



Advancing Digital Societies in Asia



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TRPC is a research consultancy with over 25 years' experience in the telecommunications and information technology industries in the Asia-Pacific region. It offers specialised advisory, research and training services, with a focus on economics, regulatory and strategic business issues, and possesses an extensive network of industry experts and professionals throughout the region.

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1 Executive Summary

Adoption and use of digital technology is driving economic, social and cultural value

Digital technology is evolving rapidly, leading to the emergence of new services and applications that are transforming the way people live, work, play and communicate. Beyond basic web browsing, which revolutionised the way people accessed and shared information in the 1990s, the emerging digital era is based on the interconnection of multiple devices over intelligent networks, enabling users to seamlessly interact with a variety of interoperable services. The large-scale societal adoption and utilisation of digital technologies is a key driver of measurable economic, social and cultural value, including increased productivity, a rise in employment rates, improved security, and greater capacity to tackle social and environmental issues.

Personal access to affordable and reliable Internet connectivity is the foundation of a digital society. As a nation's government and business activities

become more digitised, digital citizenry increasingly becomes a prerequisite for effective societal participation. The benefits of digital inclusion – and the adverse consequences of digital exclusion – become more profound. This is especially pertinent in many Asian countries, where rapid technological transformation frequently sits beside large unconnected populations.

Beyond connectivity, policymakers need to identify the complex adjacent elements required to create an interoperable digital ecosystem at a national level. This involves prioritising initiatives that drive a specific and measurable digitisation agenda, with strong support from the highest levels of government and the establishment of regulatory frameworks able to support the demands of an increasingly connected and converged society.

Asia represents a diverse landscape of emerging, transition and advanced digital societies

The level of digitisation of a country defines the primary focus of its digitisation agenda. We outline three broad categories of a digital society – emerging, transition and advanced. Emerging digital societies mainly see digitisation as a tool for accelerating socioeconomic development, particularly in relation to improving social inclusion. Transition digital societies focus on the personalisation of services to achieve higher levels of engagement between individuals and institutions. Advanced digital societies focus on developing interconnected and interoperable processes and services between sectors for productivity and efficiency gains.

Asian countries are spread across all three categories, reflecting the region's diverse digital landscape. There is no single pathway towards a digital society or a pinnacle of digitisation; rather, it is a continuous process of integration and interconnection of processes and services to create new and more efficient ways of doing things. However, common core governance structures and regulatory settings must be in place for countries to develop meaningfully as a digital society. These include consumer protection, competition, privacy and data protection, network security, taxation, and universal service and accessibility.

Specific steps required to move up the digital value chain

Analysis of the digitisation status and plans of seven Asian countries – Australia, Bangladesh, Indonesia, Japan, Pakistan, Singapore and Thailand – highlights key steps required to move up the digital value chain:

- **Emerging digital societies**, represented by Bangladesh and Pakistan, need to adopt holistic planning mechanisms to build the foundational elements of more advanced digitally enabled activities and transactions, and must establish the enabling regulatory environment for creative disruption to occur.
- **Transition digital societies**, represented by Thailand and Indonesia, need to progress from connectivity to 'hyper-connectivity', epitomised by interoperability across networks (regardless of sector) and the implementation a forward-looking agenda focused on utilising those networks for all manner of services.
- **Advanced digital societies**, represented by Australia, Japan and Singapore, should focus on improving citizen experience when accessing public services and, crucially, assuming a regional leadership role in standards setting and the sharing of best practices with other nations (especially in key areas such as IoT) to create a truly 'Digital Asia'.



Regional organisations set to play a more active role in harmonisation and collaboration

Government and economic organisations play a potentially crucial role in regional development, both in terms of helping define and promote forward-looking national digital development agendas, and in developing and supporting a harmonised approach to issues bearing cross-border and transnational dimensions.

Although some organisations, such as APEC and ASEAN, historically have used a ‘soft law’ approach to consensus-building in order to mitigate political tensions among members, the time has now come to play a more active role in establishing and

harmonising regional frameworks, and in aligning national digital society regimes in areas such as privacy, transactions, *de minimis* trade levels, spectrum and roaming rates. The non-binding nature of these institutions does not mean they must succumb to inaction. Rather, regional organisations should leverage their convening powers and marshal the imperative of collective strategic interest (that in many cases led to their formation) to bring together members and a wider group of stakeholders – including the private sector across different verticals, and NGOs – to create platforms for greater collaboration.

2

Digital society: the interconnectedness of things

Digital technology has evolved considerably over the last four decades, from basic computing and process automation in the 1970s and 1980s, to the democratisation of information in the 1990s and early 2000s with the transformational effect of the Internet on the way people communicate and transact. This decade has seen exponential growth in the number of connections between governments, businesses and citizens, ushering in new consumer attitudes and expectations, as well as more competitive and innovative markets.

The term 'digital society' refers to a modern society where citizens seamlessly interact with different aspects of life, including work, play and communication, over digital channels through a network of intelligently connected devices and interoperable services. In practice, people in a digital society can access and interact with a host of public and private services, including financial services,

utilities, education, health and transportation, any time and anywhere using digital technologies. This has led to the rapid rise of new market segments and business models, with the boundaries between products and services increasingly blurred by the interconnection of previously disparate processes and industry verticals.

Figure 1

Increasing interconnectivity



Source: GSMA Intelligence

Digitisation is an important driver of economic development and wealth creation, due to its proven ability to enhance productivity and allocative efficiency, and extend the reach of products and services beyond physical barriers. It also creates a platform for governments, businesses and citizens to communicate, collaborate and share information more effectively. Digitisation initiatives by governments around the world have increased the

level of engagement with citizens and businesses, and created broader societal value through improved service delivery and organisational performance. For example, improved access to healthcare and education via digital platforms has led to improved quality of life for individuals and their families in a number of countries, fuelling a virtuous cycle that boosts economic growth, creates more jobs and reduces poverty.

Around 40% of the 800 million transactions people in Australia conduct with federal and state government agencies are completed using conventional channels, such as by phone or in person. If this figure were reduced to 20% over a 10-year period, productivity efficiencies and other benefits to government worth about AUD17.9 billion would be realised, according to the 2015 economic study, *Digital Government Transformation: Unlocking the Benefits of Digitising Customer Transactions*, by Deloitte Access Economics. The savings to citizens – in terms of time, convenience and out-of-pocket costs – are worth a further AUD8.7 billion. The study also found that, combining the benefits to governments and citizens, the next stages of digital transformation in the country could deliver benefits worth about four times as much as they cost.

2.1 The foundational elements of a digital society

Internet connectivity is a key foundational element for a digital society. It is the primary requirement for creating, distributing and consuming digital application and services. The expansion of Internet connectivity has been a key driver for the advancement of digital societies; the total number of people connected to the Internet is estimated at 3.35 billion¹ and will rise to 7.60 billion² by 2020. The significance of Internet connectivity to the advancement of a digital society is demonstrated by the higher level of digitisation in countries with an established broadband infrastructure. South Korea has one of the most developed broadband infrastructures globally in terms of speed and coverage, and is also one of the most advanced digital societies.

To realise the full potential of a digital society, the development of broadband infrastructure needs to be complemented by individual – rather than communal – access. Individual connectivity enhances users' engagement within their social network,

increases use of digital public and private services, and helps address concerns over security and privacy when accessing personalised services, such as medical or tax records. In contrast, communal connectivity does not support the key elements of convenience, privacy and continuous accessibility in the use of digital services.

Other macro factors are also critical to the advancement a digital society. Two of these factors are:

- a stable macroeconomic environment, underpinned by inclusive economic growth, political stability and pro-investment policies
- a digitally literate consumer base with access to connected devices.

The former helps to attract the skills and capital to build the required infrastructure and content; the latter allows more complex interactions to occur online.

2.2 The components of a digital society

Policymakers need to expand their digitisation efforts beyond building the key foundational elements of connectivity to identify the complex adjacent elements needed to create a thriving and, crucially, interoperable digital ecosystem at a national level. This involves prioritising initiatives that drive a specific and measurable digitisation agenda and, as is the case in several countries, addressing digitisation as part of a national growth and development strategy. A study by Strategy& found that an increase in digitisation has a greater impact on a country's GDP compared to an increase in broadband penetration only.³

Many countries transitioning to digital societies are seeing the benefits of a digital culture on key areas such as economic competitiveness, citizen

engagement, job creation, improvements in living standards, and the capacity to tackle environmental challenges. A good example is Estonia's digital society programme. This enables citizens to engage in more than 160 different government transactions, such as paying bills, filing taxes and accessing medical records. The programme has resulted in significant time and cost savings by eliminating the need for paperwork and physical travel.

A coherent and feasible digitisation strategy is essential for enabling three broad and interrelated components required for a digital society to function effectively and deliver benefits to all sectors of society: digital citizenship, digital lifestyle and digital commerce (see Figure 2).

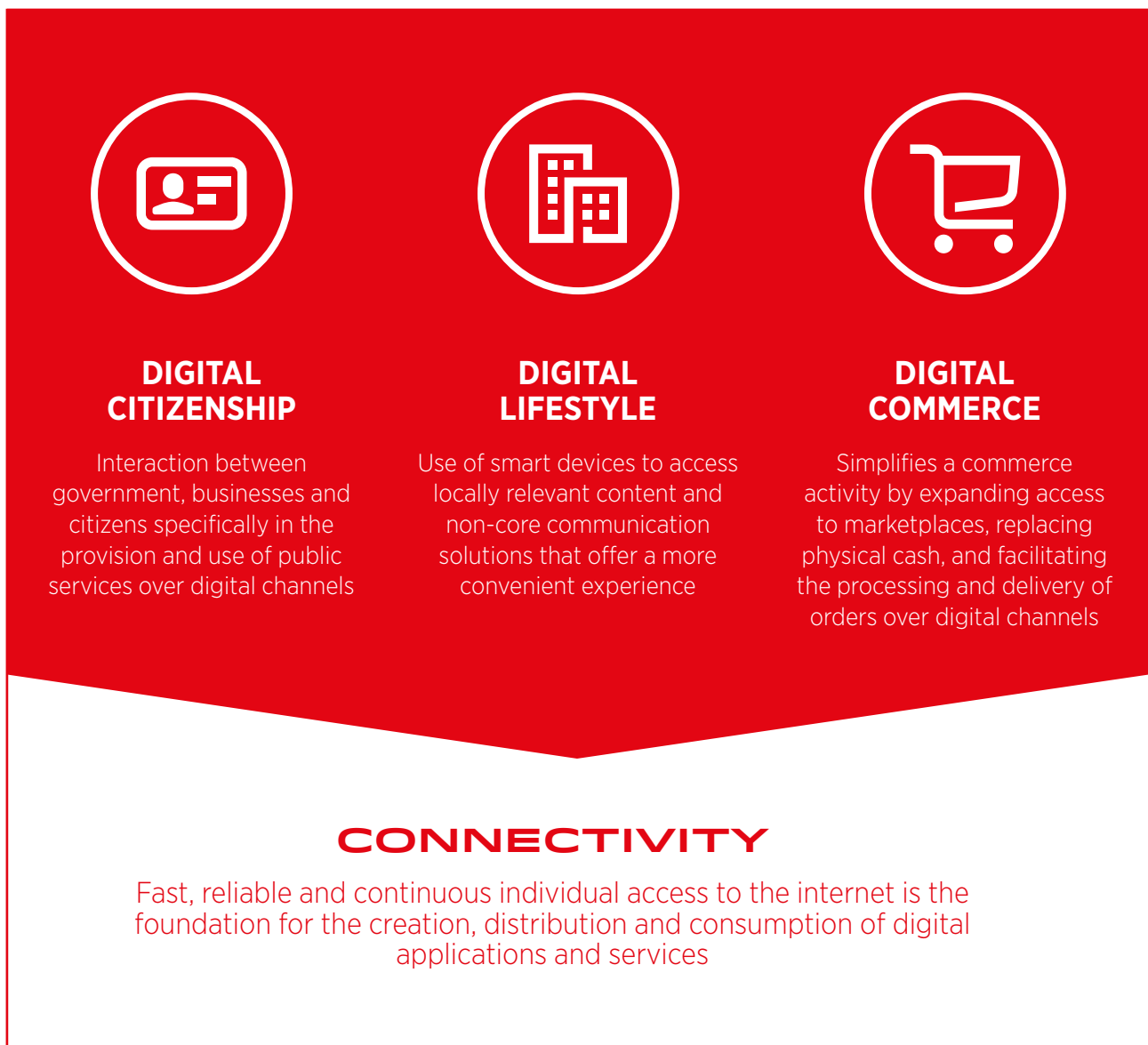
1. Internetlivestats.com

2. The State of Broadband 2014: broadband for all, Broadband Commission, 2014

3. Maximising the impact of digitization, Strategy&, 2012

Figure 2

Key components of a digital society



Source: GSMA Intelligence



Digital citizenship

Connected entities in a digital society – citizens, businesses and government – expect to access services online and transact electronically. For example, citizens want to be able to access medical records, apply for a passport or business permit, pay tax or even vote in elections online, eliminating the need to travel to and wait in government offices for long periods while also reducing the processing times for requests and applications. For developing countries with large populations, digitisation offers the opportunity to improve the quality of data collection and management, and accelerate the provision of public services in areas lacking the necessary administrative infrastructure.

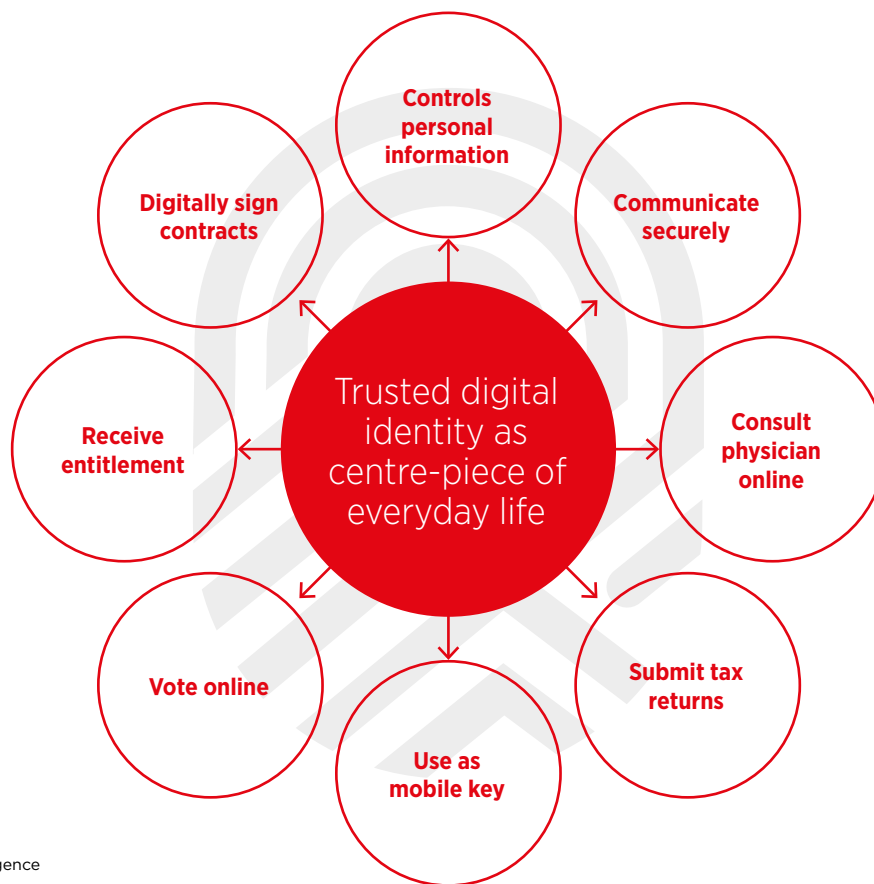
Shifting public services to digital channels also generates considerable benefits for governments – in particular, productivity enhancement, cost savings and efficient allocation of resources. In South Korea, around 90% of all government interactions can now be performed online. As one of the most advanced and comprehensive e-government initiatives, the country's strategy integrates and coordinates responsive, efficient customer services, governance and policy making. Customised services for individuals and businesses, accessible through multiple digital channels, have eliminated approximately 70% of all document requests.⁴ In the UK, the government saved around £3.56 billion over the three years to 2015 from the digitisation of public services on the gov.uk platform.⁵

4. Secure Identity Alliance, March 2014

5. "How digital and technology transformation saved £1.7bn last year", gds.blog.gov.uk, October 2015

Figure 3

Digital identity is central to accessing digital citizenship services



Source: GSMA Intelligence

Accessing government services and conducting many other daily activities depends on peoples' ability to prove their identity. Physical forms of identification, such as paper or plastic documents, have traditionally been used for identification and authentication, but are less relevant for accessing digital services. A secure and scalable digital identity ecosystem is essential to address the imbalance between the provision of digital services and the ability of citizens to identify themselves

on digital channels. Beyond public services, a secure digital identity is also essential to accessing a host of timesaving lifestyle applications – from receiving tailored promotions and special offers at the point of purchase, to signing digital contracts online and unlocking a rental car booked online. Governments and industry players around the world are developing frameworks for sustainable and interoperable digital identity systems and, by extension, enabling digital transactions.

The UAE government provides an interoperable digital identity for citizens and residents, following the integration of public key infrastructure (PKI) technology into its identity management system in 2003. The stated mission of the programme was “to contribute to stability, security and national prosperity through the provision of personal identity, an accurate population register and innovative electronic services.” The programme revolves around the digital identity card, which contains a unique identity number, basic biographical data, biometric information (for those older than 15 years old) and digital certificates of the card holder. It replaces all other forms of identification. Through the PKI gateway, citizens can digitally sign transactions and transact seamlessly with different government departments via a single sign-in.

Digital lifestyle

Digitisation is transforming the way people live, work, communicate and play. Remote working and learning, the use of social media platforms to communicate, virtual reality (VR) experiences, and the growing trend of music streaming are examples of the lifestyle changes that can be traced to the advancement of digital technologies. A key driver of this trend from a consumer perspective is the emergence of new, often disruptive, digital business models that offer significant additional value, such as convenience, through tailor-made solutions. These new business models are often characterised by a considerable increase in horizontal cooperation across the value chains and, by extension, the increasing integration of the digital and physical

worlds as consumers become more inclined to using a product as part of a service over a digital platform.

Access to affordable connected devices is a key factor for a digital lifestyle in any society. The range of connected devices has grown significantly over the last decade on the back of the exponential growth of apps and cloud-based services, with the smartphone emerging as the hub of an individual's digital experience. It is the one device that people have with them at all times. Its increasing functionality, such as embedded sensors for biometric identification, and the expanding apps ecosystem make it a suitable medium for interacting with a variety services and processes.

Figure 4

Interconnection of devices is driving lifestyle changes



Source: GSMA Intelligence

Digital lifestyle is further enriched by the Internet of Things (IoT) – the intelligent connection of devices and appliances to the Internet through multiple networks to produce a smarter outcome than the individual parts. These devices include everyday objects such as smartphones, tablets and wearables, and other machines such as vehicles, monitors and sensors equipped with machine-to-machine (M2M)

communications allowing them to send and receive data. IoT impacts lifestyles primarily by bringing real-time information to people's fingertips – for example, traffic, weather and public transport information. Smart city projects, which focus on the adoption of integrated technology to improve urban life, are also underpinned by IoT.

Sitting adjacent to Seoul, Songdo International Business District has been built from scratch with the ambition of promoting green, low-carbon living by embracing technology. Built over 600 hectares, the city is embedded with technology and sensors that continually monitor air quality, traffic and energy consumption. An integrated network of cellular towers and Wi-Fi hotspots ensures ubiquitous high-speed connectivity across the city, providing continuous access to various infrastructure and services, including government departments, schools, transportation, hospitals, utilities, law enforcement and other community services. While the city is too new for detailed research, anecdotal evidence suggests a high quality of life and significant energy savings.

Digital commerce

Digital commerce covers all forms of digital payments and interactions with financial services, from payments to viewing and managing online bank accounts in a fast, transparent, secure and efficient manner. Capgemini's *World Payments Report 2015* highlighted that the volume of non-cash payment transactions was growing faster than GDP across all geographies, underlining the significance of digital commerce in contemporary society. In both developed and developing countries, digital commerce has created new economic models and reshaped business processes across many industries, including public services, retail, transport, financial services and entertainment, enabling governments and businesses to engage

with citizens and customers in more dynamic and efficient ways.

