**About the GSMA**
The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 250 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and Internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai and the Mobile 360 Series conferences.

For more information, please visit the GSMA corporate website at www.gsma.com

Follow the GSMA on Twitter: @GSMA

---

**GSMA Intelligence**

This report is authored by GSMA Intelligence, the definitive source of global mobile operator data, analysis and forecasts; and a publisher of authoritative industry reports and research. Our data covers every operator group, network and MVNO in every country worldwide – from Afghanistan to Zimbabwe. It is the most accurate and complete set of industry metrics available, comprising tens of millions of individual data points, updated daily. GSMA Intelligence is relied on by leading operators, vendors, regulators, financial institutions and third-party industry players, to support strategic decision-making and long-term investment planning. The data is used as an industry reference point and is frequently cited by the media and by the industry itself. Our team of analysts and experts produce regular thought-leading research reports across a range of industry topics.

www.gsmaintelligence.com

info@gsmaintelligence.com
CONTENTS

EXECUTIVE SUMMARY 2

1 INDUSTRY OVERVIEW 8
1.1 Asia Pacific accounts for the majority of the global subscriber base 8
1.2 4G migration accelerating; 5G likely to see initial deployments before 2020 12
1.3 Smartphones to account for nearly two-thirds of connections by 2020 16
1.4 Growth of video and data traffic across the region 18
1.5 Revenue and investment trends 20

2 MOBILE DRIVING GROWTH AND INNOVATION ACROSS THE REGION 24
2.1 Mobile industry delivering growth and jobs 24
2.2 Mobile driving innovation across the region 30

3 MOBILE ADDRESSING SOCIAL CHALLENGES IN THE DEVELOPING PARTS OF ASIA PACIFIC 38
3.1 Mobile addressing the challenge of unregistered populations across Asia Pacific 39
3.2 Delivering digital inclusion and addressing the digital divide 41
3.3 Delivering financial inclusion: the scaling of mobile money services in Asia Pacific 46
3.4 Mobile addressing social challenges in developing markets 50

4 ENABLING DIGITISATION THROUGH EFFECTIVE POLICIES AND REGULATION 52
4.1 Moving up the digitisation value chain 54
4.2 A practical roadmap for growth: recommendations for countries at each level of development 58
4.3 The importance of regional collaboration 60
Executive Summary

Six in ten people in Asia Pacific subscribed to mobile services in 2015

At the end of 2015, 62% of the population in Asia Pacific (2.5 billion individuals) subscribed to mobile services. The region’s four dominant markets – China, India, Indonesia and Japan – together accounted for more than three-quarters of the region’s total subscriber base. Growth rates in the region are set to remain above the global average, with Asia Pacific adding more than 600 million new subscribers by 2020. The focus of growth will shift to South and South-East Asia; India alone is set to add just under 250 million new subscribers by the end of the decade.

4G connections to triple and initial 5G deployments to commercialise by 2020

The region is seeing an accelerating technology migration to 4G, with the number of 4G connections increasing by 2.5 times over the course of 2015 and now totalling in excess of 600 million. South Korea, Japan and China have been the leaders in 4G adoption. South Korea has the highest adoption rate of any market globally.

A number of previously 'laggard' markets in Asia Pacific are now migrating to 4G, including the likes of Thailand, Malaysia and the Philippines. This is being driven by a number of factors including ongoing network investments by operators, falling device prices and growing consumer appetite for higher speed mobile. For operators there is the benefit of an uplift in data consumption from the move to 4G, as observed in markets across the world.

The region’s technology leaders – South Korea, Japan and China – are now driving the development of 5G mobile technologies, in a similar way to how Europe pioneered 3G and North America led 4G. With high or rapidly growing levels of 4G adoption, supportive governments and ambitious launch targets, operators in these countries are challenging North American counterparts such as Verizon in the race to launch 5G.

The number of smartphone connections in Asia Pacific totalled 1.7 billion at the end of 2015, accounting for 45% of total connections in the region. China has been the key driver of the regional (and global) smartphone market to date, with 890 million connections at the end of 2015, though growth rates are now slowing. India is set to become the world’s second largest smartphone market in the second half of 2016, overtaking the US, with over 320 million smartphone connections forecast for the end of 2016. India will emerge as the main driver of smartphone growth in the region over the next few years, adding close to half a billion new smartphone connections by 2020.

