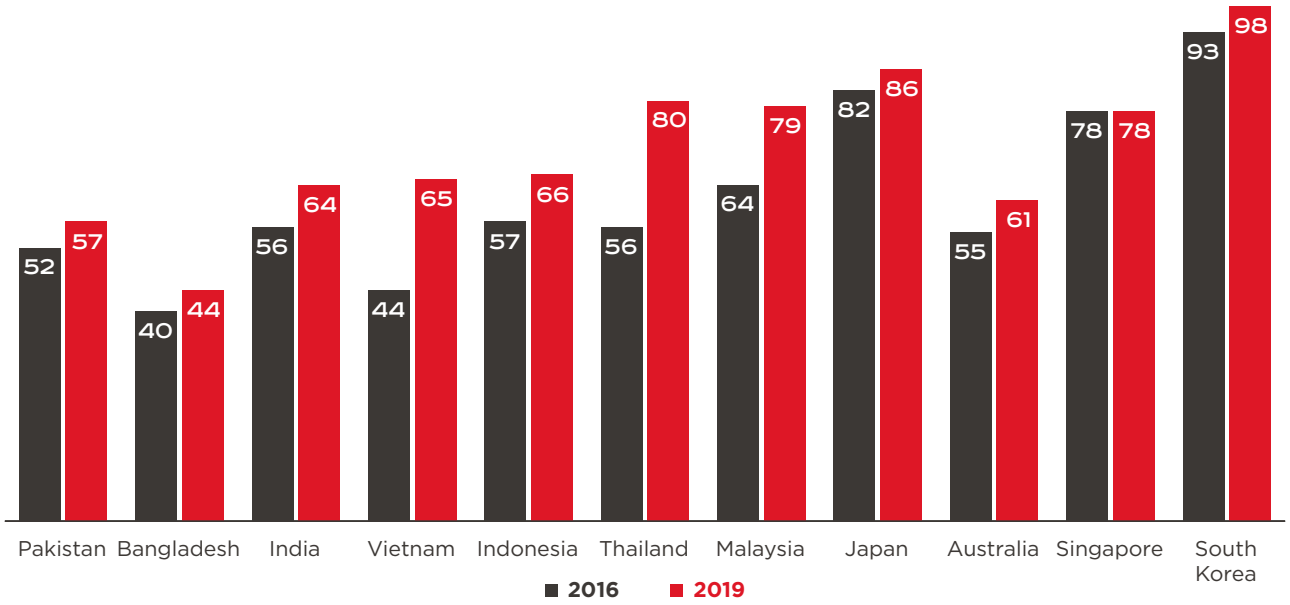
Connectivity scores



Source: GSMA Intelligence

Figure 17

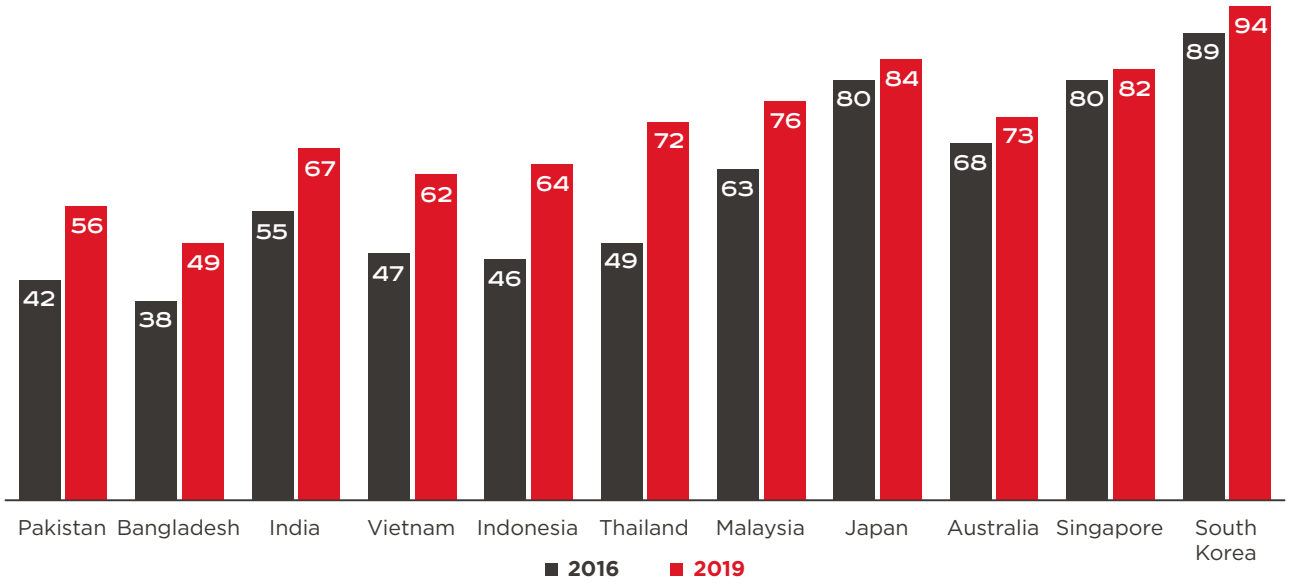
Digital identity scores



Source: GSMA Intelligence

Figure 18

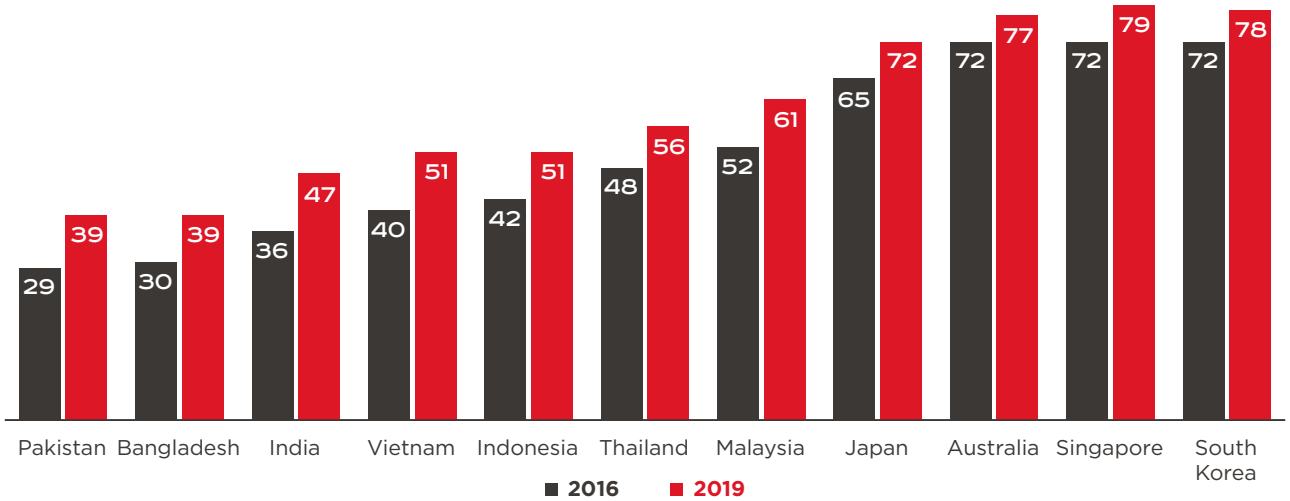
Digital citizenship scores



Source: GSMA Intelligence

Figure 19

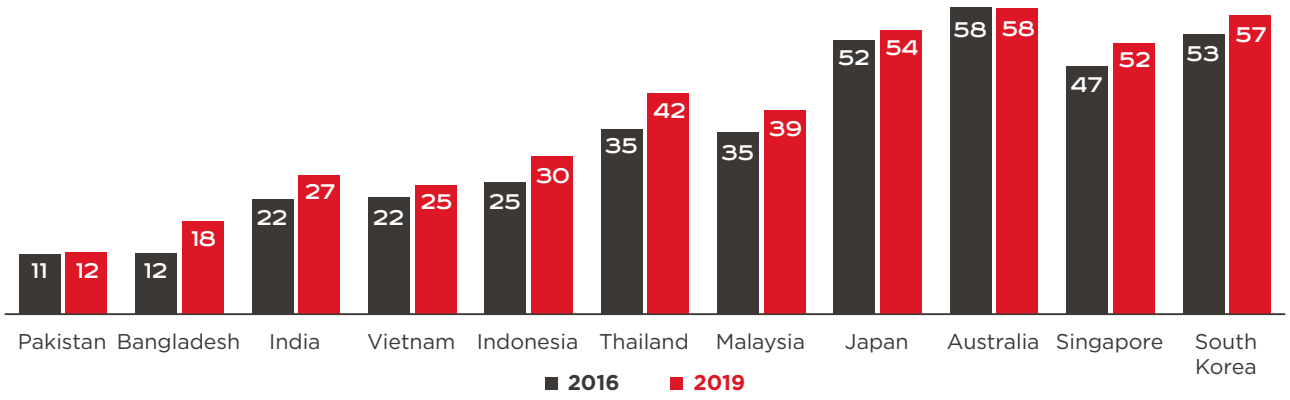
Digital lifestyle scores



Source: GSMA Intelligence

Figure 20

Digital commerce scores



Source: GSMA Intelligence

Building the index

The process for building the index consisted of determining the relevant data for the five components, identifying the 62 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, UNCTAD, IMF Financial Access Survey, the creative agency 'We are Social', the automotive trade association, Organisation Internationale des Constructeurs d'Automobiles (OICA) 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 eGov Index, which assesses different aspects of e-government services.

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