Digital commerce also extends the addressable market for goods and services by overcoming physical barriers, particularly in developing countries where considerable proportions of the adult population lack access to appropriate financial services and products, including savings, payments, credit and insurance, at a cost affordable to the customer and sustainable for the provider. Non-bank players, such as mobile operators, are increasingly using digital technologies to extend financial services to areas with underdeveloped financial infrastructure.

The Bank of Korea plans to make South Korea a cashless society by 2020. To achieve this, it has implemented several strategies including a 2% VAT reduction on all card payments as well as a policy of auditing all companies that refuse to install card terminals. There are many benefits to a cashless society; the cost savings of moving to a cashless society could equal between 0.1% and 1.1% of national GDP.⁶ A cashless society would also help restrict the shadow economy, increasing tax revenue and curtailing criminal activity. A cashless society would help the Bank of Korea more fully implement macro-economic policy as it becomes increasingly difficult to hold wealth outside the economic system.

6. "Korea shifting to cashless society", Korea Times, February 2016

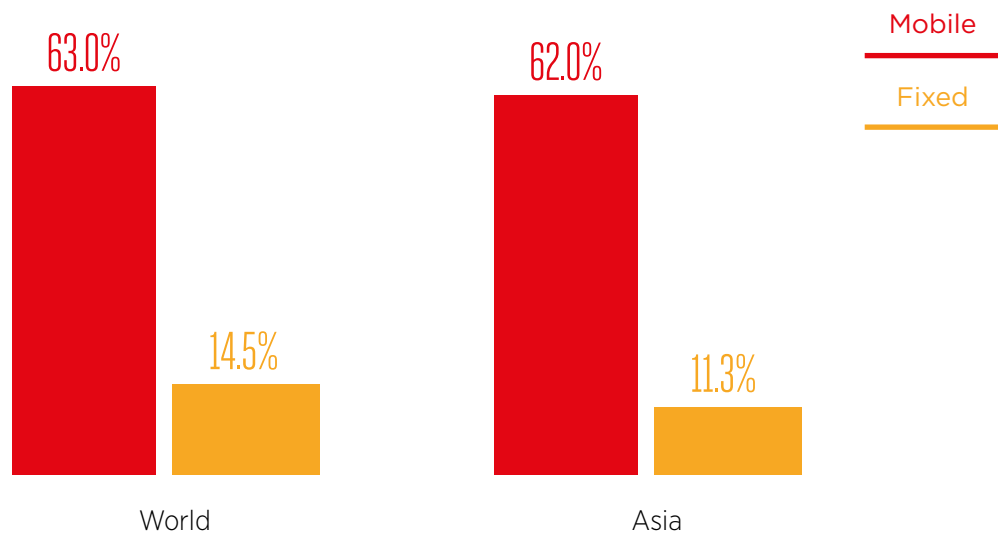
2.3 Mobile technology – enabling a digital society

Mobile technology has emerged as a key enabler for a digital society. Wireless networks cover a wide area with greater efficiency than many other technologies, particularly in developing countries which have underdeveloped fixed network infrastructure and low levels of urbanisation. This point is particularly relevant for Asia, where mobile networks are increasingly ubiquitous. Continued investment by the mobile operators means that coverage levels have also increased markedly across

the region, with 2G coverage in most markets now generally over the 90% level and average mobile broadband⁷ coverage at 46%, albeit with significant variations between the developed and developing countries in the region. Fixed penetration across the region is low due to the limited reach of fixed infrastructure; on average across the region, only 11% of the population has a fixed connection⁸, compared to 62%⁹ that subscribes to a mobile service.

Figure 5

Mobile versus fixed line penetration, 2015



Source: GSMA Intelligence, ITU

Mobile technology has evolved considerably over the last decade, with high-speed networks and smartphones supporting the delivery of advanced digital products and services. For example, many modern phones now come with sensors that facilitate a range of complex digital applications. The technology also supports individual connectivity

through personal devices, such as smartphones and wearables, enabling the user to access digital services in a convenient and secure manner. Three key elements of a digital society – connectivity, identity and financial access – are enabled by mobile technology.

7. Speeds of 3G and higher
8. ITU data
9. GSMA Intelligence

Connectivity

Globally, 3.2 billion people are accessing the internet via mobile and directly benefiting from and contributing to the digital economy. However, around 4 billion people remain offline, unable to participate in digital services. The unconnected population is predominantly located in developing markets, typically on low incomes. Mobile represents the best opportunity to bring these people online, particularly those living in rural areas and difficult terrains where the cost of deploying other technologies, such as fixed broadband and Wi-Fi, is prohibitive.

The ubiquity of mobile networks means they cover a greater proportion of the population in most markets than any other technology. More than 95% of the global population are now covered by a 2G mobile network, with 70% having access to 3G speeds or higher. Mobile services and devices are also increasingly becoming affordable, thereby easing one of the main barriers to personal access. Entry-tier smartphones costing less than \$50 have become a reality in recent years and now account for a growing proportion of smartphone sales in developing markets.

Identity

Although connectivity is key to the success of digital services, security is also an important consideration. As the number of digital services has grown and the level of risk individuals are exposed to has increased, governments and businesses recognise the need for more sophisticated, secure and convenient ways of creating, managing and applying digital identities.

Mobile identity represents a valuable platform through which to achieve these aims. Mobile offers a compelling proposition for governments and businesses seeking to provide secure access to digital services; the value of mobile identity for businesses and public administrations lies in its ability to provide increased convenience and accessibility, strong security and enhanced privacy for people, as well as lower implementation costs and higher uptake of digital services.

Mobile-based identity solutions are already meeting these expectations in several countries; in Estonia, citizens use their mobile identity (Mobile-ID) to engage with more than 400 public and private services.¹⁰ Citizens and residents with Mobile-ID can access private health records, register a business, declare their taxes and sign legal contracts all

through the legally binding PKI-based signature functionality on their mobile device, which holds the legal equivalent to a physical signature. The UAE is also implementing a mobile identity initiative that will allow residents to use their mobile phones as proof of identity when dealing with government departments and to make payments.

As governments develop their electronic identification frameworks further and create online environments where individuals and organisations can trust each other, cooperation between mobile operators and policymakers is required. The GSMA Mobile Connect service – a mobile operator facilitated authentication solution that provides simple, secure and convenient access to online services – provides a potential solution. It works by combining the user's unique mobile number and PIN to verify and authenticate them online, offering a single, trusted, mobile phone based authentication solution that respects their online privacy. Mobile Connect has been launched by nearly 40 mobile operators in around 30 countries, including Bangladesh, India, Indonesia, Thailand and Pakistan in Asia, with potential to reach more than 2 billion users.

10. Estonian Mobile ID: Driving Today's e-Services Economy, GSMA, 2013

Financial access

Digital commerce has grown significantly in recent years. A lot of that growth is driven by mobile commerce – electronic transactions performed on mobile phones. Consumers are increasingly using contactless payment technologies, such as near-field communications (NFC), while businesses in various industry verticals, including financial services, retail and transportation, are enhancing the user experience of their digital services on mobile platforms. South Korea's plan to become a 'cashless society' by 2020 relies heavily on the use of mobile platforms for digital commerce activities. Daily usage of mobile banking in the country grew by 45.5% in 2014 to 31 million transactions and now accounts for more than half of the country's 95 million Internet banking accounts.

But mobile is not just an alternative channel for existing digital commerce platforms. Crucially, it is changing the landscape of financial inclusion in developing countries where the majority of people without access to formal financial services live. People living in remote rural communities that are culturally and socially distinct from cities are able to use mobile money to purchase goods and services that would have previously been unobtainable.

In Pakistan, around half of the adult population (approximately 60 million people) have access to a mobile phone but no bank account. As a result, mobile money providers (or 'branchless banking' service providers) have heavily invested in the opportunity to extend the reach of mobile

financial services to people outside the traditional banking system. By the end of 2014, 7% of the adult population in Pakistan (just under 9 million people) had used P2P transfers or bill payment services offered by branchless banking operators at least once. As well as P2P transfers, the industry has successfully delivered various government-to-person (G2P) campaigns such as the Benazir Income Support Programme and Internally Displaced Persons payments, with the total value of transactions equivalent to approximately 3.5% of the country's GDP¹¹.

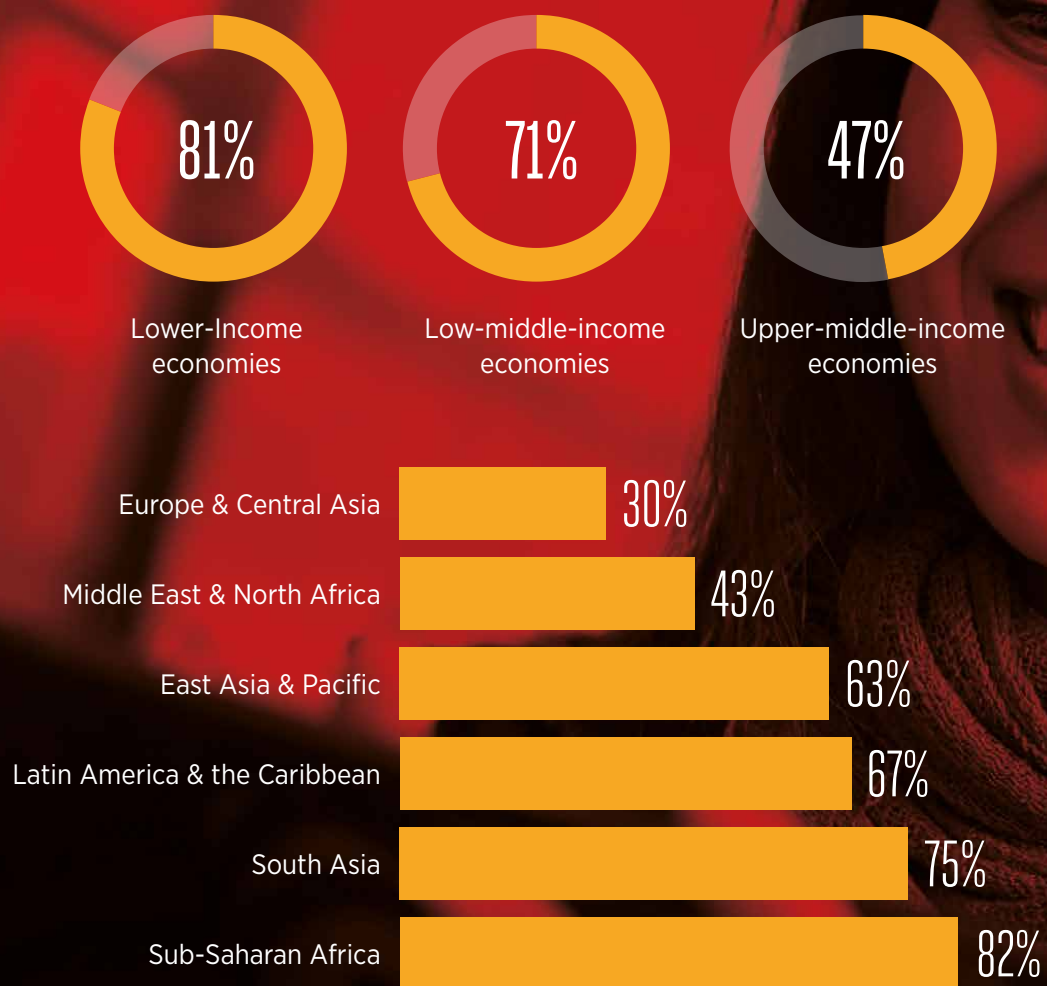
With the opportunity to manage their money more effectively and generally improve their financial health, people have greater access to health and education and can create micro economies. This results in healthier, more educated people with greater potential to drive economic growth. In 2015, 37 markets had ten times more registered agents than bank branches, and registered customer accounts grew 31% to reach a total of 411 million registered accounts globally. Mobile money services are now available in 93 countries via 271 services¹². Mobile operators continue to play a leading role in delivering mobile money and deepening financial inclusion by leveraging core assets such as customer relationship and agent networks: 69% of services launched in 2015 are operationally run by mobile operators, and 58% of all live services are mobile operator-led.

11. Building digital societies in Asia: Making commerce smarter, GSMA, 2015

12. Mobile Money 2015 State of the Industry Report, GSMA, 2016

Figure 6

Percentage of developing markets with mobile money, by region and income level



Source: Mobile Money State of the Industry Report, GSMA, 2015

3

The digital society landscape in Asia

The level of digitisation in a society depends on the connectivity of its citizens as well as the advancement of the components of a digital society. We have identified three broad categories of digital society: emerging, transition and advanced. Figure 7 shows the key elements underpinning each category.

Figure 7

Evolution of a digital society

EMERGING DIGITAL SOCIETY

Exhibit the early stages of a digital society with an emphasis on digital and financial inclusion.



DIGITAL CITIZENSHIP

Identity is based primarily in physical documents. Some citizens will not have these documents and will struggle to prove their identity.



DIGITAL LIFESTYLE

Is likely to be limited due to insufficient infrastructure and cost barriers.



DIGITAL COMMERCE

May display advanced levels of simple digital payment systems e.g. mPesa. Online banking and card-based payments likely to be low.

TRANSITION DIGITAL SOCIETY

Some personalised services are available to citizens, allowing them to perform private transactions with public and private institutions online.



DIGITAL CITIZENSHIP

Some forms of digital identity are available but are likely to be limited to a few specific use cases and not yet widely adopted.



DIGITAL LIFESTYLE

As infrastructure develops some elements of digital lifestyle may become more prevalent.



DIGITAL COMMERCE

As the number of citizens with bank accounts rises, more complex digital payments, such as loan facilities and online insurance schemes, become available.

ADVANCED DIGITAL SOCIETY

A high level of integration of public and private infrastructure and services. A strong emphasis on efficient utilisation of scarce resources.



DIGITAL CITIZENSHIP

Robust, secure solutions for establishing digital identity have been fully integrated across public and private spheres.



DIGITAL LIFESTYLE

High levels of infrastructure and investment lead to implementation of smart-city programmes and adoption of IoT across industry verticals.



DIGITAL COMMERCE

Digital payments are prevalent across all aspects of society and become the standard method of interacting with money.

Source: GSMA Intelligence

Emerging digital societies largely see digitisation as a tool for accelerating socioeconomic development, particularly in relation to improving social inclusion. Most services centre on digital citizenship and digital commerce, with the primary goal of increasing citizens' engagement with government and driving digital and financial inclusion. For these countries, the provision of essential services, such as healthcare, education and financial services, which are otherwise not easily accessible due to a lack of infrastructure, poor logistics and lack of affordability, is a priority.

Transition digital societies sit between the emerging and advanced digital societies. The key difference between transition and emerging is the personalisation of services in the former, which leads to higher levels of engagement between individuals and institutions. There is also an increasing focus on more advanced lifestyle services, partly driven by the need to effectively tackle the social, infrastructural and environmental issues that arise with rapid urbanisation in these countries.

Advanced digital societies are far more focused on developing interconnected and interoperable digital technologies between sectors, having achieved

comparatively ubiquitous levels of infrastructure access and capacity. Here, the emphasis is on improving efficiency in the utilisation of scarce resources using smart technologies such as IoT. This often manifests in a broader and coordinated strategic approach to building a digitally enabled society, compared to the largely fragmented approach to digitisation in many emerging and transition digital societies.

Asia, arguably one of the most diverse regions in the world, with a varying degree of socioeconomic and digital society development, has many countries in each category. For the purpose of this report, we examine the digitisation status of seven countries in the region – Australia, Bangladesh, Indonesia, Japan, Pakistan, Singapore and Thailand – in relation to their efforts, preparedness and progress towards becoming digitally enabled and digitally empowered societies. These countries were primarily selected to represent the various sub-regions as well as to illustrate the features of countries in each of the three categories.

3.1 National digital society plans

National digital society plans provide valuable insight into governments' digital priorities, degree of commitment, and capacity to deliver on the aspirations. The national digital society plans of the focus countries vary. Some are comprehensive and cover many strategically important sectors of the economy; for example, Japan has developed a roadmap for implementing integrated digital technology across all government ministries. Other

countries tend to focus on specific sectors. In terms of outlook, some plans set out long-term goals, while others are devoted to short-term aims.

Table 1 shows a broad overview of the national plans of the focus countries, all of which view digitisation and the widespread use of ICT as a cornerstone of their economic growth strategy, regardless of their stage of development.

Table 1

Digital society plans in Asia

Country	Plan	Emphasis on growth and development
Australia	National Digital Economy Strategy Digital First and the Australian Public Sector ICT Strategy 2013	National Digital Economy Strategy 2011 (2011 NDES) lists eight goals for Australia to become a leading digital society by 2020: 1. Increase citizens' online participation 2. Increase the online engagement of Australian businesses 3. Manage the living environment better through use of smart technology 4. Improve health and old-age care 5. Expand online education 6. Double the level of teleworking 7. Improve e-government service delivery 8. Narrow the gap in online participation between households and business, as well as urban and rural areas. To help achieve these goals, the Australian government in December 2015 offered new tax breaks for start-ups, set up a new 'cybersecurity growth centre', and relaxed visa requirements for tech entrepreneurs and ICT knowledge workers.
Bangladesh	Digital Bangladesh (2015-2020)	The first Digital Bangladesh plan published in 2009 had a sectorial approach to digitisation, mainly focusing on ICT-related industries and services. Since then, the government has shifted from fragmented initiatives to a more integrated approach to creating a digital society, primarily by incorporating Digital Bangladesh under the umbrella of the Seventh Five-Year Plan (FY2016-FY2020). This identifies the adoption of digital technology as a means of bridging developmental gaps through improved productivity and financial access for SMEs, peasants and rural enterprises.
Indonesia	MP3EI (Economic Masterplan 2011-2025) Indonesia Broadband Plan 2014-2019	The Indonesia Broadband Plan focuses on expanding fixed and mobile broadband infrastructure across rural and urban areas. In February 2016, Indonesia's president, Joko Widodo, introduced a plan to support funding for micro, small and medium enterprises (MSMEs) and a venture-capital policy to provide incentives and facilitate financing for tech start-ups, mirroring the accelerator and incubator concept model of Silicon Valley. This was part of a wider vision to make Indonesia ASEAN's largest digital economy.
Japan	Declaration to be the World's Most Advanced IT Nation	Japan's plan, revised yearly since launch in June 2013, sees digitisation and innovation as a means to rejuvenate its economy. It encourages women and senior citizens to participate in productive labour, thus mitigating social issues stemming from the country's aging population. It also focusses on improving healthcare, transportation systems and clean energy supply using a network of intelligently connected systems and devices.

Pakistan	Vision 2025	The national economic plan recognises ICT as a key driver of innovation, economic competitiveness and greater social inclusion. The plan calls for the bridging of the infrastructure and digital literacy gap to bring the ICT industry to a level where it can enable a 'knowledge economy'.
Singapore	Smart Nation Vision Infocomm Media 2025	In June 2014, the Singapore government launched a set of initiatives as part of its goal for the country to become the world's first 'smart nation', harnessing the use of technology with the aim to improve the lives of citizens, creating more opportunities, and building stronger communities. Initiatives include a smart nation operating system, an Internet of Things scheme targeted at homes, and pilot trials at a designated residential-business estate. A national-level coordinating agency, the Smart Nation Programme Office (SNPO), is leading the project. Infocomm Media 2025 sets out to create a globally competitive infocomm media ecosystem that enables and complements Singapore's Smart Nation vision.
Thailand	Thailand Information and Communication Technology Policy Framework (2011-2020): ICT2020 National Digital Economy Master Plan	The National Digital Economy Master Plan is divided into four phases over a 20-year period. Beginning with building a nationwide advanced broadband network, it focusses on promoting a digitally enabled economy and society, creating public e-services, developing a digitally skilled consumer base, and boosting public confidence in the use of digital technology.

Source: Government websites

Key takeaways from the national plans

Pakistan's Vision 2025 is coordinated by the Ministry of Planning, Development and Reform, but it remains to be seen how the Pakistan Telecommunication Authority (PTA) – the designated implementing agency for the policy – will translate the policy into roadmaps and timelines.