Mobile technology generated 5.4% of Asia Pacific’s GDP and 15 million jobs in 2015

Revenue growth in the region slowed sharply in 2015, reflecting slowing subscriber growth, a weak macroeconomic backdrop and ongoing competitive pressures in a number of markets. Growth rates should recover in the second half of the decade, due to the positive impact of the migration to 4G on data traffic growth.

In 2015, mobile technologies and services generated 5.4% of GDP in Asia-Pacific, a contribution that amounted to around $1.3 trillion of economic value. In the period to 2020 we expect this to increase to $1.7 trillion as countries benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services and the adoption of new mobile technologies such as machine to machine (M2M).
The mobile ecosystem supported 15 million jobs in 2015. This includes workers directly employed in the ecosystem and jobs that are indirectly supported by the economic activity generated by the sector. In addition to the mobile sector’s impact on the economy and labour market, it makes a substantial contribution to public sector funding, with approximately $111 billion raised in 2015 from general taxation.

Innovation axis continues to tilt towards Asia Pacific

The global axis of mobile innovation continues to tilt towards Asia Pacific. The rapid adoption of smartphones and the willingness to embrace new apps and services are the common threads that link an otherwise highly diverse region. Asia is now building digital societies at a rapid rate. Citizens living within a digital society can access and interact with public and private services, such as utilities, education, health and transportation, anytime and anywhere, leading to increased efficiency and productivity not just for themselves, but for the institutions with which they engage.

Innovation extends from the regional technology leaders such as Japan, Korea and increasingly China, to the developing countries that are embracing mobile technology and particularly smartphones as their access point to the digital future. As well as the growth of regional internet players, smartphone manufacturers have emerged in several markets, particularly China and more recently India, with growing ambitions to enter the developed markets of North America and Europe.

Mobile can help address social challenges and the UN’s Sustainable Development Goals

Mobile technology continues to address a range of challenges, including the issue of unregistered populations, reducing the digital divide and delivering financial inclusion. In September 2015, the UN introduced the Sustainable Development Goals — a 17-point plan to end poverty, combat climate change and fight injustice and inequality. Mobile networks have the power to accelerate this journey in a way no other technology can: the GSMA and mobile operators are united in ensuring that connectivity plays a key role in helping achieve the 17 targets.
The penetration of the mobile internet in Asia Pacific has increased 2.5 times in the last five years, reaching 45% of the population by the end of 2015. Over the next five years, an additional 800 million people are expected to gain access to the mobile internet, bringing the total to 2.6 billion, and accounting for just over 60% of the population in Asia Pacific.

Despite earlier challenges in scaling mobile money services, operators in Asia Pacific are now exploring new opportunities to scale by widening the ecosystem. Mobile money is now available in 93 countries globally, and 33 countries in Asia via 87 service providers. However, despite the progress to date, the overall number of registered mobile money accounts as a percentage of the total number of connections is still relatively low. A fundamental challenge in Asia is the lack of an enabling policy and regulatory environment for mobile money.

Forward-looking policies and regulation are key enablers of digitisation

If the full potential of digital societies is to be realised, policymakers need to identify the complex adjacent elements required to build 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 regulatory frameworks that can support the demands of an increasingly connected and converged society.

The level of digitisation of a country defines the primary focus of its digitisation agenda. There are three broad categories of digital society development – emerging, transition and advanced. Emerging digital societies mainly see digitisation as a tool for accelerating socioeconomic development, particularly in relation to improving social and financial 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.

Countries in Asia Pacific 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 way of doing things. However, common core governance structures and regulatory settings (including those addressing consumer protection, competition, privacy and data protection, network security, taxation, and universal service and accessibility) must be in place for countries to develop meaningfully as a digital society.