The national plans of Australia, Singapore and Japan clearly articulate their respective visions and list detailed milestones and benchmarks against which they will measure success. This provides a clear roadmap for the respective governments to follow. For example, the five-year implementation timeline for Australia's national plan (Advancing Australia

as a Digital Economy) lists specific action points for specific agencies and the deadline for achieving each target. This is presently lacking in the national plans of Thailand, Indonesia, Pakistan and Bangladesh.

Japan's national plan also specifies quantitative key performance indicators (KPIs) to assess progress and results of actions taken. The plan says KPIs will be continuously improved throughout the process of implementing the strategy by adding and deepening policies to establish more appropriate indicators, suggesting that policymakers recognise the dynamic nature of digital technology and that flexibility is required to accommodate new scenarios.

13. The document recognises the need to strengthen inter-agency and inter-provincial coordination mechanisms, particularly in key areas such as FATA, Gilgit-Baltistan (GB) and Azad Jammu and Kashmir (AJK), given that the programme will be delivered through various line ministries.

3.2 Analysis of the national plans

We employ a two-pronged approach of quantitative metrics and qualitative evidence to review the national plans, focussing on how well the respective countries are positioned to achieve set goals in relation to the three components of a digital society – digital citizenship, digital lifestyle and digital commerce – with connectivity as the underlying foundational element. Our objective is to produce a tool for countries to understand their current level of digitisation and put in place the necessary policies and governance structures to move up the digital society value chain.

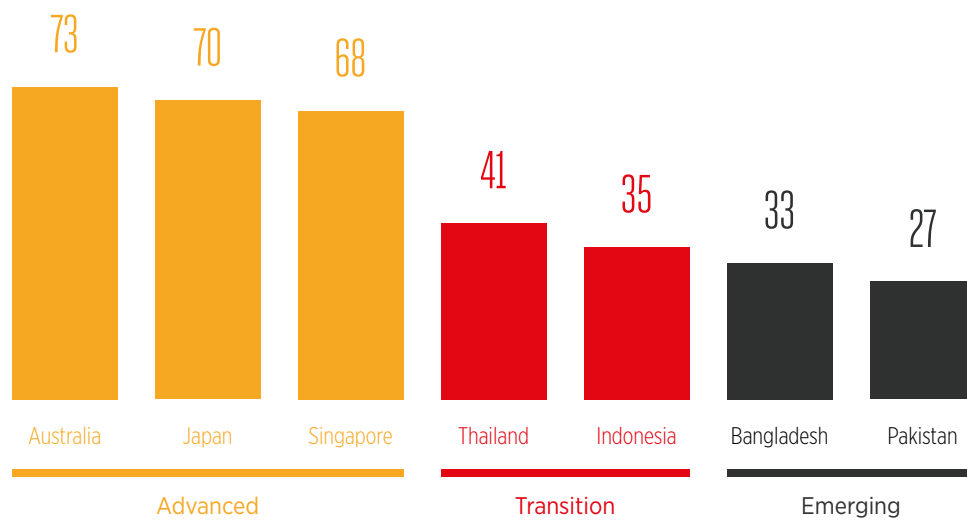
We consider two key dimensions in comparing the national plans: firstly, we consider whether a plan is

largely aspirational or focuses on realistic goals and the means to achieve them. Secondly, where the plans outline specific aims and objectives, we assess their feasibility in view of current realities. Despite the multi-faceted and multi-layered approach to building a digital society, there are notable commonalities among countries within similar income groups, highlighting the impact of wider macro factors on a country's digitisation efforts.

Using these distinctions and a set of metrics (see the Appendix for detailed methodology and indicators), we categorise the seven focus countries as shown in Figure 8.

Figure 8

Digital society: country index scores



Source: GSMA Intelligence

Connectivity

A first step to building a digital society is putting in place a robust and scalable digital infrastructure. Across Asia, mobile has emerged as the primary form of connectivity for the majority of individuals accessing digital services (see Figure 9). The policy implications for economies making the transition towards digital societies are significant.

First, mobile – and increasingly mobile broadband – is the way the majority of Internet users get online,

communicate and transact business. It therefore follows that policies should be designed to promote the fastest growth of mobile network coverage and usage as possible. Since mobile markets are usually highly competitive, the role of policy should target the efficient allocation of radio spectrum to maintain the pace of innovation in service offerings, particularly non-communication services.

Connectivity – the foundation of a digital society

Indonesia

The Indonesia National Broadband Plan 2014–2019 aims to provide robust ICT connectivity to every citizen. The plan sets specific targets for mobile and broadband connectivity. For urban centres it aims to provide fixed broadband connectivity (20 Mbps) to 71% of households and 100% mobile broadband (1 Mbps) to all – a significant challenge in an archipelago of 17,500 islands spanning some 6,400 kilometres and home to more than 249 million people.

Cellular coverage is available to around 80% of the population, but only 16% of the population are Internet users and only 8% of the population have PCs. However, 74% of all districts in the country are connected by fibre optic. After many years of delay due to problems with financing, Indonesia is aiming to complete a 75,000 kilometre fibre-optic digital ‘Palapa’ ring that runs around the archipelago. Once completed, more than 85% of the country will have access to a broadband backbone, with the rest connected by alternative technologies such as satellite.

Singapore

The foundations of Singapore’s digital society efforts are based on the Intelligent Nation 2005–2015 (iN2015) Plan, a 10-year ICT blueprint by the Infocomm Development Authority (IDA). This plan focused on rolling out a Next Generation National Infocomm Infrastructure (Next Gen NII) based on the wired Next Generation Nationwide Broadband Network (NGNBN) and ubiquitous wireless and Wi-Fi coverage through its Wireless@SG programme. Now the city-state, with its Infocomm Media Masterplan 2025, is aiming to build the world’s first Smart Nation built upon ‘pervasive connectivity’, including a heterogeneous network (HetNet) using strategically positioned Above Ground (AG) boxes to interconnect wireless and wired networks across Singapore.

Thailand

Although reliable high-speed broadband service is available in major cities, broadband penetration in Thailand remains below 40%. The country's Information and Communication Technology Policy Framework (2011–2020) envisions at least 100 Mbps broadband access by 95% of the population by 2020. In February 2016 the National Digital Economy Committee approved in principle the digital economy development plan to realise these objectives. Specific targets include installation of free Wi-Fi services at 10,000 points nationwide; achieving internet coverage in 30,000 villages; and expanding international bandwidth to at least 4,000 Gbps in a bid to promote Thailand as ASEAN's Digital Hub.

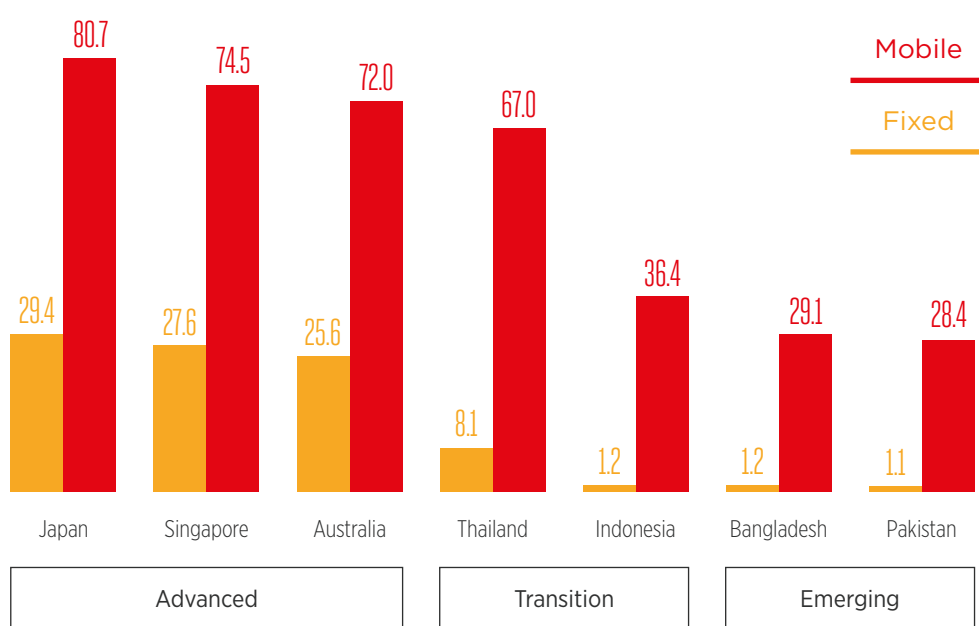
Thailand has a mixed record for achieving such goals in the past. For example, the IT2001 policy framework set the following three goals: Moving the ranking of Thailand in the UN's Technology Achievement Index (TAI), from "dynamic adopters" to the group of countries identified as "potential leaders" by 2010, ensuring that 30% of the Thai workforce uses ICT by 2010, and value addition by knowledge industry to constitute 50% of GDP by 2010. Recent figures suggest only partial success in meeting these targets. According to a 2015 labour survey conducted by the government only 26% of the working population above the age of 15 had used a computer, and UNESCO's 2010 TAI tables showed Thailand was still in the ranks of 'dynamic adopters'. However, given the funding for the National Digital Economy Plan and the recent licensing of 4G services, along with the political will cited above, Thailand is on track to make substantive progress towards achieving its connectivity goals.

Second, the growth of mobile networks and their usage requires investment in high-capacity backhaul networks, linking mobile switching centres on a local basis, mobile networks to Internet exchanges and data centres, and mobile networks to long-haul

backbone networks on a national basis. Policies that encourage such investment, which may, for example, give MNOs an option to build such networks for themselves, and may allow infrastructure and facilities sharing, should be encouraged.

Figure 9

Percentage of citizens with mobile versus fixed broadband



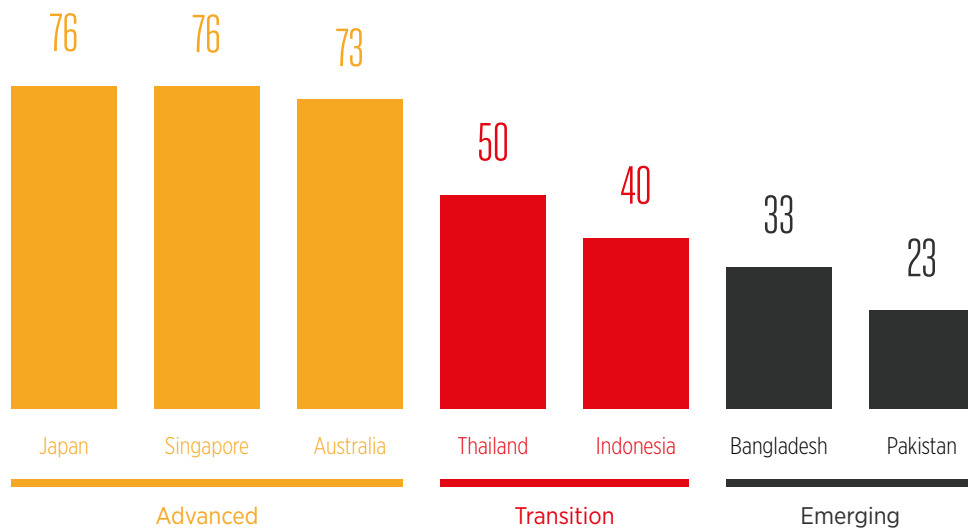
Source: GSMA Intelligence 2016 (Mobile); World Bank 2014 (Fixed)

Third, the development of local and national, optical fibre, high-speed broadband networks is complementary to the national coverage of mobile networks, but because of the costs of building such networks and the many levels of permissions necessary, such as rights-of-way and permissions to build ducts, they will take longer. Policies may well require a mix of public-private participation and private sector initiatives, and should be

viewed as long-term investments that will create the infrastructure of a fully developed digital economy. These network developments should be seen as necessary and complementary, with the mobile networks providing the leading edge in the transitional period and the fixed line networks providing the long-term underlying support infrastructure.

Figure 10

Connectivity: country index scores



Note: see the Appendix for indicators and methodology.
Source: GSMA Intelligence



Connectivity levels are generally low in Bangladesh and Pakistan, underlining the main challenge to realising these countries' digital society goals. Limited broadband access makes it harder to realise the full benefits of digitisation for economic development as the introduction of advanced digital services without the requisite universal connectivity would likely exacerbate the digital divide. Connectivity in both countries, as well as in Indonesia, is primarily held back by poor enabling infrastructure, such as the lack of grid electricity in rural areas. There is also a need to improve the allocation of spectrum for mobile services (see *Appendix*).

Generally, the emerging digital societies (Bangladesh and Pakistan) are primarily focusing on extending mobile connectivity to unconnected citizens while the transition digital societies (Indonesia and Thailand) are interconnecting networks to enable broader use. The advanced

digital societies (Australia, Japan and Singapore) are already laying the foundations for the next generation of digital infrastructure in the form of smart, interoperable technologies and IoT.

The advanced digital society countries lead on the infrastructure dimension of the GSMA Connectivity Index. In addition to widespread mobile broadband (3G and 4G) coverage and higher penetration rates, Australia, Japan and Singapore also record significantly better levels of network performance.

The allocation of spectrum is another key indicator in the Connectivity Index. Australia and Japan lead in spectrum allocated for mobile services, followed by Singapore and Thailand. Although Thailand has allocated considerable amounts of spectrum, issues around ownership and spectrum regulation over many years have delayed the deployment of high-speed mobile broadband networks, resulting in sub-optimal network performance and coverage.

Digital citizenship

For citizens, the right to access and participate fully in government services relies on their ability to prove their identity. Many advanced societies have established safe and secure ways for citizens to do so. For example, while Australia does not have a national identity (NID) scheme, it has launched an online biometric authentication system for the checking of unique identities (UIDs). In Japan there is no mandatory NID, but benefits are offered to those who choose to have one, while Singapore does have a mandatory NID. Meanwhile, the use of a biometric NID to register to vote is now being promoted across Bangladesh and Pakistan, as well as in Indonesia and Thailand.

As more people move to online commercial transactions and governments increasingly use digital technology to deliver social welfare, healthcare, disaster relief and other essential services, citizens need to be able to identify themselves over digital channels. This makes digital identification a necessary precondition for digital citizenship and a personal UID (an ID that cannot be shared with others) essential for safe and secure access to public services. It is possible for an individual to have multiple digital identities, some of which may also be UIDs. In countries where multiple UIDs are used and recognised by the state, interconnectivity and interoperability among the registries becomes a priority for seamless use of the ID and full coverage.

Digital citizenship – improving service delivery, inclusion and governance

Pakistan

The Ministry of Planning, Development & Reforms organised a national mobile apps competition in December 2014 to allow citizens to participate in designing mobile apps to improve government services, transparency and information dissemination with the public over mobile phones. The winners were announced in May 2015 and had the opportunity to fine-tune their applications with technology companies. With mobile the primary means of accessing the Internet for many, mobile-government services are needed to encourage greater inclusion among citizens.

Thailand

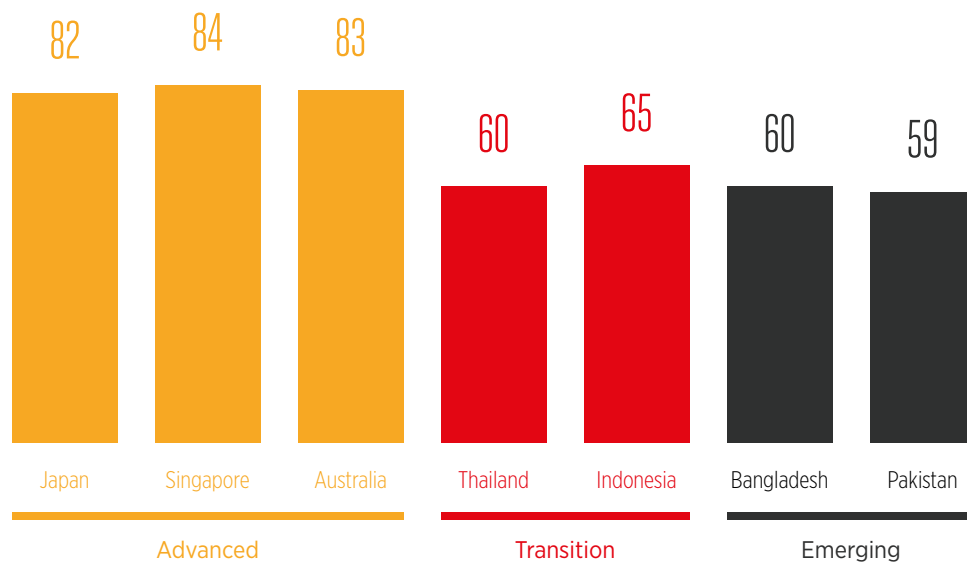
Transforming online government services is a key part of the Digital Government Development Plan (2016–2018), developed by the Electronic Government Agency (EGA). It includes plans for developing and deploying a G-Cloud. The objective is to reduce costs and improve operational efficiency. As part of the service, it has launched govchannel.go.th as a first step to creating a single integrated ‘window’ through which citizens can interact with the government on a range of issues and services.

Japan

Japan has a robust e-government platform through which many local ministries and agencies operate websites providing the public with government information. To promote online use, the government engages in publicity and dissemination activities related to e-government, and is working to make systems more streamlined and efficient. In an attempt to increase transparency and confidence, as well as promote participation from the public, the government launched the Open Government Lab, publishing public data in machine-readable formats, and gathering ideas from the people for both commercial and non-commercial purposes. More than 15,582 datasets have been put on this platform; the vast majority have come from government ministries and agencies.

Figure 11

Digital citizenship: country index scores



Note: see the Appendix for indicators and methodology.
Source: GSMA Intelligence



Overall, there is a narrow spread in the rankings for the use of digital IDs despite the very different approaches. Across the seven focus countries, only Australia does not use a NID, but it relies heavily on digital identification for delivery of a range of public services. Many traditional forms of ID are now taking on digital forms. Passports, for example, are more often than not digital and can be swiped by immigration officials. In many cases, passport holders can use them at digital entry barriers to their home countries, and trials have begun in placing passport IDs within smartphones. Driving licences and other UIDs are equally capable of being included in the secure element of a SIM card. In Australia, many different types of ID are becoming completely digital, including fishing permits, permits

to sell alcohol, and gambling licences. To simplify the process of accessing government services online, Australia's MyGov platform enables citizens to access various services from one place through a single sign-in.

NID is compulsory in the other focus countries, except Japan (see Table 2). In Singapore the NID is a plastic barcoded biometric card, while the other countries are introducing biometric smartcards to replace their paper and plastic ID documents to improve security and reduce fraud or ID theft. Ultimately, smartcards can be directly linked to a wide range of public and private services by providing an online reading of the security chip.

Table 2

National IDs by country

	Bangladesh	India	Pakistan	Thailand	Australia	Japan	Singapore
NID since	1973	2011	2000	1976	N/A	1999	1966
e-NID since	2016	2015	2012	2003	N/A	2003	1991
Mandatory	No	Yes	Yes	Yes	No	No	Yes
Bio-NID available	Yes	Yes	Yes	Yes	N/A	Yes	Yes
Coverage	90% ¹⁴	85% by 2014 ¹⁵	100% by 2020 ¹⁶	100%	N/A	100%	100%

Source: World Bank ID4D Dataset

14. "Millions await National ID card in Bangladesh", bdnews24.com, 2016

15. "Indonesia's eKTP National ID Card: The Practical Solution to e-Governance" @TunzeemGroup, 2014

16. National Database and Registration Authority

In emerging and transition digital societies, security is a major concern in the implementation of digital ID programmes. The registration of new births and expanding the reach of digital IDs to populations in remote areas or regions of conflict are the two main challenges. In advanced digital societies, the focus has moved to broader issues of convenience and interoperability.

Pakistan has one of the most developed NIDs among the emerging and transition digital societies. Every Pakistani citizen above the age of 18 is entitled to a Computerized National Identity Card (CNIC), which integrates biometric technologies such as Automated Finger Identification Systems (AFIS) and Facial Recognition Systems (FRS) and is capable of providing identity verification. Some 93 million adult Pakistanis were registered on CNIC or carried voter's cards at the beginning of 2016, but in February of the same year the online CNIC issuance and renewal service was abruptly discontinued due to insufficient capacity to keep up with the volume of requests, a situation that could slow take-up of the programme.

In Bangladesh, despite progress in advancing the role of e-governance in areas such as public procurement, administrative capacity building in the use of ICT, and the adoption of biometric national ID cards, access to e-government services is still skewed in favour of urban residents who have access to computers and smartphones, excluding most rural dwellers who rely on featurephones.

There is a marked difference between the focus countries in the range of public services delivered over digital platforms, with the advanced digital

societies outperforming the emerging and transition digital societies. Also, clear gaps exist between the different categories in the level of diffusion of e-government services, the key distinction being the shift from government-centric to citizen-centric services. Advanced digital societies have realised that digitisation not only improves efficiency but also creates more open, transparent, innovative and participatory governments. For example, Japan is moving all public services online, leveraging its high-speed broadband infrastructure.

The efforts of the emerging and transition digital societies to move public services online are improving, but they still lag behind the advanced digital societies. Contributory factors include the limited scope of digital public services, poor maintenance and standards of government websites, little or no opportunity for feedback, and a general incompatibility of government portals with mobile access. A large part of the problem lies in the lack of capacity across government departments and agencies to adopt a coordinated e-government strategy at either the technical or service level. This situation needs to be addressed in the affected countries as citizens increasingly adopt digital services, mostly using mobile devices.

The growing access to mobile connectivity in transition and emerging digital societies means that they now have the potential to narrow the gap with the advanced countries. Although smartphones and mobile apps are increasingly becoming the platform of choice, SMS-based m-government is still relevant and useful in certain countries such as Bangladesh.

The background paper to *Digital Bangladesh* notes that since 2009, SMS has been used for applications and registration at 32 public universities and 400 colleges as well as all public medical colleges. It has also been used to confirm vehicle registration, access health services from the Upazila Health Complex, and for other information services such as agriculture.

Digital lifestyle

Digital lifestyle centres on the use of smart devices to access a wide range of relevant content and solutions, beyond core communication services. In a digital society, the range of personal smart devices includes mobile phones, tablets, game consoles and wearables such as smart watches and smart glasses. Digital lifestyle transcends the use of digital services for just social purposes – which is now commonplace in many countries; it incorporates an individual's interaction with a more complex network of intelligently connected devices and services.

IoT has taken off in many advanced digital societies, where multiple industries have been interconnected to drive efficiency in the production, distribution, storage and consumption processes, and is also gaining momentum in many developing countries, driven by increasing digital literacy and localised content and solutions. This has the potential to bring substantial social and economic benefits to governments, citizens and businesses through the creation of new jobs, increases in productivity and competitiveness, and more efficient use of scarce resources.

Digital lifestyle – towards a hyper-connected society

Australia

A number of initiatives in Australia by both federal and state governments demonstrate the ability of IoT to better manage the civic environment, including reducing congestion and improving traffic conditions through smart grid and smart city related initiatives. Given that the majority of Australia's population live in cities, deployment of smart city projects, such as ensuring that all major new urban road projects have minimum levels of intelligent transport system technology in their design, will have wide-ranging benefits to the population.

Indonesia

Indonesia has an active mobile penetration rate of over 100%, and a population of more than 250 million people, which presents a significant opportunity to leverage IoT to solve many of its urbanisation problems. One of the country's biggest challenges is traffic congestion; the capital city Jakarta has been ranked as having the worst traffic in the world.¹⁷ Despite this, the Jakarta government has aspirations to become a smart city by 2018, and has already piloted and planned projects to ease the city's traffic problems. Projects include the use of Google's Waze mobile app for drivers to update and share traffic information, and exploring the use of IoT-integrated road-use management systems to replace traffic toll booths.

Bangladesh

Dhaka, the capital of Bangladesh, has many urban problems such as traffic congestion and waterlogging during the rainy season. The city government has ambitious plans to turn Dhaka into a smart city to solve its problems, but is still at a nascent stage, with basic infrastructure still lacking. Nevertheless, the local government is engaging with IoT companies as it seeks to turn Dhaka into a smart city.

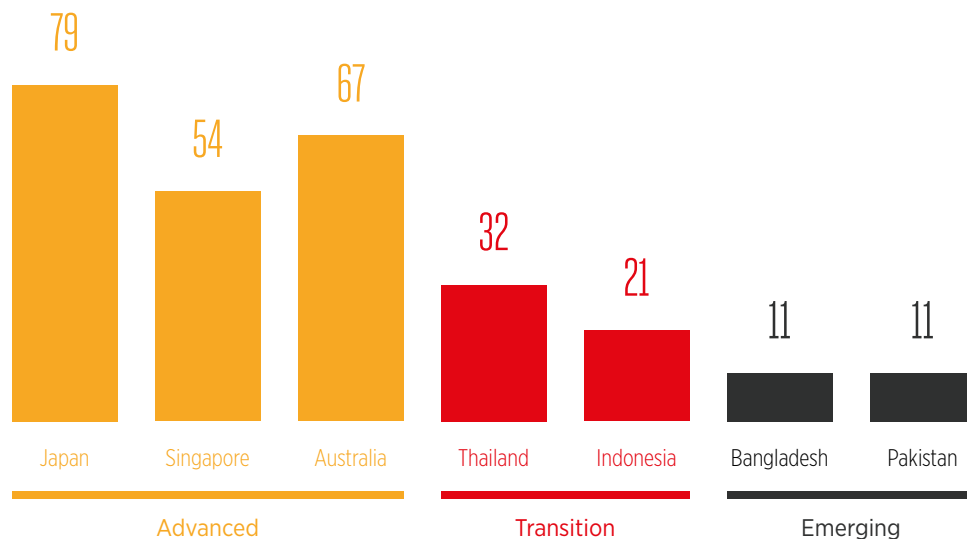
17. "Indonesia's Capital Has World's Worst Traffic", The Diplomat, 2015

Our analysis of the current state of digital lifestyle in the focus countries is underpinned by three key elements – access to and adoption of smart devices, the development of IoT, and availability of locally

relevant content. Overall, there is a considerable gap between the three categories of digital society, with the advanced countries showing strength across all three elements (Figure 12).

Figure 12

Digital lifestyle: country index scores



Note: see the Appendix for indicators and methodology.
Source: GSMA Intelligence

Smartphone penetration rates and the networks used differentiate the emerging, transition and advanced digital societies. The emerging and transition digital societies generally have a lower smartphone adoption, partly due to poor mobile broadband network coverage and affordability constraints in less wealthy societies. But this is changing rapidly with the uptake of low-cost devices across the region. In cities across Asia, it is common to see citizens using smartphones and tablets, most of them accessing locally relevant content such as local language-based social media sites, native apps and games.

The use of social media, whether for communication, business or entertainment, is a basic indicator of the advancement of a digital lifestyle. Indonesia has one of the youngest, largest and arguably most digitally savvy populations in the world. More tweets were sent from the country's capital, Jakarta, in 2014 than from any other city in the world, accounting for 2.4% of the global total. Australia, Japan and Singapore lead in the availability of local content, primarily because of

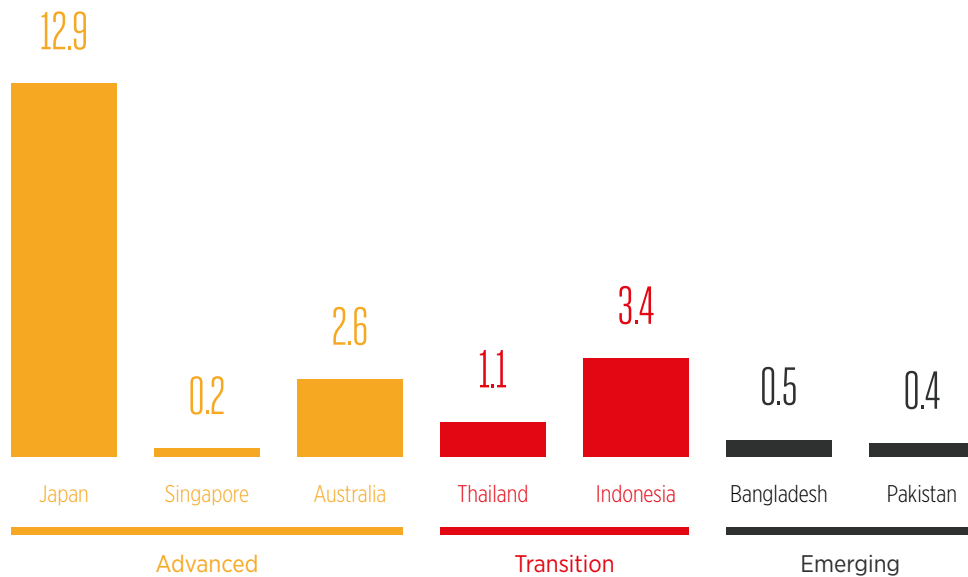
a more developed local app economy and digital ecosystem. Bangladesh and Pakistan still lag the advanced and transition digital societies by a wide margin, reflecting the underdevelopment of a local digital content ecosystem.

IoT needs a solid network infrastructure, which does not always need to be broadband, but does need to have the capacity to transport large amounts of data between a multitude of devices in use across densely populated locations. This is driving the shift from voice-centric and text-centric to app-centric and data-centric networks and business models. Network operators in the advanced economies are already well used to these trends, but they are now affecting emerging and transition economies. Policymakers and regulators need to be tuned into these issues as much as network operators, vendors and service providers. Japan is a regional leader in IoT. The government has committed to working with automakers on autonomous vehicle initiatives and is now planning to allocate the prefix 020 to IoT services to identify transmissions from 'things' (as distinct from people).

Figure 13

Forecast number of M2M devices, 2016

(Million)



Source: GSMA Intelligence

Overall, advanced digital societies do a much better job of identifying future growth opportunities in the digital era and have a smaller resource gap (financial, technological and human capital) than the transition and emerging digital societies.

Singapore's national Infocomm Development Authority (IDA) is working with industry and public sector partners to develop a Smart Nation Platform to take advantage of the emerging opportunities in IoT. Singapore has identified a number of gaps in the transition to a smart nation, including a lack of open and interoperable standards that could help unlock the potential of IoT. IDA is thus working with private sector partners to set standards and carry out trials for IoT applications.

Digital commerce

Digital commerce is an essential element of a digital society, providing a platform for financial transactions to be settled in the digital space without the need for physical cash. Digital commerce is growing rapidly in emerging digital societies, helped by the take-up of mobile money services. In Pakistan and the Philippines, where large swathes of the population do not have access to formal banking services, mobile money offers an efficient means of managing simple transactions. The transition and advanced digital societies have already seen rapid growth of e-commerce, and are now facilitating digital commerce across multiple channels.

Digital payments are a central part of digital commerce, though some parts fall outside of the scope of commerce, such as remittances or fund transfers between accounts. Digital payments facilitate financial transactions between individuals, businesses and governments, and are growing fastest for online transactions as e-commerce becomes more popular. E-commerce and m-commerce are being driven by a range of factors, including open markets, growing use of smartphones and mobile shopping apps, trusted payments systems, the search for online price comparisons and peer reviews, and more mobile-friendly websites.

Digital commerce – simplifying transactions and driving inclusion

Indonesia

Although less than 1% of domestic trade was through e-commerce in Indonesia by 2014 according to one study¹⁸, eMarketer projects this share to grow to up to 2.2% in 2016.¹⁹ This highlights the potential for rapid change once key enablers such as secure payment gateways and data privacy are addressed. Although less than 5% of Indonesia's population own credit cards, an increasing number of payments players are taking steps to enable transactions. This trajectory is set to accelerate rapidly within the next few years, with the Indonesian government formulating a comprehensive e-commerce roadmap.

Pakistan

In 2015, the State Bank of Pakistan launched its five-year strategic plan, SBP Vision 2020, and in 2016 formally launched the National Financial Inclusion Strategy (NFIS). Both schemes emphasised branchless banking and digital finance as a means to offer formal financial services to the 87% of adults that are financially excluded.²⁰ With the NFIS envisaging “universal financial access”, the target set of expanding formal financial access to 50% of adults by 2020 would still, however, leave a big gap in Pakistan's ability to foster a digital society.

Singapore

In Singapore use of all forms of digital and online payment systems is well advanced, including NFC on mobile devices. The government is encouraging the use of ubiquitous contactless travel cards to reduce the need for cash transactions and to speed transaction processes across the economy. Singapore has emerged as a banking and wealth management centre for the region, but this adds to its cybersecurity concerns as it will inevitably attract cybercriminals. The government is placing considerable emphasis on cybersecurity, developing partnerships with international companies and research institutes, and Interpol has based its regional cybersecurity facility in Singapore. Nevertheless, a recent CA study suggests Singapore still has a way to go in this area.²¹

18. According to AT Kearney's Lifting the Barriers to E-Commerce in ASEAN (2015), Indonesia's e-commerce represented less than 1% of total retail sales in 2014

19. “Asia-Pacific is home to majority of world retail ecommerce market”, eMarketer, December 2015

20. World Bank (2015), Global Findex

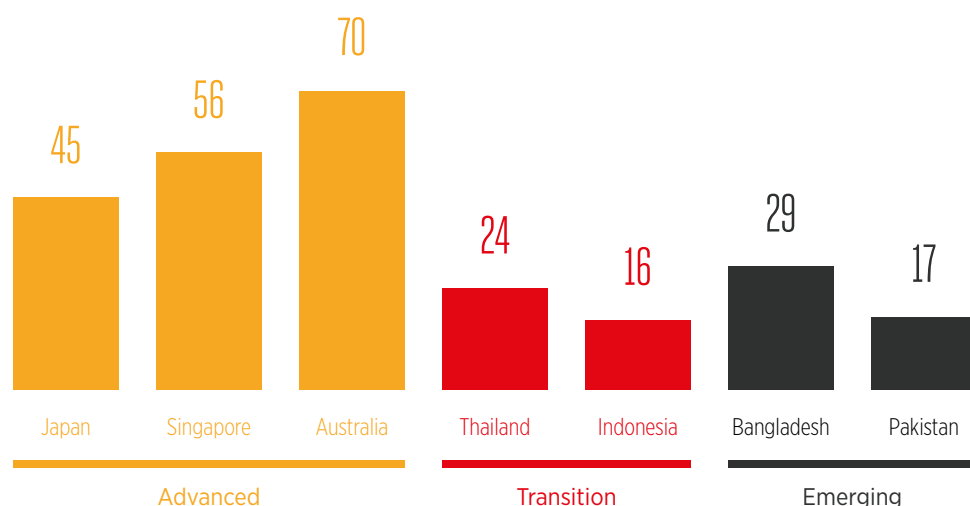
21. CA Technologies Asia Pacific & Japan Application Economy Index 2016

Our analysis of the digital commerce landscape in the focus countries is based on three elements – digital payments, e-commerce and accessibility of

financial services – each of which has significant implications for the development of a digital society (see Figure 14).

Figure 14

Digital commerce: country index scores



Note: Indices are developed from a combination of mobile and digital metrics, and not purely mobile money. See Appendix for indicators and full methodology.
Source: GSMA Intelligence

Digital payments

High smartphone adoption levels in advanced digital societies have enabled a wide range of mobile-centric digital payment solutions, including NFC and payment apps. As smartphone adoption rises in transition digital societies, these forms of digital payment services will become more prevalent. In emerging digital societies, however, mobile money services are playing a major role in enabling digital payments. The number of registered mobile money accounts continues to grow rapidly in countries such as Pakistan with mobile money providing significant socioeconomic benefits.

By 2014 there were eight mobile money providers operating in Pakistan, with agent networks significantly outnumbering traditional banking channels.²² Within five years of introducing mobile money services in Pakistan, the value of mobile money transactions had reached 3.5% of the country's total GDP.²³ Part of its success can be attributed to allowing more than just a bank-centric

mobile money model. Following the Branchless Banking Regulations in 2008, four different business models emerged: bank-centric, mobile-centric, third party-centric and agent-centric. In 2009, Telenor, in collaboration with Tameer Microfinance Bank, launched Easypaisa, which quickly revolutionised mobile money transfer in Pakistan. By 2016, some 22 million customers were conducting nearly 650,000 transactions on a daily basis through Easypaisa, which is accepted in around 75,000 shops across the country.

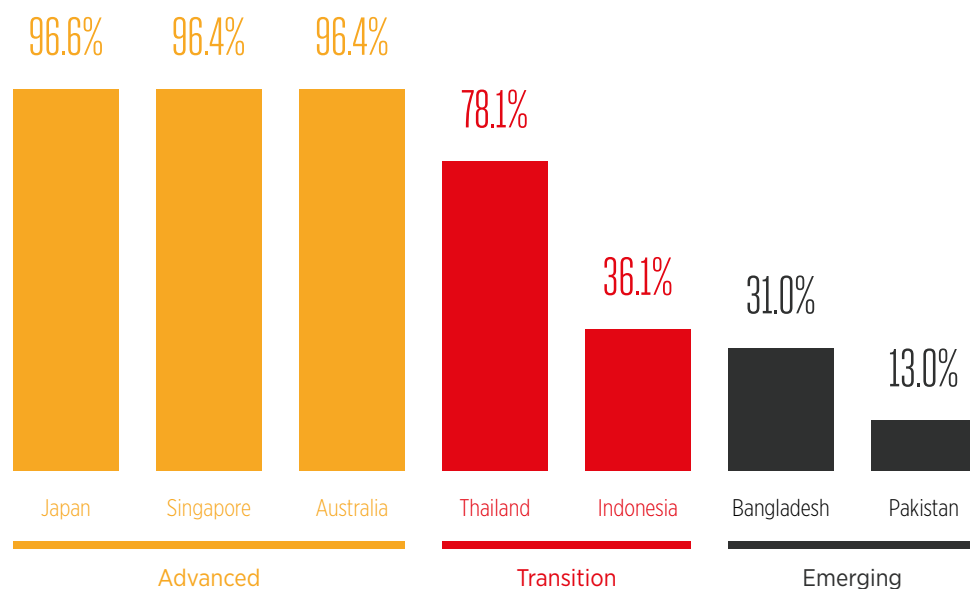
Accessibility of financial services

Financial inclusion is a key area for improvement for emerging and transition digital societies. With the exception of Thailand, where 78% of the population have accounts with banks or other financial institutions, more than two-thirds of the populations of the emerging and transition digital societies do not have bank accounts (see Figure 15). Mobile money offers an opportunity to close the gap in financial access in these countries.

22. Easypaisa, HBL Express, MCB Lite, Mobicash, Mobile Paisa, TimePey, UBL Omni, Upaisa
23. Using Mobile Money to Promote Financial Inclusion in Pakistan, Karandaaz, 2015

Figure 15

Percentage of people with a formal bank account



Source: World Bank Findex

E-commerce

E-commerce is growing in Indonesia, with more than 5% of the population aged over 15 years using the Internet to make purchases. But due to the low level of home Internet penetration many online shoppers are using their computers at work to make purchases, with retailers regularly seeing a daily peak at 11:00, followed by an after-lunch peak. These have become key times for targeted promotions. In 2016, Indonesia's Minister of Information and Communication designated the e-commerce sector open to 100% foreign investment if more than IDR100 billion (approximately \$7.4 million) is invested, and forecast the e-commerce market to grow from \$18 billion in 2015 to \$130 billion by 2017. Whether the target is reached or not, this could be a seismic moment for digital commerce that is already growing at pace, and will place Indonesia on the same footing as the open advanced economies.

E-commerce, particularly C2C, has been growing rapidly in Bangladesh, recording 51% growth between Q3 and Q4 2014.²⁴ The E-Commerce Association of Bangladesh (e-CAB) declared 2015 as the year of e-commerce, estimating that there were around 500 service-related web portals. Although mobile still trails desktop PCs and laptops used for browsing e-commerce websites, e-commerce traffic from mobile devices is expected to increase as 3G and 4G adoption increases. Mobile phones play a key role in facilitating e-commerce, with e-commerce conversion statistics showing that visitors prefer using mobile devices to gather product information, conduct research about the product specs and prices, and then use PCs to complete the online purchase.²⁵

24. E-Commerce in Bangladesh, Center for Enterprise and Society, University of Liberal Arts Bangladesh, 2016
 25. A Report on eCommerce Trends in Bangladesh, Kaymu, 2015

A small but rapidly growing e-commerce market is developing in Pakistan. Fuelled by a young population and supported by better connectivity and the spread of smartphones, Pakistan has the foundations in place for digital commerce but for it to truly take off important barriers still need to be overcome, including an informal cash-based financial system and lack of availability of an online platform that accepts all payment solutions. National policy encourages private sector investment in the sector, with local e-commerce start-ups attracting venture capital from foreign and expatriate investors, Urdu language content becoming widely available, and tech-savvy entrepreneurs developing portals and apps tailored to the needs of the local market. However, given the size of the population the scale of local content is not adequate. Policy tools available include lowering costs of devices and services by eliminating and reducing taxes, bringing all government services to the web, expanding m-education, m-health and m-agriculture, and facilitating m-commerce. Since 2009, smartphone penetration has been higher than PC penetration. Although making new spectrum available has helped increase connectivity, taxation policy has stymied the growth of e-commerce.