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 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.
At the end of 2015, 62% of the population in Asia Pacific (2.5 billion individuals) subscribed to mobile services.
Unique subscribers

<table>
<thead>
<tr>
<th>Year</th>
<th>Subscribers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2.5bn</td>
</tr>
<tr>
<td>2020</td>
<td>3.1bn</td>
</tr>
</tbody>
</table>

Penetration rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>62%</td>
</tr>
<tr>
<td>2020</td>
<td>74%</td>
</tr>
</tbody>
</table>

CAGR (2015 - 2020) = 4.5%

Connections

<table>
<thead>
<tr>
<th>Year</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>3.9bn</td>
</tr>
<tr>
<td>2020</td>
<td>5.0bn</td>
</tr>
</tbody>
</table>

CAGR (2015 - 2020) = 5.0%

Mobile operator revenues

- Data growth driving revenues and operator investments
- Operator capex of up to $404bn for the period 2016-2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$409bn</td>
</tr>
<tr>
<td>2020</td>
<td>$471bn</td>
</tr>
</tbody>
</table>

CAGR (2015 - 2020) = 2.9%

Accelerating moves to mobile broadband networks and smartphone adoption

- By 2020, there will be 3bn smartphones.
- Growth of 1.3bn from the end of 2015
Mobile contributing to economic and social development across the world

Delivering digital inclusion to the still unconnected populations
Mobile internet penetration
2015: 45%
2020: 63%

Delivering financial inclusion to the unbanked populations
in 33 countries in Asia via 87 service providers as of December 2015

Delivering innovative new services and apps
Number of M2M connections to reach 435m by 2020

Mobile industry contribution to GDP

2015 $1.3tn
GROWING TO, BY 2020 $1.7tn

2015 5.4% GDP

Public funding
Mobile ecosystem contribution to public funding before regulatory fees
2015 $111bn

Employment
Jobs directly supported by mobile ecosystem in 2015
5.4M

Plus an additional 9.8M indirect jobs supported in 2015
At the end of 2015, 62% of the population or 2.5 billion unique users subscribed to mobile services in Asia Pacific. At present, the top four countries by number of subscribers – China, India, Indonesia and Japan – together contributed more than three-quarters of the region’s total subscriber base. Asia Pacific has been the biggest contributor to global subscriber growth over the last five years and still has considerable room for growth over the rest of the decade. By 2020, almost three-quarters of the region’s population will have a mobile subscription, with around 600 million new subscribers added over the period.
These latest unique mobile subscriber statistics are based on the results of an extensive global consumer survey conducted by GSMA Intelligence in 2015\(^1\). The survey results are used to calculate unique mobile subscribers, based on the number of active SIMs used by an individual, who can account for multiple mobile connections. Measuring unique subscribers is a significantly more meaningful representation of the true reach and impact of the mobile industry than connections.

At a country level, Asia Pacific is a region of contrasts in terms of the development of its mobile markets. On the one hand developed economies such as Australia, Hong Kong, New Zealand, South Korea and Japan are already saturated, with penetration rates above 90% and minimal future subscriber growth. On the other hand, lower levels of penetration, combined with burgeoning digital economies, are driving rapid unique subscriber growth in South and South-East Asia markets.

Among the fast-growing markets, Myanmar is a particularly strong example of the transformative power of mobile technology. Having liberalised its telecoms market in 2014, Myanmar is expected to see one of the highest subscriber growth rates in the world over the next five years. The country’s subscriber base grew at a CAGR of 12% over the last five years, adding 6.5 million mobile subscribers in 2015 alone, making it the fifth fastest growing mobile market in the world. Growth rates will continue to be high given the still modest penetration rate (41% at the end of 2015), continued high levels of investment to increase network coverage and competitive prices.

\(^1\) Moving beyond subscriber growth, GSMA Intelligence, February 2016
## Subscribers and penetration rate by country