In advanced economies, e-commerce and m-commerce are being driven by a range of factors, including open markets, the rising use of smartphones and mobile shopping apps, trusted payment systems, the search for online price comparisons and peer reviews, and more mobile-friendly websites. Among the advanced economies, Japan has long been a leader in the use of mobile devices for transactions and mobile money accounts. This is part of Japan's keitai (mobile)

culture which prefers using stored-value forms of money, such as mobile wallets, to credit cards or other forms of borrowing. By 2015 Japan was the world leader in the percentage of online retail sales accounted for by mobile transactions at 49%.²⁶ Japan was an early adopter in the use of Quick Response (QR) barcodes on smartphones to receive marketing information, and with i-Mode quickly established its own Internet standard for mobile phones. Japan has also been a pioneer in the use of NFC for mobile devices, and has a cross-border interoperability agreement with South Korea.

In Australia, 76% of Internet users were shopping online by the end of 2014, representing a CAGR of 8% between 2012 and 2014.²⁷ Purchases by mobile shoppers accounted for nearly 30% of online transactions, and 41% of smartphone users shopped online at least once. A survey by PayPal and Ipsos in 2015 forecast e-commerce in Australia to reach \$50 billion by the end of 2016, which is around 3.3% GDP, of which m-commerce would account for more than 40%.²⁸ Australia has recognised the importance of interoperability of networks, financial and payment platforms. By 2017 a New Payments Platform (NPP), connecting all financial institutions, will begin operations.

A study of e-commerce in ASEAN in 2015 by AT Kearney estimated total online sales revenues at \$7 billion, with Singapore accounting for the highest share at 25%.²⁹ Indonesia and Malaysia both accounted for 20%. A report issued on behalf of Singapore's Competition Commission estimated total online sales in Singapore by the end of 2015 to have risen above \$3 billion, four times higher than in 2010,³⁰ but still only 1% of GDP.

26. "Japan leads the world in mobile commerce", Netwise, March 2015

27. Cross-border E-Commerce Report-Australia, The Paypers, 2014

28. "M-Commerce Growth Triples Total Online Retail", PowerRetail, February 2015

29. Lifting the Barriers to E-Commerce in ASEAN, AT Kearney, 2015

30. E-Commerce in Singapore - How it affects the nature of competition and what it means for competition policy, Competition Commission Singapore, 2015

3.3 Regional-level digital society initiatives

Digital platforms have enabled people and businesses to interconnect and transact across national boundaries at unprecedented speed and scale. According to a 2016 McKinsey report, more than 80% of tech-based start-ups, for example, are now 'born global', with customers, financing and suppliers coming from abroad from day one³¹. The same report estimates that cross-border digital flows have grown 45 times in volume since 2005 and now exert a greater impact on economic growth than the centuries-old trade in goods. While digitisation is creating new opportunities for companies and countries to deepen their participation in the global economy, it is posing new challenges such as cybersecurity that are equally transnational in scope. A deeper level of regional and international cooperation is necessary to be able to reap the benefits and address the challenges presented by digital technologies.

However, there is growing awareness that the legacy role of facilitator played by regional multilateral and inter-governmental entities may not be sufficient as the importance of cross-border flows increases and as constraints to cross-border digital commerce, and therefore overall regional trade, grow. Many of these organisations are starting to look at how to play a more active role in establishing regional frameworks and aligning national digital society regimes in areas such as privacy, transactions, *de minimis* trade levels, spectrum and roaming rates.

Complicating the picture further are the differences that exist across and between these organisations. Regional inter-governmental organisations such as APEC and ASEAN have sovereign states as members. Unsurprisingly, the stated positions or

visions of these organisations tend to mirror the developmental stage and viewpoint of the members. Often, projects or agreements emanating from these groups are implemented through member countries, and therefore tend to heavily reflect the capacities of the members. As such, these regional platforms tend to approach changes incrementally and iteratively, which tends to preserve the status quo. Problematically, they are often determined by consensus, and in contentious or newly emerging areas this will often mean settling for the lowest common denominator position. For this reason alone, the much mooted ASEAN Single Telecommunications Market framework has remained stalled at the gates for many years despite wide recognition of the potential benefits to both regional and national economies.

International financial institutions such as the World Bank, IMF and the ADB operate differently from inter-governmental organisations and often oscillate between their identity as development banks and their aspirations to be knowledge hubs and thought leaders in international development; following their original mandate of providing concessional loans and technical assistance to low-income countries, their programmes and lending focus are often dictated by member countries' needs but the knowledge production side often follows industry development closely.

There are also organisations such as the OECD, which, for non-OECD member countries, can be viewed as operating like a think-tank and best-practice dissemination body.

31. Digital Globalisation: The New Era of Global Flows, McKinsey & Company, 2016

Categorisation of organisations



Among the international and regional bodies, three groupings emerge based on commonalities across focal areas. These are not mutually exclusive groupings; certain organisations may show up in all three categories.

Holistic approach to digital societies development

- Looking to prepare frameworks in an integrated manner, with a more forward-looking approach.
- Seen to be advocating frameworks that are flexible and 'future-proof' in preparation for convergence and digital transformation (e.g. OECD, ASEAN).

Focused on addressing digital ecosystem development beyond connectivity

- A detailed and often technical focus on areas such as security, human capacity building and IPR. Focused on promoting digitisation and bringing an increasing number of key services online, as well as promoting interconnection, interoperability and convergence through innovation.
- Emphasis on the development and dissemination of best practices and standards (e.g. World Bank/CGAP, ADB, ASEAN, ITU).

Focused on establishing pre-conditions such as connectivity

- Working to bridge digital divides (e.g. SAARC, ASEAN, ADB, World Bank, ESCAP).
- Working to promote inclusive digital access and usage (e.g. World Bank, ASEAN).

Key digital society and related plans

Bearing the above general groupings in mind, the following key initiatives or plans of these organisations as they relate to digital society development have been identified (Table 3) and briefly outlined.

Table 3

Regional organisations and digital society initiatives

Organisation	Type	Digital economy-related initiatives
ASEAN	Regional – intergovernmental organisation	ASEAN ICT Masterplan 2011–2015 ASEAN ICT Masterplan 2016–2020 ASEAN Economic Community
APEC	Regional – intergovernmental organisation	Ad-Hoc Steering Group on the Internet Economy (AHSGIE) E-Commerce Steering Group (ECSG) Telecommunication and Information Working Group (TELWG)
OECD	Plurilateral organisation	Measuring Digital Economy Digital Economy Ministerial Meeting 2016 Digital Economy papers
ADB	Regional – IFI	Various projects related to digital trade, financial inclusion and ICT for social protection
World Bank	Global – IFI	2016 World Development Report – Digital Dividends Open Data Initiatives including the Global Findex and ID4D Data Sets Various projects related to telecommunications policy, national IDs and use of ICT for social protection programmes

Source: organisation websites



Association of Southeast Asian Nations (ASEAN)

ASEAN is a political and economic organisation comprising 10 Southeast Asian countries formed to accelerate regional economic growth and social progress and to promote peace and stability. ASEAN leaders have long recognised the critical role technology plays in regional integration, connectivity and competitiveness. ASEAN's commitment to develop a regional digital society is best seen in the ASEAN ICT Masterplan (AIM).

The first AIM 2010–2015 (AIM 2015) was launched in 2011 at the 10th ASEAN Telecommunications and IT Ministers (TELMIN) meeting as a framework and roadmap to enable ICT development and the better use of ICT for growth and development. It identified six strategic thrusts:

- economic transformation
- people empowerment and engagement
- innovation
- infrastructure development
- human capital development
- bridging the digital divide.

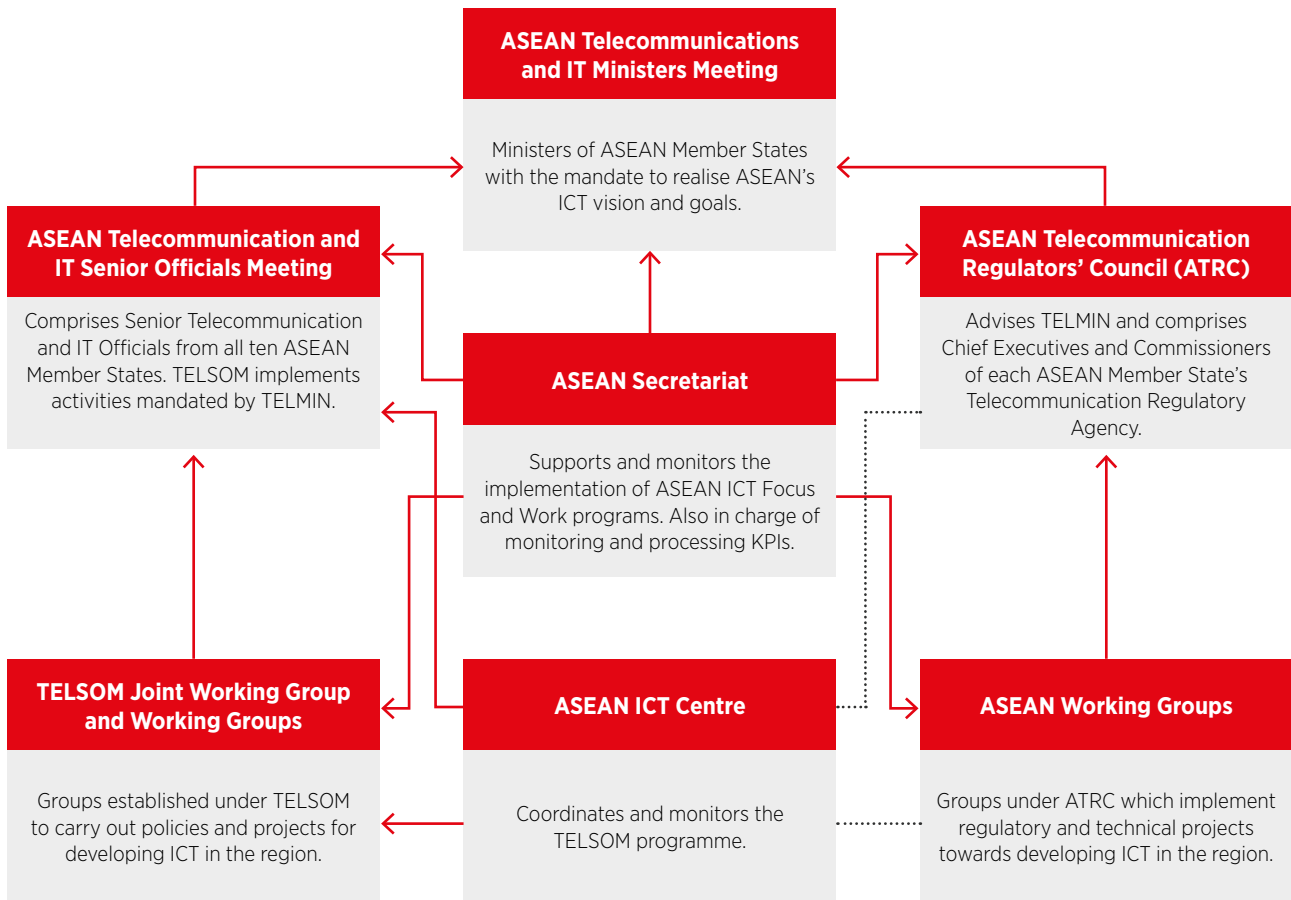
Under each strategic thrust were a series of Initiatives, with subsequent action points specifying what needed to be done in order to meet the objectives of each strategic thrust.

The AIM 2015 completion report noted that member states had carried out and completed some 87 projects, addressing all action points of AIM 2015. In terms of allocation of projects and resources, the infrastructure development and bridging the digital divide thrusts received nearly 50% of the budget and project priorities, reflecting ASEAN's emphasis on connectivity and digital ecosystem development in the region.

The ASEAN ICT Masterplan 2016–2020 (AIM 2020) reflects the rapidly changing landscape and the growing aspirations of the region's citizens. Where the previous AIM focused on being connected, AIM 2020 looks "to propel ASEAN towards a digitally enabled economy". It has eight strategic thrusts, including a focus on utilising ICT across the region, new media and content, especially local content creation, and information security. The phrase 'digital economy' first finds its way into the plan as one of the key outcomes along with next-generation ICT and smart city development, indicating the aspirations of the ASEAN leaders to ensure that the region is not left behind in the new digital divide. ASEAN made a conscious decision to approve all necessary projects during the first half of the five-year period so as to provide ample time for development and engagement with relevant groups.

Figure 16

AIM governance structure



Source: ASEAN ICT Masterplan 2015 Completion Report

Aside from the AIM, there are other key initiatives where a digital society discussion would resonate. The newly established ASEAN Economic Community (AEC) is one such platform. The AEC Blueprint 2025, adopted in November 2015, aims to achieve a regional economic bloc with five interrelated and mutually reinforcing characteristics:

- a highly integrated and cohesive economy
- a competitive, innovative and dynamic ASEAN
- enhanced connectivity and sectoral cooperation
- a resilient, inclusive, people-oriented and people-centred ASEAN
- a global ASEAN.

The blueprint shows that ASEAN leaders understand the critical role digital technology plays across multiple economic building blocks such as trade, investment, people-to-people connectivity and financial inclusion.

Dubbed the 'ASEAN way', ASEAN's multilateralism is based on principles of non-interference, informality, minimal institutionalisation, consultation, consensus, non-use of force and non-confrontation. Its initiatives should therefore mostly be seen as collaborative programmes with limited mechanisms for ensuring compliance at a national level. That said, there are initiatives in sectors such as finance, aviation and trade that provide precedent for more established ASEAN regional engagement. One initiative mooted for serious consideration is the development of the ASEAN Single Telecommunications Market, which would seek to encompass issues of spectrum harmonisation, roaming fees minimisation, and OTT service provider alignment, among others. This would be a major step forward in championing the growth of a regional digital society if it were to take root.



Asia Pacific Economic Cooperation (APEC)

APEC is the economic forum established to promote liberalisation and facilitation of trade and investment in Asia-Pacific. Many of its initiatives are geared towards harmonising regulations to minimise national treatment and protectionism measures. Participation in APEC dialogue and forums is open to member economies, partnering regional organisations such as the OECD and, in select cases, private sector players through the APEC Business Advisory Council (ABAC).

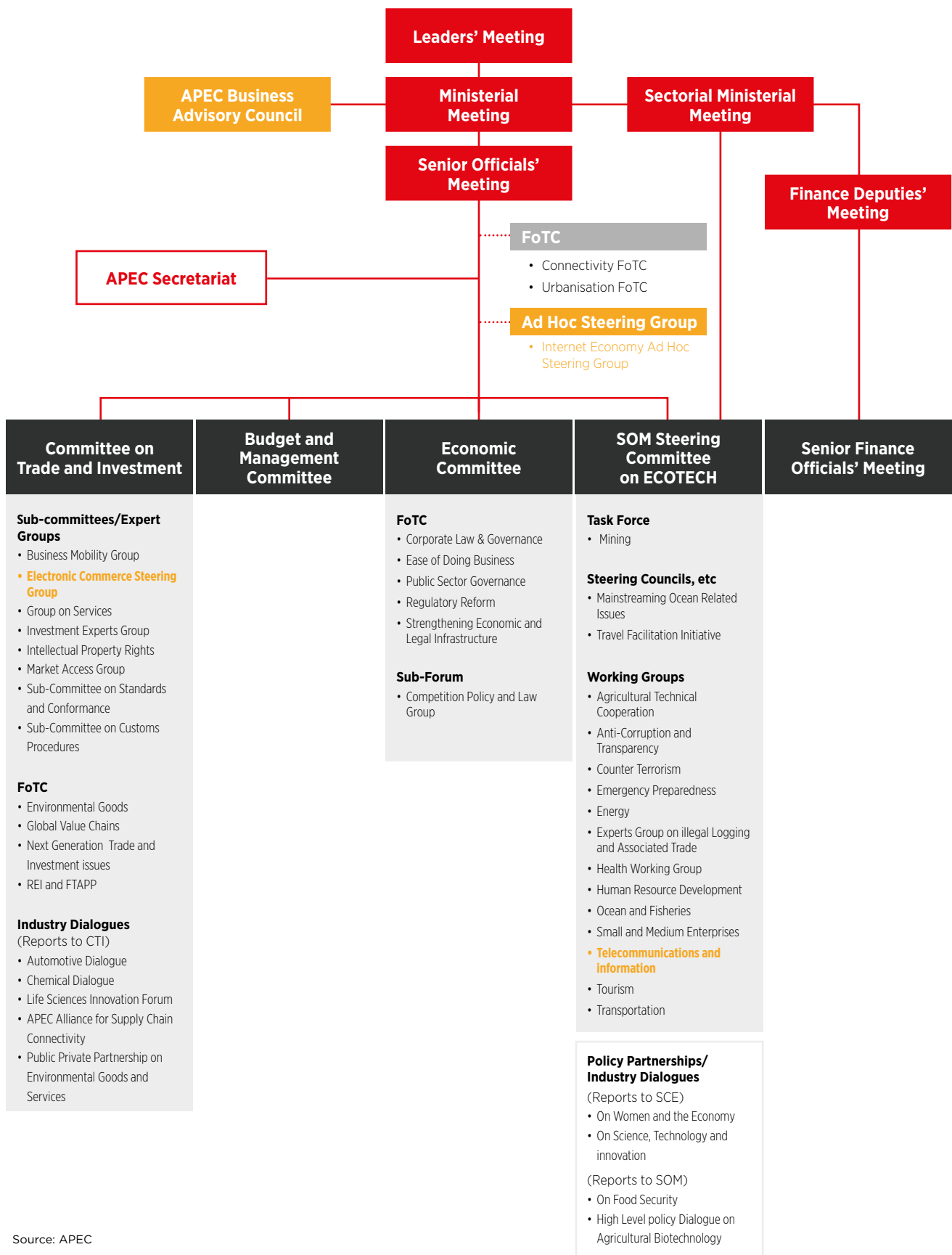
Leaders from APEC economies have long recognised the potential of the digital economy with regards to e-commerce, adopting the *APEC Blueprint for Action on Electronic Commerce* at the 1998 APEC Summit, which became one of the first regional statements of principles for the digital economy agenda. This was followed by the e-APEC Strategy and the *Statement to Implement APEC Policies on Trade and the Digital Economy* endorsed by APEC leaders in 2001 and 2002.

Within APEC there are three key groups and initiatives that look at the promotion of a digital economy. The first is the APEC Electronic Commerce Steering Group (ECSG), established in 1999 to perform a coordinating role for APEC e-commerce activities, based on the principles set out in the 1998 Blueprint. ECSG projects include those on data privacy such as the creation of the APEC Privacy Framework and the Cross-Border Privacy Rules (CBPR) system, to enable accountable cross-border flow of personal information within the APEC region. The Data Privacy Subgroup (DPS) is also working on achieving interoperability between APEC and EU Privacy Rules Systems through a joint working group. Another relevant sub-working group is ECSG's Paperless Trading Subgroup (PTS), which has been developing e-solutions or e-processes such as Electronic Certificate of Origin (ECO) and e-invoicing to promote cross-border trade and implement the Supply-Chain Connectivity Framework and Action Plan.

A second, older, platform within APEC is the APEC Telecommunication and Information Working Group (TEL WG), which is focused more on the pre-conditions for a digital society, namely connectivity and technology development. TEL WG was created in 1990 to promote affordable and universal access to ICT and the internet. Its vision is to create an "ICT ecosystem, characterised by an integrated, seamless, secure, trusted and innovative ICT infrastructure, services and applications" by 2020. The connectivity focus of TEL WG becomes apparent in the projects currently undertaken by the ICT Development Steering Group, such as Next Generation Networks (led by Japan), IoT (led by China) and TV Whitespaces (led by Singapore).

Figure 17

APEC governance structure



Source: APEC

Recognising the cross-cutting disruption that the internet and digitisation have created across sectors, APEC leaders endorsed the creation of the Ad Hoc Steering Group on the Internet Economy (AHSGIE) in 2014, sitting above existing committees and reporting directly to the Senior Officials' Meeting (SOM). This can bring different, and often siloed, forums, such as ECSG, TEL WG and ABAC, within APEC together. The group will focus on platforms such as e-identity, e-payments, cloud computing and cross-border data flows.

Through the establishment of the AHSGIE, APEC appears to be taking a holistic approach to the development of digital societies. Ideally this group will use its mandate to show leadership on two important fronts. The first is a set of principles (focused on regulatory equivalence between economies) for cross-border data flows. This will

require a set of recognised data classifications and agreed-to norms for protections around different data classifications, particularly as these pertain to data privacy and requests for data access.

The second will be the establishment of a set of consistent digital trade statistics that can be measured on an ongoing and comparative basis, and will provide the empirical evidence for looking at barriers to digital trade and therefore digital economy growth. APEC has a reasonable track record in this regard having created frameworks such as the Cross Border Privacy Rules and de minimis trade levels. Where it has fallen short is in the implementation of these frameworks. The prospect of APEC becoming a leading platform for a digital society and economy development agenda appears, therefore, to depend on the success of the AHSGIE experiment.





Organisation for Economic Co-operation and Development (OECD)

The OECD has been a leader in advancing policies to promote the digital economy; it has focused on understanding what challenges the digital economy poses, ‘measuring’ the socioeconomic impact of the digital economy and advancing policy dialogue. Its reports and indicators are often treated as best practices for even non-OECD member countries to use as reference. There are three key initiatives under the Directorate of Science, Technology and Innovation that are relevant to digital society development.

First, the OECD was one of the first plurilateral platforms to elevate the status of the digital agenda discussion, continuing its pathmaking role. Following the 1998 OECD Ministerial Conference on Electronic Commerce in Ottawa, Canada and the second Ministerial Meeting on the Internet Economy in 2008 in Seoul, Korea, the OECD will organise its third Ministerial meeting: Digital Economy – Innovation, Growth and Social Prosperity in Cancun, Mexico in June 2016.

Relatedly, the OECD has promoted data privacy and protection as a fundamental value and has established guidelines since the mid-1970s. Its efforts include *Guidelines on the Protection of Privacy and Transborder Flows of Personal Data*, which focuses on the need to address the global dimension of data privacy through improved interoperability, and *OECD Recommendation on Digital Security Risk Management*, which urges that digital security risk should be treated as an economic rather than technical issue and be integrated into overall planning.

Through publication of the *Measuring Digital Economy* series, the OECD has promoted the importance of internationally comparable and updated statistics and cross-country analyses for evidence-based policy making, and has proposed experimental indicators. The OECD also publishes papers on the digital economy that are shared to both OECD and non-OECD members. For example, the *OECD Digital Economy Papers* series consists of policy reports and working papers that the OECD Committee has declassified for wider readership. They cover a broad range of issues related to digital technology and ecosystem development such as internet traffic termination, broadband and IoT. The OECD also publishes a biennial series, *Digital Economy Outlook*, which examines emerging opportunities and challenges in the digital economy.

Although its membership base is limited to high-income countries, with at least half from Europe, the OECD has increased its cooperation with emerging economies such as China, India and Indonesia. It also formally collaborates with business and trade bodies. While many of the countries in this report’s focus are non-OECD members and are not tracked by OECD datasets, OECD indicator tools and reports still provide useful references as best practices in measurement, which are crucial in the context of rapidly changing technology.



Asian Development Bank (ADB)

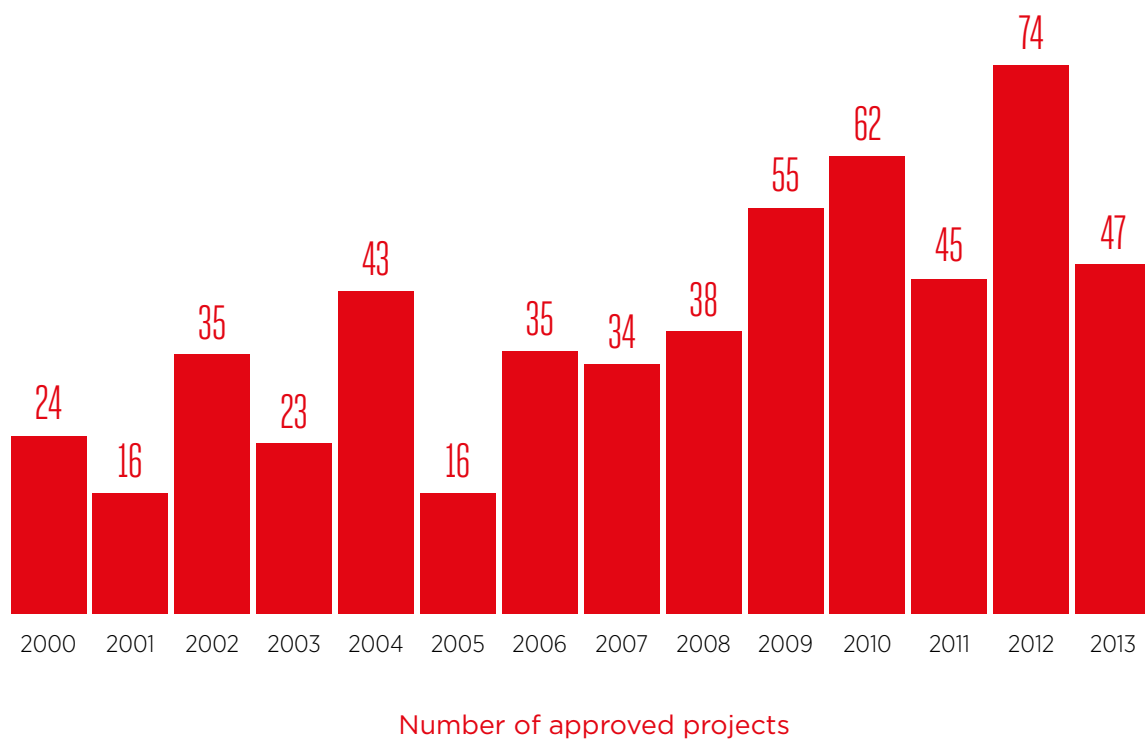
ADB is the region's first development bank and has been an important source of funding and technical assistance in various poverty reduction and development initiatives. Throughout its history, ADB has been a heavy user of digital technology as a component of its investment portfolio in strategic areas. For example, among 547 projects amounting to \$17.67 billion that ADB carried out between 2000 and 2013, more than 97% of the funds (\$17.16 billion) went to projects that had ICT as a component to support development in key ADB sectors such as public sector and education.³² In terms of the number of ICT projects, there was sharp growth from 2009 onward, reflecting the growing digital footprint in ADB's portfolio (see Figure 18).

In recent years, ADB has started to recognise the potential of digital technology in transforming and enhancing trade, social protection and financial sector management, and initiated research and projects in these areas. For example, ADB has started issuing newsletters on financial inclusion and is ramping up its efforts to grow its presence in the area by organising its first regional forum on Financial Inclusion in Digital Economy in May 2016.

32. ICT: Summary of Projects, ADB

Figure 18

Number of ADB-funded ICT projects by year (2000–2013)



Source: ADB

Despite the accumulated lending and project experience across Asia, ADB, at this point, is not yet poised to be a source of knowledge or best practice in digital society development. Developing

member countries of ADB such as Bangladesh, Pakistan and Indonesia, however, can look to ADB to help fund national-level initiatives, policy reform or infrastructure development.



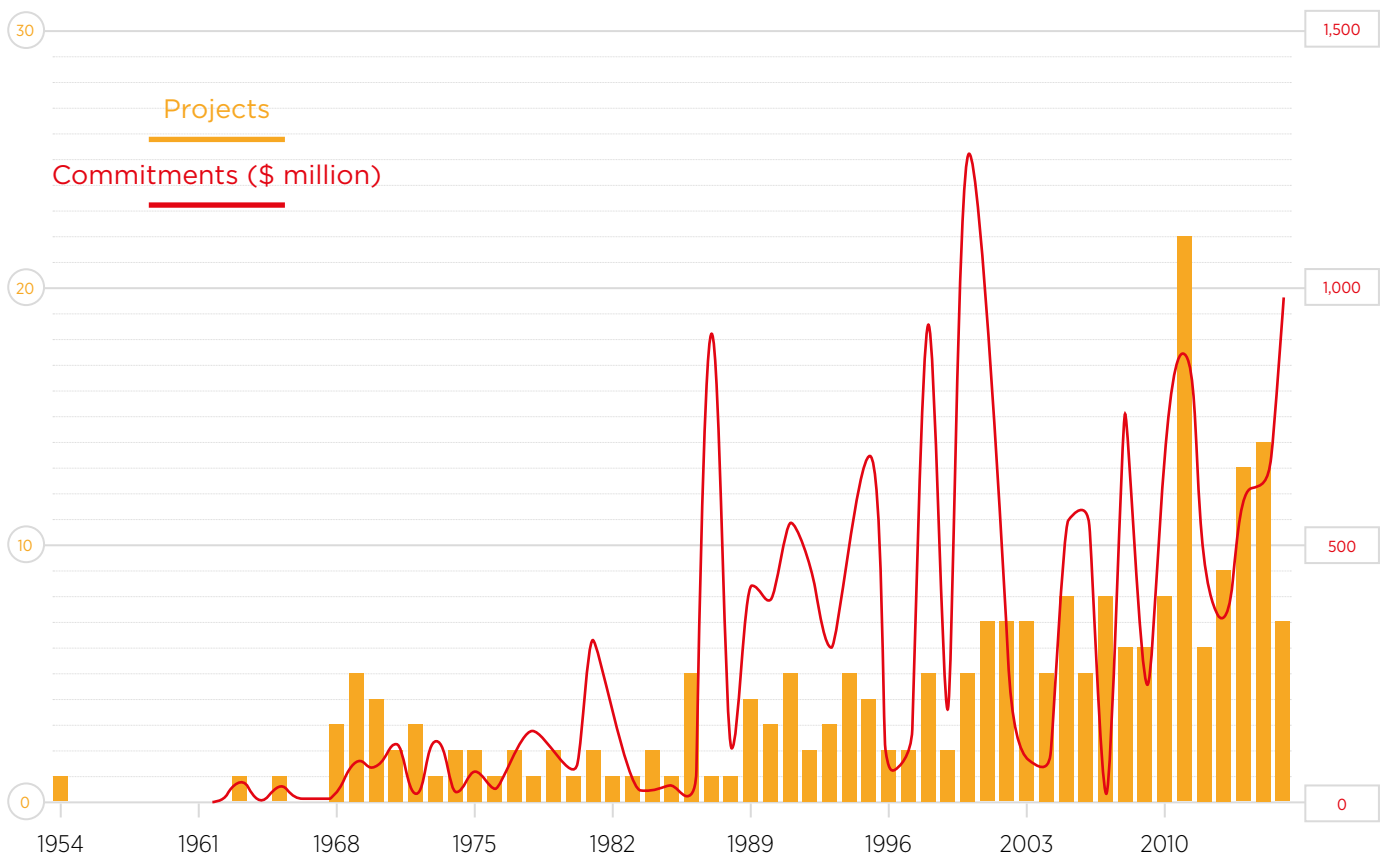
World Bank

The World Bank, with a stated mission to end extreme poverty, provides concessional loans, credits and grants to developing countries for support across a wide range of investments in key socioeconomic sectors. The World Bank also focuses on sharing knowledge and relevant data through its open data programmes, advisory services and technical assistance packages for developing countries to make informed and evidence-based investment decisions.

The World Bank has steadily increased its involvement in the digitisation of key sectors within developing countries through a wide range of ICT-related projects. Since 1954, the Bank has approved over 257 projects in the ICT sector for the East Asia and Pacific, South Asia, and Europe and Central Asia regions. In the first three months of 2016, it committed \$977 million, or more than 63% of the total commitment for ICT-related sector investment, to Asia, reflecting the importance of the region (Figure 19).³³

Figure 19

World Bank ICT projects in Asia since 1954



Source: World Bank

33. World Bank, Projects and Operations

An example of the World Bank's commitment in the region can be seen in Indonesia. In 1995, it supported legal and regulatory reform to enable private operators to enter the telecoms sector. In 2014, the World Bank and the government of Indonesia launched a connectivity modernisation project, aiming to enhance domestic connectivity between the different islands of the archipelago.

The World Bank is also devoting significant resources to developing national IDs as a step towards social inclusion. In 2010, for example, the World Bank helped implement biometric national IDs to distribute cash grants to flood victims in Pakistan as part of the Citizens' Damage Compensation Programme. The programme reached more than 1 million flood-affected households. The World Bank has also played a kick-starter role in enhancing national ID systems for better public service delivery in other emerging digital societies in Asia. In 2011, a \$195 million concessional credit was approved for the Identification for Enhanced Access to Services (IDEAS) Project to assist the government of Bangladesh in developing a reliable and accurate national identification system.

A crucial contribution of the World Bank is its influence in shaping country and donor policies. Its research and open data initiatives are important resources in digital society dialogue, and its publications, such as the annual *World Development Report* and *Doing Business* reports, help set the global agenda by drawing attention to crucial development issues and economy growth or social development blockers.

The *2016 World Development Report 2016: Digital Dividends*, for instance, calls for action around key digital society issues such as digital citizenship and digital finance so that the benefits of rapid technological development can be widely extended. The publication showcases mobile developments in extending access to financial services, public services, health care and education, as well as driving productivity in agriculture and enabling innovation such as in smart city programmes. The report points to lessons learned from past projects on the importance of organisational and human capacity as key components in being able to deliver on digital opportunities, while emphasising the need for cross-agency collaboration.

Other notable data initiatives include the Global Findex, which provides in-depth data on financial inclusion for 140 countries, and the ID4D Global Dataset, a further source of analysis and decision-making for the broader development community.

How countries and the broader development community can best capitalise on the World Bank's strengths and prowess may be less than straightforward. Its recent re-organisation towards a solutions-driven approach by re-orienting its previous matrix model into 14 global practices and five cross-cutting areas is being met with criticism that the World Bank is becoming more centralised with less emphasis on bottom-up channels from country departments. With more decisions being made in Washington DC, national governments that have historically worked closely with country offices may find themselves encountering new barriers. Global practices may lack the necessary local context that country departments were previously able to offer.



Moving up the digital society value chain



In a digitally interconnected world, national competitiveness, citizen wellbeing and economic growth are intrinsically tied to how digitally advanced a country's economy and society are. There is no single pathway to a digital society or pinnacle of digitisation; it is a continuous process of integration of disparate industries and services through digital technology to create new and more efficient ways of doing things. This demands action from policymakers, who must now establish governance structures and regulatory frameworks to support the advancement of a digital society.

Policymakers need to put in place the necessary building blocks for a successful digital society. These relate to key aspects of the emerging digital landscape, including consumer protection, competition, privacy and data protection, network security, taxation, and universal service and accessibility. These are largely interrelated and must be tackled in a coherent and holistic manner

to realise the full potential of a digital society. For example, a framework that takes into account the rights and needs of consumers in a digital environment will inspire confidence and trust in the consumption of digital services, while the prevailing tax structure on the sectors and services as well as the framework for spectrum management will affect the affordability and deployment of access networks.

4.1 Principles and practices for structuring national digital society agendas

Government plays a fundamental role in establishing the environment and developing the momentum for a digitally empowered economy and society. This is true regardless of the level of development of a country. For example, creating an open and level playing field to allow participants to innovate and reach underserved communities in areas such as mobile money is critical to advancing a digital society agenda, while failures of government to digitally transform themselves can lead to poor service delivery, inefficiency in public spending, privacy and security breaches, and loss of citizen trust, thus impeding progress towards digital citizenship.

Beyond policy setting and regulatory design, governments need to become more involved in the digitisation process by fostering digital economic activities that benefit citizens and businesses. Specific steps governments can take to realise this objective are:

- **Secure high-level political commitment to the digitisation strategy to ensure inter-agency cooperation.** The cross-cutting nature of digital society agendas requires deeper coordination across government ministries and agencies and, increasingly, agency alignment and collaboration.

Success will require leadership from the top and a long-term commitment from all involved to ensure that the compromises required can be made. Some governments have used a coordinating body with an overarching mandate across other line ministries to set priorities in the digital agenda and provide ongoing links and information flows between different ministries and across different levels of government. This has helped spur adoption and stimulate change, particularly in cases where that change is regulatory or legislative.

- **Become leading digital users to stimulate the use of digital services.** Governments are usually one of the largest technology users in a country, regardless of the level of development. Governments are able to promote further adoption and industry growth by delivering public services over digital platforms as well as being a major buyer of digital technologies and services.
- **Engage all stakeholders.** Policymakers should work closely with industry, consumers and government agencies to establish an inclusive digital ecosystem that encourages greater uptake and usage of digital services.

Policies and regulations

A central objective of regulatory policy should be to promote (or at least not significantly hinder) innovation in the digital ecosystem. The GSMA report *A New Regulatory Framework for the Digital Ecosystem*³⁴ lays out three key principles to establishing a modern regulatory framework:

- redesign of regulations and regulatory institutions around the concept of functionality, rather than legacy technologies or industry sectors
- regulations should be dynamic rather than static, focusing on ex post enforcement of broad rules rather than detailed ex ante prescriptions
- reform efforts should be broad-based and

bottom-up in the sense of re-evaluating from a clean slate the need for regulation, its goals, and the means by which those goals are accomplished.

Policymakers need to establish clear and forward-looking policies that address key regulatory areas with direct implications for the creation, distribution and consumption of digital content and services. The aim should be to quickly modernise traditional policies and frameworks, taking into account the intricacies of the emerging digital landscape.

We take a closer look at four key areas: connectivity, spectrum management, data and privacy, and e-governance.

34. A new regulatory framework for the digital ecosystem, GSMA, 2016



Connectivity

To increase digital services uptake, people need to be able to access relevant applications over a reliable network, using a suitable device. Public policy has traditionally focused on two parts of this challenge: policies designed to increase the availability or affordability of communications services (universal service funds, cross-subsidies, mandates on regulated carriers) and policies aimed at increasing the supply of local content (typically through subsidies for producers, mandates on

broadcasters, or a combination). Countries looking to move up the digital society value chain need to adopt a regulatory framework that takes a balanced and holistic approach to improving the availability and affordability of the entire digital ecosystem. This will increase online participation by stimulating the required investment in network infrastructure and ensuring the availability of relevant content and access devices.



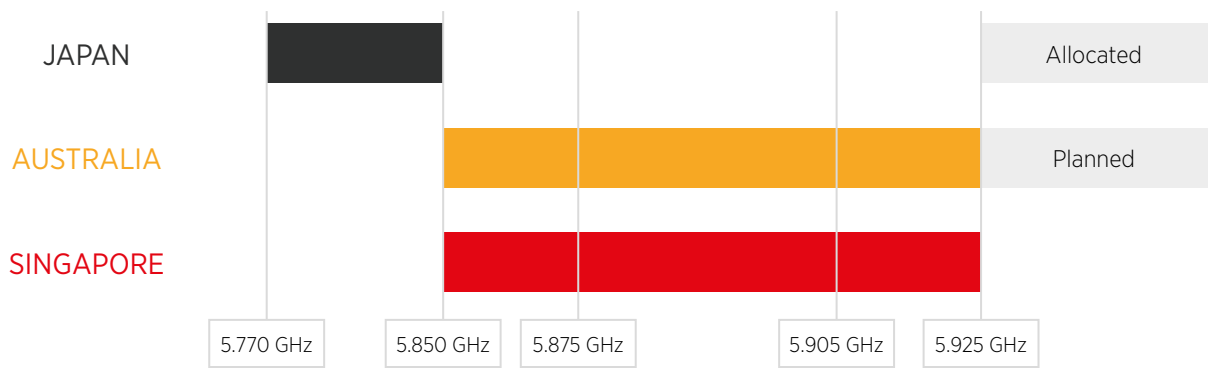
Spectrum management

The digital ecosystem increasingly relies on mobile technology for Internet connectivity. Mobile broadband is not only taking the lead for overall usage in developed countries but is also essential in providing universal access in developing nations. Spectrum is a critical input into the provision of mobile broadband services. As more digital services, encompassing citizenship, lifestyle and commerce activities, and social interactions are conducted over mobile networks, it is essential to establish

a framework that employs spectrum as a vital resource required to deliver a wide range of digital services and, as such, facilitate market mechanisms for the efficient allocation and management of spectrum assets. For example, the Singapore government has assigned the 5.9 GHz frequency for the coming generation of autonomous vehicles as part of a long-term plan to ensure the available of spectrum for mobile-based digital services (Figure 20).