<table>
<thead>
<tr>
<th>Country</th>
<th>Subscriber base (millions)</th>
<th>Subscriber penetration 2015</th>
<th>Subscriber penetration 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>6.9</td>
<td>79%</td>
<td>75%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>12.4</td>
<td>93%</td>
<td>83%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>42</td>
<td>92%</td>
<td>96%</td>
</tr>
<tr>
<td>South Korea</td>
<td>95%</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>Philippines</td>
<td>72%</td>
<td>72%</td>
<td>78%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>78%</td>
<td>85%</td>
<td>83%</td>
</tr>
<tr>
<td>Japan</td>
<td>69%</td>
<td>78%</td>
<td>73%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>53%</td>
<td>67%</td>
<td>66%</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>51%</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td>China</td>
<td>1008.7</td>
<td>73%</td>
<td>85%</td>
</tr>
<tr>
<td>Nepal</td>
<td>615.2</td>
<td>81%</td>
<td>81%</td>
</tr>
<tr>
<td>India</td>
<td>171.0</td>
<td>62%</td>
<td>65%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>50.4</td>
<td>47%</td>
<td>65%</td>
</tr>
<tr>
<td>Thailand</td>
<td>20.8</td>
<td>75%</td>
<td>38%</td>
</tr>
</tbody>
</table>

High saturation → Low saturation

Source: GSMA Intelligence
Multiple SIM ownership has seen a decline in recent years, after increasing steadily in the earlier stages of mobile growth, and is forecast to continue to decline out to 2020. At the end of 2015, there were almost 1.5 SIM cards for every person, with the connection penetration in Asia Pacific standing at 94%. With 3.7 billion connections at the end of 2015, the region accounts for more than half of mobile connections globally. Overall connections growth has flattened out as markets, particularly developed ones, become saturated.

Over 1 billion subscribers will be added to the global total between 2015 and 2020, with Asia Pacific accounting for more than six in 10 of these new subscribers. Growth in Asia will continue to be ahead of the global average, with a compound annual growth rate (CAGR) of 4.5% to 2020, compared to the global average of 3.9%.

Just under half of the incremental growth in the region by 2020 will come from the two dominant markets, China and India. India is expected to add just under 250 million new subscribers by 2020, though with the penetration rate by that date of only 62% there will still be considerable scope for growth. A range of other countries, including Indonesia, Pakistan, Myanmar and Bangladesh will see significant further growth in their subscriber bases over the period. Of the top 10 markets across the world in terms of subscriber growth over the next five years, six are in Asia Pacific.

![Figure 3](image-url)

**Top 10 global markets by subscriber growth, 2015-2020**

**Millions**

- India: 245
- China: 195
- Indonesia: 48
- Brazil: 38
- Nigeria: 30
- USA: 28
- Pakistan: 27
- Bangladesh: 25
- Mexico: 20
- Myanmar: 15

Source: GSMA Intelligence
1.2 4G migration accelerating; 5G likely to see initial deployments before 2020

Mobile broadband connections accounted for 45% of the total connections base in Asia Pacific by the end of 2015, a figure forecast to rise to 70% by 2020. There has been a dramatic shift in the technology splits from 2010 (when 2G accounted for well over 80% of connections) to 2015, when the share of 2G has reduced to 55%. 4G is forecast to more than double its share of connections to 37% by 2020, as operators continue to invest in 4G network build-outs and subscribers migrate to higher speed networks.
The accelerating migration to 4G across the region has been a particular highlight of the last year. 4G connections increased by 2.5 times during 2015, and now total in excess of 600 million. At the end of 2015, Asia Pacific had 76 live LTE networks (18% of the global total), as well as 20 live VoLTE networks (45% of the global total). Markets such as South Korea, Japan and China have been the early leaders, with faster 4G adoption rates than North America and Europe. In South Korea the legacy 2G networks have now been switched off. South Korean operator LG UPlus has gone even further and fully migrated its network to 4G, having closed its 3G network during the first quarter of 2016.

A number of the previously laggard 4G markets in Asia Pacific such as Malaysia, Indonesia, Bhutan and the Philippines are now beginning to see an accelerating migration to 4G. This is being driven by a number of factors including ongoing network investments by operators, falling device prices (particularly from regional vendors) and growing consumer appetite for higher speed mobile. For operators there is the benefit of an uplift in data consumption as consumers move to 4G, as observed in markets across the world.