Figure 20

Connected vehicle radio frequency allocations



Source: IDA 'Connected Vehicle Technology Development in Singapore' Jaya Shankar

In December 2015, the Australian Communications and Media Authority (ACMA) proposed changes to spectrum regulations aimed at providing easier access to spectrum for M2M operators using spectrum for IoT. These changes would eliminate the technical barrier preventing them from readily accessing narrowband, low-powered networks in the 900 MHz, 2.4 GHz and 5.8 GHz spectrum bands for applications such as data telemetry, machine data and monitoring, smart metering, security systems, sensor networks and industrial control. ACMA is also looking at adding new frequency bands for other applications including using in-ground ultra-wide bandwidth transmitters for automated parking management systems; radio-determination transmitters for industrial sensors; and analysis devices used for detecting objects in walls, ceilings and floors. An additional aim is to align usage of the 122.25–123 GHz and 244–246 GHz bands for short-range devices with the European system.

Data and privacy

A critical factor for the sustainable development of a digital society is a robust and effective framework for the protection of privacy, so users can continue to have confidence and trust in digital applications and services. Legal frameworks have been created in many parts of the world to address privacy and data protection concerns, but these laws vary from country to country. This situation presents a continuing challenge to digital content providers attempting to comply with myriad national legal requirements, while at the same time seeking to meet users' privacy expectations. Users should also be provided with information about privacy and security issues and ways to manage and protect their privacy. Where this is lacking, the uncertainty and confusion about which rules apply to various services could be harmful to users.

To overcome this challenge, policymakers need to work closely with industry players and international organisations to create consistent privacy standards and codes, based on internationally agreed principles that meaningfully protect the privacy of digital services users. GSMA also argues in favour of a technology and business model agnostic approach to privacy regulation, which focuses on the ways in which data is collected and used.³⁵ It would recognise the need to apply specific protections to certain data (e.g. financial and health data) and uses of information (e.g. for credit, employment and insurance), regardless of the 'sector' occupied by the company collecting it or the technology used to gather it. This allows consumers to form consistent expectations about how information is collected and used and also promotes competition through a stable and level regulatory environment.

E-government

E-government services are a primary feature of a digital society, but limited PC access in emerging and transition digital societies has hindered citizen participation. Mobile technology offers an opportunity for these countries to narrow the gap with traditional leaders in e-government but there needs to be a clear strategy to redesign existing service delivery platforms, including the user interface, for mobile access. Smartphones facilitate access to feature-rich content, but governments in emerging digital societies where large swathes of the population still rely on 2G connectivity need to accommodate this fact into their e-government policies by delivering services that are accessible on feature phones.

Mobile also enables further personalisation, convenience and location-based services that can enhance the benefits for citizens, resulting in greater engagement. With mobile playing an increasingly important role in identity management through initiatives such as Mobile Connect, policymakers can take advantage of the platform to deliver a range of public services to citizens and businesses. Governments also need to work with mobile services providers to create and deliver mobile applications that enable users to directly access personalised and relevant public services.

35. A New Regulatory Framework for the Digital Ecosystem, GSMA, 2016

Singapore's mobile government (mGov) programme was launched as part of iGov2010, to extend the reach of e-services and deliver them via SMS. The programme resulted in the launch of more than 300 SMS-based services over a five-year period. With the uptake of smartphones, the programme now delivers feature-rich government services via mobile devices – through mobile-enabled browsers or native mobile apps – to enhance the consumer experience. It uses the following policy levers:

- a funding framework to encourage agencies to deliver quality mobile services through effective use of technology and inter-agency collaboration
- mobile studies to inform agencies of the latest mobile trends so they can make informed decisions when implementing services via the mobile channel
- mobile engagement platforms to encourage incubation of mobile ideas and co-creation of government m-services both within the public service and with the private sector
- mobile implementation references and standards to facilitate delivery of quality and consistent government m-services by setting minimum standards, as well as sharing key references on the changing mobile landscape and guidelines on best practices
- a study on common mobile enablers to help agencies quickly develop new m-services, or improve existing ones
- mobile specification clauses to serve as a reference for agencies when developing mobile applications based on commonly used mobile implementation services and tools
- mobile excellence award to recognise agencies that deliver best-in-class government m-services.

Measuring success

In formulating a digitisation strategy, governments need to determine what the intended results are and how to recognise them when achieved. This can take the form of specific milestones for basic indicators, such as mobile broadband penetration, to be reached over predetermined timescales. For emerging and transition digital societies, the Partnership on Measuring ICT for Development, an ITU-backed international, multi-stakeholder initiative to improve the availability and quality of ICT data and indicators, provides a globally agreed set of standards that are crucial to informed decision-making. There are also efforts by international organisations and industry associations to collect and develop internationally comparable statistics

and benchmarks for emerging digital services with less widespread usage around the world – for example, the GSMA's frameworks and processes for the collection, accounting and analysis of information and data on mobile-enabled digital services, such as commerce and identity.

Establishing ahead of time what success looks like based on these initiatives and other internal processes provides the opportunity to keep track of progress and quickly identify any gaps or challenges in the implementation of the digital society agenda. It also ensures consistency across sectors and encourages other stakeholders, particularly citizens and businesses, to adopt digital technologies.

4.2 A practical roadmap for growth: country-specific recommendations

In designing and implementing whole-of-government approaches to digital society agendas, emerging digital society countries are still at a nascent stage, with limited practical precedence in collaboration between different agencies. Transition digital societies by contrast will likely have created a 'supra' ministry or coordinating committee to drive a more collaborative approach to planning but still need to challenge institutionalised silos and therefore need continuous monitoring and empowerment. Advanced digital societies need to focus on making the fundamental shift from a siloed to a holistic approach a permanent feature of their governance approach.

In terms of connectivity, emerging digital societies need to first focus on improving nationwide connectivity by enhancing affordability, availability and accessibility of Internet networks to lay the foundations for a digital society. Transition digital societies need to ensure their long-term plans include building out for hyper-connectivity, while advanced digital societies are moving to the vanguard of identifying use cases and business models for IoT and data analytics. This puts them in a position to lead in setting standards for advanced connectivity areas such as IoT as well as initiatives on the commercial opportunities and applications that can scale in the future.

	NATIONAL DIGITAL AGENDA	DIGITAL CITIZENSHIP	DIGITAL LIFESTYLE	DIGITAL COMMERCE
Emerging	Build awareness of the need and capacity for effective inter-agency coordination Focus on improving governance and enhancing affordability, availability and accessibility of Internet networks	Strengthen identity management frameworks to build trust in the system Emphasise individual connectivity to pave the way for more personalised services Design services that are accessible on featurephones to prevent exclusion of significant proportions of citizens that still rely on such devices	Facilitate development of online services and content in local language to encourage adoption and drive demand Facilitate affordable connected devices; consumer taxes on mobile devices in many emerging digital society countries weigh on the ability of citizens to use digital services	Enable an open and competitive mobile money market Encourage adoption of mobile money for financial inclusion Build foundations for digital commerce by focusing on MSME access
Transition	Move from inter-agency coordination to collaboration Ensure that the agenda setting process is consultative and focused on deployment	Expand and integrate digital-ID based services with traditional ID systems Streamline delivery and shift emphasis to citizen-facing services	Keep in view the need to build hyper-connectivity to meet expanding and evolving bandwidth demands Expand the use of M2M for industrial use	Encourage growth of e-/m-commerce by ensuring secure data flows across borders Foster MSME connections to global supply chains through e-commerce
Advanced	Focus on implementing holistic government planning from the outset, with sustainability a key objective	Simplify and remove duplication of services based on secure digital IDs Pursue holistic shift towards interoperable services and access through multiple channels	Pioneer new use cases and business models for IoT and data analytics Lead standard setting discussions for IoT	Harmonise rules and regulations for use of traditional and digital currencies on key issues such as tax, know your customer/ anti-money laundering Advance and align dialogue on digital trade

Emerging digital societies

To move up the value chain, emerging digital societies need to focus on holistic planning when it comes to digital society development, building foundational elements for more advanced digital-based activities and transactions (e.g. e-commerce) and establishing the enabling regulatory environment for creative disruption (e.g. new entrants) to occur.

Improving affordability is fundamental to increasing access to digital services in countries where large swathes of the population remain unconnected. However, a GSMA study³⁶ found that despite the positive socioeconomic impact of mobile communications, a number of developing countries impose sector-specific taxes on mobile that increase barriers to access. Higher than normal taxation on mobile operators and consumers distorts production and consumption behaviour. It may also limit usage of digital services, reduce the ability of mobile operators to finance investment in digital infrastructure, and can in the long term reduce government revenues.

Mobile is at the heart of the financial inclusion agenda in emerging digital societies. Evidence shows that countries that allow both banks and non-banks to provide mobile money services are more successful in reaching the previously

financially excluded population. An enabling policy and regulatory framework creates an open and level playing field that fosters competition and innovation, leverages the value proposition of both banks and non-bank providers, attracts investment, and allows providers to focus on refining operations and promoting customer adoption. Specifically, policymakers should establish frameworks that:

- create an open and level playing field that allows both banks and non-bank providers to offer the service
- recognise the need for technology and new players in the financial sector to grow mobile money
- allow for a diversity of payment methods and breadth of scope for fund transfer and storage.

Interoperability can also add value in driving adoption and thus scaling the reach of mobile money services if the market conditions and timing are right. Mandating interoperability, however, runs the risk of discouraging investment from players and may stymie growth of nascent business models. Governments can engage industry players to examine market conditions and its maturity level in order to understand both the benefits and risks associated with mandating interoperability.

36. Digital Inclusion and Mobile Sector Taxation, GSMA, 2015

In **Bangladesh**, the Impact of the Access to Information (A2I) programme – a key medium for delivering Digital Bangladesh – has had limited success in improving connectivity and digitisation due to three main factors:

- a lack of coordination
- limited private sector involvement
- fragmented projects spread thinly across many areas.

There is also a need to review the current tax regime to improve affordability and investment friendliness. While Bangladesh is increasingly being recognised as an attractive ICT investment destination, it also has one of the highest rates of taxation on ICT,³⁷ which runs counter to the vision of Digital Bangladesh. Regulatory issues also need to be addressed that have the potential to suppress growth of some digital services. For example, the mobile money market needs to be opened to participation by non-bank providers to boost the expansion of financial inclusion opportunities. While a limited number of providers have expanded their services, the extensive reach and expertise of MNOs and other non-banks has not been fully leveraged due to restrictions on participation.

Policymakers also need to actively pursue mobile-based identity management and verification platforms, taking into account the reach of mobile connectivity. Issues of biometric ID fraud need to be tackled with adequate data protection and security measures to engender consumer trust and confidence in digital services, while efforts need to be made to link public services to personal digital IDs to enhance the user experience.

Pakistan has a large and as yet underserved market with a demonstrated strong appetite for connectivity and affordable digitally enabled services. Pakistan's 3G auction in 2014, following a long delay, led to rapid growth in mobile broadband take-up when rollouts were complete, illustrating the pent-up demand that had accrued. However, the impacts of the rollout went far beyond the telecommunications sector. Financial inclusion, education and public service delivery are some of the areas that have subsequently grown strongly with the advent of widely accessible mobile broadband.

Pakistan also needs to review the tax regime for ICT goods and services to ensure affordable access to connectivity for the large underserved market. It is often cited as having one of the highest ICT tariffs in the region. Extending access to the unconnected while also rolling out broadband to the major metropolitan areas needs to be a key focus area for policymakers.

With Vision 2025 Pakistan's various ministries devise their own policy documents, roadmaps and timelines before soliciting approval from the economic committee within the Ministry of Planning. This process needs to be consolidated, ushering in a more collaborative planning process, such that line ministries are engaging with each other in the process of initial design, resourcing and timeline setting. The Ministry of ICT and the PTA also need to be empowered to coordinate cross-agency implementation, monitoring and evaluation of digital policies under Vision 2025. For example, there is room for improvement in collaboration between financial and non-financial authorities to boost branchless banking/digital financial inclusion efforts.

37. A study by the International Technology Information Foundation (ITIF) found that Bangladesh adds 57.8% to the cost of ICT goods and services over and above the country's universal 15% value-added tax (VAT). See Digital Drag: Ranking 125 Nations by Taxes and Tariffs on ICT Goods and Services, Miller and Atkinson, 2014

	NATIONAL DIGITAL AGENDA	DIGITAL CITIZENSHIP	DIGITAL LIFESTYLE	DIGITAL COMMERCE
Bangladesh	Institutionalise top-level support from the Prime Minister's Office to empower relevant agencies to drive implementation. Bangladesh has a plethora of acts, policies and guidelines related to realising the vision of Digital Bangladesh³⁸ with no clearly stated mechanism to ensure coherence and avoid duplication of effort or conflicts among these plans Strengthen monitoring of progress of Digital Bangladesh. Progress has been evaluated only once thus far.³⁹ A single entity, either the Planning Commission or Ministry of Finance, needs to publish the progress on a more regular basis Improve partnerships with private sector to enrich content and services of key A2I projects	Remove cost barriers to mandatory SIM registration with biometric ID Empower relevant agencies to be able to drive implementation. Sufficient resources need to be allocated to core e-services to go beyond pilots and expand m-government services Continue to build the foundations for digitised government service delivery. This could include the creation of an integrated population database (e.g. National Population Registry) based on the Bangladesh Poverty Database that is currently underway so that various authorities with G2P programmes have a single point of reference	Reduce tax on mobile devices to boost access to connectivity; tax on mobile devices increased from 10% to 21.75% in the 2014-15 budget proposals Support development of local language apps and promote digital education	Provide enabling environment to encourage greater competition in the market for mobile financial services through the introduction of non-bank providers
Pakistan	Continue the tradition of stakeholder consultation to ensure genuine participation. Pakistan is still in the process of formulating specific roadmaps based on Telecom Policy 2015 and Vision 2025. Involving a wider community of stakeholders including the private sector, academia, NGOs and industry organisations during the design stage will be beneficial Identify areas where technology can act as a tool for change; for example, access to knowledge, improved health outcomes outside of urban centres, e-government, and e-commerce to drive access to Pakistani brands Improve ability to monitor progress by identifying relevant and internationally comparable indicators in digital connectivity and usage, and build capacity to collect them	Scale the success of biometric pilot for SIM card registration to other uses Move towards more comprehensive delivery of government services through digital technology	Reduce tax on imported mobile phones; Pakistan proposed to double the general sales tax (GST) on all types of imported mobile phones for the fiscal year 2015/16 Support development of local language apps and promote digital education	Digitise government payments, such as salaries, pensions and social benefits, to create a source of funding for branchless banking accounts

38. Over 19 policies and regulatory instruments related to the Digital Bangladesh have been identified

39. This was done as part of the 6th Five Year Plan review

Transition digital societies

Transition digital societies looking to move up the value chain need to focus on progressing from connectivity to hyper-connectivity, epitomised by interoperability across networks (regardless of sector) and a forward-looking agenda focused on utilising those networks for all manner of services.

Transition digital societies also need to extend and streamline public service delivery by integrating government operations, shifting orientation to greater citizen-centric service delivery, and developing applications to run across the networked economy. The emphasis should be on services and user experience rather than the network.

Indonesia has made strong commitments to financial inclusion through a branchless banking model but thus far has only empowered the larger banks to lead the implementation and recruitment of agents. This model does not take advantage of the extensive airtime dealers that work for the telcos as cash-in and cash-out agents throughout the archipelago. To make the most of the existing landscape, the government needs to ensure that competition is open to both banks and non-banking players.

Thailand has made considerable progress expanding connectivity across the country, but now has to support investments in M2M network services for key sectors of the economy, including manufacturing, hospitality and tourism, and agriculture. This will involve support for the growth of mobile broadband. The National Digital Economy Plan and the Broadband Policy appear to prioritise improving fixed and Wi-Fi access, but mobile broadband continues to play a leading role in driving access. This means ensuring availability of sufficient spectrum to enable investment in new technology and infrastructure. Moving forward, clear ownership and accountability mechanisms for implementation as well as monitoring and evaluation of the National Digital Economy Plan need to be put in place.

Thailand's establishment of the Committee for Digital Economy and Society is a step in the right direction, with support from the Prime Minister and representatives from the relevant ministries. However, its planning infrastructure is still burdened by political fragmentation, and there is little benchmarking against international best practice or regional competitiveness.

	NATIONAL DIGITAL AGENDA	DIGITAL CITIZENSHIP	DIGITAL LIFESTYLE	DIGITAL COMMERCE
Indonesia	Recognise that digital society development will have cross-sector implications. For example, the Masterplan for the Acceleration and Expansion of Economic Development of Indonesia (MP3EI) focuses on building domestic industry competitiveness and connectivity but does not adequately recognise digital imperatives, or impacts, across different sectors Universal affordable access is still a priority focus Ongoing delays to the Palapa Ring project in regions of Indonesia need to be addressed Connectivity focus needs to shift towards interoperability and hyper-connectivity	Ensure interoperability of government digital services. For example, collaboration among relevant ministries including the Ministry of Finance and Ministry of CIT from the outset is important to ensure that G2P payments work together once digitised	Ease 'Made in Indonesia' and other local content requirements to facilitate foreign direct investment Relax data localisation requirements for data service providers	Enable full use of individual agents by non-bank players in mobile money services Increase efforts to consult with private sector in developing new frameworks for areas such as e-commerce and e-payments Allow non-banks to participate in digitising G2P payments
Thailand	Given the long shelf-life of the National Digital Economy Plan, there needs to be a regular and transparent schedule for reviews and adjustments in line with market and technology developments Promote coordination of key agencies Ensure that spectrum release is timely and predictable, and will meet the demands of a digital society (particularly in 4G) Expedite the transition from a state concession spectrum model to a best-practice licensing model with clearly defined rights and obligations Strengthen consultation with the private sector, both local and foreign, in designing national plans. The National Digital Economy Plan was led by a small group of committee members, and the extent to which the private sector was consulted remains unclear	Develop broader m-services and ecosystem Improve interoperability of existing e-services Streamline multiple ID platforms, and link to public services	Accelerate interconnectivity and interoperability of industries, particularly public infrastructure Assign and make 700 MHz spectrum available for mobile use as per APT/ITU recommendation and promote infrastructure sharing among mobile operators, including full radio access network (RAN) sharing and backhaul, to enhance connectivity	Promote government digitisation of taxation and payments through national e-payments system; this includes developing a centralised database on social welfare programmes

Advanced digital societies

Advanced digital societies need to make holistic planning a permanent feature of their governance approach. The focus should be on improving citizen experience in accessing public services through multiple digital channels as well as the streamlining of digital IDs. Crucially, advanced digital societies should take the lead in setting standards, help push for regional harmonisation to drive economies of scale, and share best practices in key areas, such as IoT, with emerging and transition digital societies to create a truly 'Digital Asia'.

The **Australian** government is undertaking a regulatory review to harmonise tax treatment and AML/CTF laws between new payment systems (e.g. bitcoin) and traditional currencies. Australia's learnings from this experiment, when shared with regional peers, could shape digital currency initiatives going forward. That said, Australia needs to ensure that policy and regulatory design support digital innovation. This means potentially re-thinking policies around data governance, tax regimes and immigration laws.

In support of its plan to be 'the world's most advanced IT nation,' the **Japanese** government appointed a Deputy Chief Cabinet Secretariat as Government CIO, with the authority to coordinate high-level policy across ministries and formulate inter-ministry plans and expense budgets. Japan's plan, which involves coordinating government bodies including the Cyber Security Strategic Headquarters, Council on Economic and Fiscal Policy, Headquarters for Overcoming Population Decline and Headquarters for Healthcare and Medical Strategy Promotion, represents a coordinated approach to the

implementation of a digital agenda.

Japan also needs to recognise the potential of mobile and cloud in rejuvenating traditional industries. While the digital strategy focuses on use of IT and data in education and agriculture, it falls short of showing strategic understanding of how mobile and digital services such as cloud can help. For example, Japan's agriculture is hampered by the small scale and non-contiguous nature of farms, and an aging population of farmers. Use of M2M sensors and cloud computing technologies can improve crop management and information systems to help overcome such challenges.