Thailand is moving rapidly to 4G. The country had a relatively belated 4G (1800 MHz spectrum) auction in November 2015, and is now seeing rapid migration to the technology. Competitive pricing from operators (typically in line with or at a discount to 3G, though to date there is an absence of unlimited data plans) and the early distribution of 4G SIMs by some operators prior to the auction results have led to fast adoption of 4G in the country. A key factor has been the rapid network build-out by the operators following the spectrum award, with AIS for example adding around 7,000 base transceiver systems (BTS) within two months of the auction (covering 42 major cities), with a further doubling of the number of BTSs planned by mid-2016. AIS had already surpassed 5 million 4G connections by early March 2016, following launch in January. For the country as a whole, the proportion of 4G connections is set to increase from just 6% at the end of 2015 to 43% by 2020.

![4G adoption rates by country](image)

Source: GSMA Intelligence
Asian markets such as South Korea, Japan and China are driving the development of 5G mobile technologies, in a similar way to how Europe pioneered 3G and North America led 4G. With high or rapidly growing levels of 4G adoption, supportive governments and ambitious launch targets (linked to flagship sporting events), operators in these countries are challenging North American counterparts such as Verizon, which is initially focusing on 5G as a fixed-wireless solution. We expect to see some kind of commercial 5G launch in all three countries by 2020, despite the fact that 5G standardisation is not scheduled to be completed until then.

Operators in South Korea have announced plans to launch 5G services in readiness for the 2018 Winter Olympics in the country, with nationwide deployments by 2020. The country’s leading mobile operators plan to undertake a number of trials over the next year, with for example NEC announcing the successful completion of a proof-of-concept trial with KT Corporation for a 5G wireless backhaul solution that uses E-Band spectrum (70-80 GHz). SK Telecom also completed the field trial of 2800 MHz-based 5G services along with Samsung and plans to develop 5G pilot networks before the end of 2016.

In Japan, Tokyo Tech, Sony, JRC and KDDI Labs have jointly developed a ‘wave-based, high-throughput wireless access network for large-scale data content distribution’ in the 40 GHz and 60 GHz bands. Development of mmWave represents a key technology for the heterogeneous networks that will be used for 5G.

China is also committed to a rapid move to 5G, with its Ministry of Industry and Information Technology (MIIT) indicating that 5G will be commercially available in the country by 2020. Chinese operators have announced a number of partnerships to work on 5G (including the recent announcement by China Unicom and Ericsson). The EU has also signed an agreement to cooperate with China on the development of 5G, including the joint-funding of research in a number of areas such as standardisation and spectrum use.

### 5G timelines

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITU timeline</strong></td>
<td>Requirements</td>
<td>Workshop</td>
<td>Proposals</td>
<td>WRC 2019 (Spectrum)</td>
<td>Specifications</td>
</tr>
<tr>
<td>SK Telecom</td>
<td>Pilot launch</td>
<td>Winter Olympics</td>
<td>Commercial launch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KT</td>
<td>Pilot launch</td>
<td>Winter Olympics / Soft launch</td>
<td>Commercial launch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTT DoCoMo</td>
<td>Field trials</td>
<td></td>
<td>Olympics / Commercial launch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China Mobile</td>
<td>Commercial trial</td>
<td></td>
<td>Commercial launch</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GSMA Intelligence
1.2.1 Governments need to support spectrum for mobile broadband and IoT

Asia Pacific began the UN’s World Radio Communication Conference (WRC-15) in November 2015 with more identified mobile broadband spectrum, on average, than any other region; it ended with almost the least. With mobile broadband demand at record levels and 4G and future 5G technology becoming ever more spectrum-hungry, governments in Asia Pacific need to take extra steps to release more spectrum and ensure they can realise their digital ambitions.

The warning signs regarding spectrum were present before WRC-15. The existing 700 MHz band is key to bringing affordable 4G mobile broadband services to all parts of Asia Pacific – from urban centres to rural villages – yet few governments in the region have licensed it. As a result of WRC-15, many countries in the region are now at a disadvantage when it comes to supporting rapidly growing mobile broadband uptake and usage as well as advanced 4G, and in future 5G, services. Governments need to agree on a harmonised set of new bands for 5G use and work to identify them at the next WRC in 2019.

The Internet of Things (IoT) picture in Asia Pacific is more positive. Asia Pacific dominates the global market for cellular M2M connections, with China the world’s largest cellular M2M market, exceeding 100 million M2M connections at the end of 2015, representing almost a third of the global base. This highlights Asia Pacific’s strong position in the wider Internet of Things - the coordination of multiple machines, devices and applications connected to the internet through multiple networks, including machine to machine (M2M) and low-power, wide-area (LPWA) networks.

The recent progress in the development of 3GPP release 13 means that cellular standards can now support all wide-area IoT use cases, including LPWA for the first time. Mobile operators across Asia Pacific should be able to flexibly use their licensed spectrum for IoT and non-IoT services - even in the same band - which simplifies rollouts, and supports efficient spectrum use and high quality-of-service guarantees. It is essential that governments in the region provide a regulatory framework that facilitates the development and growth of IoT and does not impose service or technological restrictions that inhibit innovation.
1.3 Smartphones to account for nearly two-thirds of connections by 2020

The number of smartphone connections in Asia Pacific totalled 1.7 billion at the end of 2015, accounting for 45% of total connections in the region. China, India and Indonesia have been the main drivers of growth, helping the region double its overall smartphone base over the last two years. The region will add a further 1.3 billion smartphone connections by 2020, reaching a total of more than 3 billion, or two-thirds of the region’s total connections base by that date.

Source: GSMA Intelligence
China has been the key driver of the regional (and global) smartphone market to date, with 890 million connections and a smartphone adoption rate of 68% at the end of 2015. However, growth rates have now slowed sharply, with the smartphone market now largely in replacement mode, driven by subscribers upgrading to higher-end devices and the migration from 3G to 4G.

India is set to become the world’s second largest smartphone market in the second half of 2016, overtaking the US, with more than 320 million smartphone connections forecast for the end of 2016. With smartphones accounting for less than a quarter of total connections at the end of 2015, India will emerge as the main driver of smartphone growth in the region over the next few years, adding close to half a billion new smartphone connections by the end of 2020. This will take the adoption rate in India to 54%, highlighting the scope for smartphone sales in the future as the devices and data services become more affordable, digital literacy improves and more locally relevant content is made available.

Myanmar has been a notable smartphone success story in the region, with uptake mirroring the rapid subscriber growth in the country. With a total smartphone base of 25 million at the end of 2015, the smartphone base experienced 3.5-fold annual growth, the fastest of any country in the region. Myanmar was relatively late to liberalise the mobile market and has seen its youthful population ‘leapfrog’ basic and feature phones and become active data users, helped by the growth of more affordable low-end smartphones and an operator focus on driving data usage in the country’s rapidly expanding subscriber base.

South Korea, Japan and China have been the traditional smartphone manufacturing hubs in the region. However, more recently a number of local smartphone manufacturers have been gaining share in countries such as India (Micromax, Lava, Karbonn), the Philippines (Cherry Mobile, MyPhone, Torque), Indonesia (Advan, SmartFren, Evercross), Thailand (I-Mobile) and Vietnam (Mobiistar). With low smartphone penetration, most of these South-East Asian countries offer a lucrative market for local as well as global brands.

**Figure 8**

Share of connections by device type

Excluding M2M

<table>
<thead>
<tr>
<th>Year</th>
<th>Smartphones</th>
<th>Basic/feature phones</th>
<th>Data only devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>5%</td>
<td>45%</td>
<td>65%</td>
</tr>
<tr>
<td>2015</td>
<td>3%</td>
<td>41%</td>
<td>92%</td>
</tr>
<tr>
<td>2020</td>
<td>19%</td>
<td>16%</td>
<td>65%</td>
</tr>
</tbody>
</table>

Source: GSMA Intelligence
1.4 Growth of video and data traffic across the region

The increase in high-speed network coverage and smartphone adoption is leading to a surge in the use of mobile data in Asia Pacific. 4G launches in many countries have also enabled high-speed use of video and movie applications. Ericsson, in its latest mobility report, estimates that monthly data traffic per smartphone in Asia Pacific is expected to increase from 1 GB per month in 2015 to 6.9 GB per month by 2021, and will account for 40% of the total global smartphone traffic for that year.