Singapore plans to trial a Mobile Digital ID system for all online transactions, including those with government agencies and commercial firms such as banks. The Mobile Digital ID would sit in the mobile SIM card. It will be based on advanced encryption techniques, known as public key infrastructure (PKI), that are more secure than (and could supersede) the use of one-time passwords, which are delivered via SMS or generated by a security token. The Infocomm Development Authority is leading this endeavour in close collaboration with the Monetary Authority of Singapore and the Ministry of Health.

Singapore is well placed to lead the development of new digital initiatives and capabilities in the region, particularly in the ASEAN community, in areas such as data analytics, cloud computing and hyper-connectivity. This includes momentum around HetNet trials and promoting M2M connectivity through nationwide aggregation gateway boxes.

	NATIONAL DIGITAL AGENDA	DIGITAL CITIZENSHIP	DIGITAL LIFESTYLE	DIGITAL COMMERCE
Australia	While internet penetration is high, it lags behind other OECD countries when it comes to affordability and the quality of broadband availability. Digital disparity and public capacity between urban centres and remote territories is persistent even in Australia. Focus, therefore, still needs to be given to hyper-connectivity in remote, indigenous and refugee locales Optimise digital delivery based on the principle of citizen centricity. Despite increase in availability and take-up of online services, Australians remain critical of their digital experience with government Design multichannel services that provide end-to-end service with integrated online customer support	Lack of national digital ID is a potential issue for future delivery and integration of government services	Relax mandatory health data residency requirements and enable government's ambition to host personal health records online (MyHealth) Promote opportunity for networked identity combined with government records access and payment tools Ensure MyHealth records implementation, hospitals and clinics meet requisite standards	Government should focus on developing fintech industry and cross-platform innovation while harmonising frameworks for new (digital) and traditional currencies
Japan	Still lacks coherently articulated cloud policy; conflicts with aspirations to be "the world's most advanced IT nation" Declaration has been revised each June since launch in 2013, presenting opportunity to re-focus on key areas, such as using cloud for standardised smart city and IoT development Address lack of interoperability with legacy technologies that hinder adoption of new technologies Undertake consultation with industry and other stakeholders to improve transparency. Provide stakeholders an opportunity to comment on draft laws, regulations, and other measures related to the development of a digital society	Should focus on broad promotion and integration of MyNumber ID system Integrate MyNumber ID system with new cybersecurity policy	Focus on aging population and requirements for reskilling Revise language around enabling standards and accreditation around distance learning	Encourage integration of Japan's payment platforms with international access, particularly in lead-up to 2020 Olympics Focus on harmonising frameworks for new (digital) and traditional currencies
Singapore	Deepen whole-of-government approach and coordination across agencies and initiatives. For example, various assistant schemes to boost digitisation of SMEs have been developed in silos, creating potential grey areas in coverage. SMEs also find it difficult to navigate the plethora of grants Singapore needs to further zero in on boosting homegrown innovation and entrepreneurship. This means consistency across available programmes that support innovation and digitisation of SMEs and startups. This may include more flexible tax regimes and immigration laws	Focus on broad promotion of mobile "e-IC" digital ID particularly for government services. Opportunity to build the platform to support broad array of further services Integration with new cybersecurity agency	Promote industry investment and standardisation process in cloud and Smart Nation technologies. The regulatory framework for cloud computing and Smart Nation is in place, but has yet to see significant commercial adoption or application. Continuous dialogue as well as partnerships with the private sector in setting standards in emergent digital technologies will be helpful Construction Authority to promote smart and green building architecture in new and existing Singapore buildings, connecting to various cloud platforms to showcase capabilities and cross-agency interoperability	Banks are using own stringent guidelines on outsourcing, which override ABS guidelines Focus on broad promotion of mobile "e-IC" digital ID which can be used for commercial services such as banking

4.3 Working regionally

Multilateral, plurilateral and inter-governmental bodies have an integral role to play as facilitators and convenors of dialogue, as a hub for knowledge sharing and dissemination with regards to national development objectives, and as a platform to harmonise differences in approach towards a digital society. The question is whether they are effectively stepping up to meet this role and challenge. APEC and ASEAN, for instance, rely on a 'soft law' approach to consensus-building in order to mitigate political tensions among members. The non-binding nature of this approach often affects timely delivery or limits the efficacy of initiatives. Member countries and wider stakeholders of these platforms need to realise that challenges of a digital era cannot effectively be met by maintaining the status quo. Regional organisations should consider the following to achieve their mandates in a rapidly digitising world.

- Strengthen links with non-state actors such as the private sector, NGOs and academia. In order to work through the complex cross-border issues of a digital era, broader dialogue and collaboration channels need to be in place to engage a wider group of stakeholders. This inclusive approach will enable regional organisations to develop a more accurate take on the issues at hand by drawing in the necessary expertise.
- Recognise that the challenges of a digital era are opportunities to revive and rejuvenate member collaboration. While negotiation impasses and political posturing cannot be completely avoided in multilateral cooperation, moving up the digital society value chain is an agenda that countries can easily rally around and will allow these regional organisations to reassert their influence. Digital trade and commerce, digital financial inclusion and digital identity for development are examples of common accessible agendas that can readily turn into regional development goals.
- Identify alternative mechanisms to encourage action among members. The non-binding nature of institutions does not mean they have to succumb to inaction. Rather, regional organisations should leverage their convening powers to bring together members and a wider group of stakeholders across different sectors. For example, ASEAN still does not have a cross-sectoral channel linking telecommunications and finance at a working level such as APEC's Ad-Hoc Steering Group on the Internet Economy. For these platforms to be effective, they need to be charged with shorter term and achievable goals.

Individual countries also need to realise that a deeper level of regional and international cooperation is necessary to reap the benefits and address the challenges presented by digitisation, considering the inherently cross-border nature of digital technologies. It is essential for countries to work closely with regional and international organisations to establish uniform standards that will enable the interoperability of digital services beyond national borders. Regional organisations play an important role as facilitators and coordinators as issues in the digital era are inherently cross-border and transnational. Regional platforms also enable national-level lessons and successes to be propagated so that emerging and transition societies have reference points for best practices.

To effectively engage with regional organisations, countries need to understand the mandates of these organisations in advancing a digital society agenda, given that no single organisation offers a one-size-fits-all solution. For example, the Asia-Pacific Telecommunity (APT) advocates the harmonisation of spectrum allocation to bring about economies of scale for the cost of mobile broadband equipment and devices and enable greater interoperability and international roaming between networks. Harmonisation across countries and regional blocs becomes especially pertinent when it comes to data protection and privacy issues, with the compatibility of privacy regimes, for example, bringing about the realisation of economic benefits of global data flows.

The APT band plan aims to harmonize the use of 698–806 MHz spectrum (or more commonly referred to as 700 MHz) for the deployment of mobile broadband technologies in the region. The spectrum is expected to be freed up once the countries complete their switchover from analogue to digital broadcasting. The recommendation to harmonise the 700 MHz band for mobile broadband has since been expanded from a regional to a global focus, with Europe, the Middle East and Africa, joining the Americas and Asia Pacific, as a result of the ITU's World Radiocommunication Conference 2015 (WRC-15).

Thailand and the Philippines are the only two countries in the region yet to commit to the allocation of the 700 MHz band for mobile broadband services. Both countries need to move quickly to harmonise use of the 700 MHz band to keep pace with the rest of the region. Countries that have committed to harmonisation need to meet their digital switchover targets to realise the potential of the band to boost Internet connectivity.

Appendix: methodology

Digital society metrics

The level of advancement of a digital society is evaluated across three pillars: digital citizenship, digital lifestyle and digital commerce. Access to internet connectivity is included as the foundational pillar for the development of these three components of a digital society.

The digital society metrics use a total of 30 indicators across the three components, and 22 indicators for connectivity. The metrics give equal weight to each of the four pillars. Each pillar is made up of the following components, number of indicators and corresponding weighting of indicators within each component:

① Digital citizenship pillar:

- a. Formal e-ID: 5 indicators – 50% weighting
- b. Provision of public services through digital channels: 3 indicators – 50% weighting

② Digital lifestyle pillar:

- a. Access and use of smart devices: 3 indicators – 30% weighting
- b. Solutions beyond core communications into consumer apps and IoT: 5 indicators – 50% weighting
- c. Locally relevant content online: 2 indicators – 20% weighting

③ Digital commerce pillar:

- a. Digital payment: 4 indicators – 40% weighting
- b. E-commerce: 4 indicators – 40% weighting
- c. Accessibility of financial services: 4 indicators – 20% weighting

④ Connectivity:

- a. Mobile infrastructure: 4 indicators
- b. Network performance: 2 indicators
- c. Other enabling infrastructure: 7 indicators
- d. Spectrum: 9 indicators

DIGITAL CITIZENSHIP is measured along two dimensions:

1. The existence of formal digital identities.

This is measured in terms of whether digital ID adoption has been adopted in the economy, how long the digital ID has been in use, the technical sophistication of the digital ID, and the percentage of the total and registered population that has adopted digital IDs.

2. The provision of public services through digital channels.

This is measured in terms of the extent of services that are supported by digital ID, the development of online government services, and the level of e-participation. Services supported

by digital ID may include civil ID; transport; passport; voting/election; education; health; finance/payments; tax/customs; and social security. Online government services may include websites providing information on policy and laws; e-communication between government and citizen; online forms for government services; e-filing of taxes; and applications for licences. E-participation captures the existence of digital information on – among other things – policies, budget, environment, public datasets, citizen e-consultation mechanisms and e-decision-making tools.

DIGITAL LIFESTYLE is measured along three dimensions:

1. **Access and use of smart devices.** This is measured in terms of the smartphone adoption rate and the proportion of the population covered by 3G and 4G networks.
2. **Solutions beyond core communications into consumer apps and IoT.** This is measured in terms of M2M connections, connected cars, connected health, connected cities, and connected living and industry, per capita. Connected health includes applications such as consumer health monitoring and clinical remote monitoring for post-diagnosis patients. Connected cities include connections to public transport, traffic management, and street equipment such as CCTV and digital signs.
3. **Locally relevant content.** This is measured in terms of online creativity and the proportion of the population that are active social media users. Online creativity captures the number of generic top-level domains and country-code top-level domains per capita; Wikipedia monthly edits per capita; and video uploads to YouTube per capita.

DIGITAL COMMERCE is measured along three dimensions:

1. **Digital payment.** This is measured in terms of the percentage of adults with bank accounts that made a financial transaction using a mobile phone; the percentage of adults who used a mobile phone to pay bills, send or receive money, or receive wages, government transfers or payments for agricultural products through a mobile phone; the percentage of adults who paid for school, utilities or sent domestic remittances through a mobile phone; and the percentage of adults that received remittances, government transfers and payments through a mobile phone.
2. **E-commerce.** This is measured in terms of the percentage of adults that used a mobile phone to make payments, purchases, or send or receive money; the percentage of adults that used the Internet to pay bills or buy things; the proportion of e-commerce transactions as a share of total retail; and the availability of Amazon, PayPal and eBay in a country.
3. **Accessibility of financial services.** This is measured in terms of the percentage of adults that have access to a bank account or other financial services; the percentage of adults with a credit card; the percentage of adults with a debit card; and the number of automated teller machines (ATMs) per capita.

CONNECTIVITY is measured along four dimensions:

1. **Mobile infrastructure.** This is measured in terms of 3G and 4G network coverage, and the number of years since 3G networks launched.
2. **Network performance.** This is measured in terms of average mobile download speeds and latency.
3. **Other enabling infrastructure.** This is measured in terms of access to electricity, penetration of fixed and mobile broadband, international bandwidth per internet user, the number of secure internet servers per capita, and median download speeds and latency for fixed broadband connections.
4. **Spectrum.** This is measured in terms of MHz, sub-1 GHz and above-1 GHz spectrum used for mobile services in total, per capita, and per operator.

A team of researchers collected data in February and March 2016. The process consisted of determining the relevant data for the three components, identifying the 30 indicators, normalising the data, addressing missing data, and finally calculating the composite index. The index is constructed as a composite index of three components – as well as internet connectivity as the foundational element for the three components – each of which is measured along a 100-point scale where 1 represents the worst situation and 100 the best.

Selecting the Indicators

A total of 30 indicators were selected for the three components, and 22 indicators for connectivity. For all the indicators, the latest data available at the time of research was used, and the values for each indicator were taken from the same year.

Each category constitutes a 100-point scale component of the composite index. The indicators selected for each of the components, and the weightage of the indicator within each component, are summarised below:

DIGITAL CITIZENSHIP COMPONENT	DIGITAL LIFESTYLE COMPONENT	DIGITAL COMMERCE COMPONENT	CONNECTIVITY
• Digital ID adoption – 10% • Digital ID longevity – 10% • Digital ID technical sophistication – 10% • Digital ID linkages with the formal ID card – 10% • Digital ID penetration among registered population – 10% • Digital ID penetration among total population – 10% • e-ID services – 20% • Online Service Index – 20%	• Smartphone penetration – 10% • 3G network coverage – 10% • 4G network coverage – 10% • M2M connections per capita – 10% • Connected cars per capita – 10% • Connected health per capita – 10% • Connected cities per capita – 10% • Connected living and working per capita – 10% • Online creativity – 10% • Social media penetration – 10%	• Use of mobile banking – 10% • Use of mobile wallet/account – 10% • Use of mobile payment for school, utilities, domestic remittances – 10% • Use of mobile remittance, government transfers and payments – 10% • Use of mobile commerce – 10% • Use of e-commerce services – 10% • Proportion of e-commerce in retail – 10% • Availability of Amazon, PayPal and eBay in a country – 10% • Banking account penetration – 5% • Credit card penetration – 5% • Debit card penetration – 5% • Access to ATMs – 5%	• 2G mobile coverage (% of market population) • 3G mobile coverage (% of market population) • 4G mobile coverage (% of market population) • Number of years since first 3G network launched • Average OpenSignal mobile download speed (Mbit/s) • Average OpenSignal mobile latency (milliseconds) • Access to electricity (% of population) • Fixed-telephone subscriptions per 100 inhabitants • Fixed-broadband subscriptions per 100 inhabitants • International Internet bandwidth per Internet user • Secure Internet servers (per 1 million people) • Median M-Lab download throughput for fixed connections (Mbps) • Median M-Lab client-to-server Round Trip Time for fixed connections (milliseconds) • Spectrum below 1GHz frequency used for mobile services (MHz) • Spectrum above 1GHz frequency used for mobile services (MHz)

Normalisation

As the indicators had different units and scales, any indicator that did not use a 100-point scale had to be normalised to make the indicator values comparable, as well as to construct aggregate scores for each economy.

For indicator values that required normalisation, minimum and maximum values were set in order to transform the indicators expressed in different units into indices between 0 and 100 using the following formula:

$$\text{Normalised value} = ((\text{actual value} - \text{minimum value}) / (\text{maximum value} - \text{minimum value})) \times 100$$

Certain indicators that already used a 100-point scale measure aspects of digital society that have very low values for each of the seven economies. This includes indicators such as use of mobile payment services to pay for school fees/utilities, and to send domestic remittances. These indicators were normalised in order to make them relevant in the overall weighting of a given aspect of digital society.

Treatment of missing values

None of the indicators used had missing values for any of the seven economies covered.

Aggregation and construction of the composite digital society index

Once all the necessary values had been normalised, each economy was scored along the three categories, as well as for internet connectivity, on a 100-point scale according to the weightages described in the indicator table above. This allows us

to compare the economies' scores for each category.

To calculate the overall score, the sum of the indicators within each component was used, taking into consideration the weightage of each indicator.

Data sources

The indicators and data were drawn from official and publicly available sources such as the United Nations and World Bank, as well as GMSA Intelligence data.

The majority of the datasets comprise hard, factual data such as smartphone adoption rates. Some of the data consists of qualitative facts, such as whether tax and customs services are connected to digital identity, in which case dummy variables were assigned to calculate the evolution of digital society. Some data sources rely on more subjective inputs, such as United Nations eGov Index, which assesses different aspects of e-government services.

Index scores

Connectivity and digital society pillar metrics

		Connectivity	Digital citizenship	Digital lifestyle	Digital commerce
Advance	Japan	76.1	81.9	79.3	44.6
	Singapore	76.4	83.8	54.0	56.1
	Australia	73.2	82.6	67.3	70.0
Transition	Thailand	49.7	59.7	31.8	24.2
	Indonesia	40.4	64.7	20.5	15.1
Emerging	Bangladesh	32.7	59.7	11.0	29.2
	Pakistan	23.3	58.6	10.7	16.8

Connectivity metrics

	Mobile infrastructure	Network performance	Other enabling infrastructure	Spectrum	Penetration (%)
Japan	99.8	67.4	75.3	54.4	90.1
Singapore	92.0	83.7	79.2	39.2	94.9
Australia	94.4	70.9	76.1	41.8	93.5
Thailand	66.4	36.4	58.5	35.4	74.1
Indonesia	62.5	32.8	47.9	11.3	66.0
Bangladesh	51.5	19.4	32.4	24.5	54.7
Pakistan	23.4	12.6	41.7	21.1	43.8

Source: GSMA Connectivity Index 2016

Digital citizenship metrics

	JP	SG	AU	TH	ID	BD	PK
1.1 National digital IDs	33.8	38.4	40.2	34.9	41.6	39.9	38.0
1.2 Digital public services	48.1	45.4	42.4	24.8	23.1	19.8	20.6
Sub-total	81.9	83.8	82.6	59.7	64.7	59.7	58.6

Digital lifestyle metrics

	JP	SG	AU	TH	ID	BD	PK
2.1 Access and adoption of smart devices	24.2	27.2	27.6	20.8	15.2	10.1	9.2
2.2 IoT	47.6	14.6	26.4	3.2	0.8	0.0	0.2
2.3 Local content	7.5	12.2	13.2	7.8	4.5	0.9	1.3
Sub-total	79.3	54.0	67.3	31.8	20.5	11.0	10.7

Access and use of online services

Global Innovation Index	BD	ID	PK	TH	AU	JP	SG
Online creativity (1)	0.4	14.9	0.9	21.6	74.4	33.1	39.7
ccTLD /1000 population	0.01	0.13	0.07	0.22	31.0	2.9	7.1
Monthly Wiki edits/1000 population	113	261	245	944	7,868	3,291	2,562
YouTube video uploads/capita	–	55	–	72	89	83	92
Smartphones and broadband	BD	ID	PK	TH	AU	JP	SG
% phones connected to 3G	13%	35%	18%	92%	41%	37%	48%
% phones connected to 4G	0.5%	3.4%	0.9%	5.4%	54%	60%	51%
% population covered by 3G network	79%	90%	65%	97%	99%	100%	97%
% population covered by 4G network	0%	20%	12%	53%	98%	99%	95%

Source: Global Innovation Index and GSMA; (1) Online Creativity Sub-index Score from Global Innovation Index. Numbers represent an aggregate of four indicators scaled by population aged 15-69 years

Connectivity and use of cellular

	BD	ID	PK	TH	AU	JP	SG
Car devices connected by cellular	18,908	827,968	80,164	820,410	1,643,033	7,351,611	93,958
All connected health devices	56,142	77,821	66,528	79,469	818,025	10,276,551	247,824
Health connections by cellular	9,594	10,765	11,086	9,574	107,551	526,863	11,995
Connected cities – all modes	27,820	176,634	51,632	112,837	1,487,614	51,124,201	211,419
City connections by cellular	7,543	19,199	8,637	11,311	97,899	2,274,185	62,234
Connected living/working	10,174,070	28,391,181	17,850,385	21,710,753	49,392,001	418,880,984	9,187,354
L/W connected by cellular	267,321	711,387	485,776	951,365	1,198,827	5,028,818	74,277

Source: Machina Research (2014 data)

Digital commerce metrics

	JP	SG	AU	TH	ID	BD	PK
3.1 Digital payment	1.9	27.1	17.4	5.8	3.0	26.2	14.7
3.2 Digital commerce	26.5	16.3	35.5	8.2	7.6	1.1	1.3
3.3 Accessibility of financial services	16.3	12.7	17.1	10.2	4.5	1.9	0.8
Sub-total	44.6	56.1	70.0	24.2	15.1	29.2	16.8



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