Source: Ericsson Mobility Report 2016

---

2. Ericsson Mobility Report, February 2016
With a view to understanding consumer use of IP messaging services, the GSMA Intelligence Consumer Survey 2015 asked respondents how frequently they use an IP messaging app on their mobile phones. More than 70% of the respondents in China said that they use IP messaging apps at least once a month. India scored much lower on this, with 21% (males) and 14% (females) using IP messaging frequently. The Philippines continues to be the “SMS capital of the world”; it recorded the least respondents using IP messaging.

At least once a month frequency of using IP messaging services on mobile phones

![Bar chart showing frequency of using IP messaging services by country and gender]

Source: GSMA Intelligence Consumer Survey 2015

Although social media and IP messaging services are strong contributors to data traffic, video now represents the majority of mobile data traffic globally, having reached the majority level during 2014, according to Cisco®. Video represented 54% of all data traffic globally in 2015 and will reach 75% by 2020, with growth projected at an annual rate of 63% through to the end of the decade. Asia-Pacific is growing more rapidly than the global average, with video-related data growing at a 65% rate through to 2020. China is in a similar position to the rest of the world, with video already accounting for more than half of all mobile data traffic. However, growth rates over the next few years are set to be well ahead of the global average figure, with China set to catch up with the US and South Korea by the end of the decade in terms of video-driven mobile data (see Figure 11).

---

3. Cisco Mobile VNI, 2016
Revenue and investment trends

Asia Pacific witnessed strong revenue growth between 2010 and 2014, on the back of increasing subscriber penetration and healthy economic growth. However, as subscriber growth, particularly in the region’s developed markets, slowed and with the backdrop of a more challenging macroeconomic environment, revenue growth slowed sharply in 2015. Growth is forecast to remain relatively subdued in 2016, with competition a contributing factor in certain markets, while the ongoing weak macroeconomic backdrop is a further drag at the regional level.
New operator launches are expected in several markets across the region, including India (already one of the world’s most competitive mobile markets) and the Philippines. Several other markets remain highly competitive, including Australia and Malaysia.

Revenues have also been affected by the widespread adoption of IP messaging services, with for example voice revenue declines in China and Japan accelerating in 2015, down 15.4% and 15.6% year-on-year respectively. Revenue growth will begin to recover from 2017, driven in particular by the ongoing data traffic growth across the region, which will increasingly offset the cannibalising impact of IP messaging on voice and SMS revenues.

The accelerating technology migration to 4G should help drive incremental revenues in many developing markets, where data traffic per subscriber lags well behind the figure in the more developed markets of the region. Strong data traffic growth in China should also help drive an improvement in revenue trends in a market that accounts for almost 40% of total revenues in the region. China Unicom for example reported that in 2015 data already accounted for more than half of its revenues, with data traffic volumes increasing by 143% over the prior year.

India is set to be a key driver of revenue growth in the region, with a CAGR of 4.3% out to 2020. A number of other markets will contribute to the overall improvement in revenue trends, including Indonesia, Myanmar, the Philippines and Vietnam.

---

**Figure 12**

**Total mobile revenues in Asia Pacific**

$ billion

![Chart showing total mobile revenues in Asia Pacific from 2010 to 2020.](chart)

**Source:** GSMA Intelligence
Overall capex in the region has increased sharply in recent years, primarily due to extensive 4G network rollout in China, India and several other developing parts of the region. Capex will fall in 2016 and then drop more sharply from 2017 onwards as increased investment in markets such as India will not offset the slowdown in China, where 4G spend has already peaked. Capex levels are then likely to stabilise to 2020, with operators particularly in many developing countries in the region continuing to invest in mobile broadband networks. Towards the end of the period, operators in some of the more developed markets are likely to begin investing in preparation for 5G network launches, which could drive an increase in overall capex levels.

Note: Total capital expenditure as a percentage of total revenue, expressed as a rolling average for the prior 12 months.
Source: GSMA Intelligence
2 Mobile driving growth and innovation across the region

2.1 Mobile industry delivering growth and jobs

The mobile ecosystem makes a significant contribution to the economies in Asia-Pacific in terms of economic growth, job creation and public funding. The mobile ecosystem consists of mobile network operators, infrastructure service providers, retailers and distributors of mobile products and services, handset manufacturers, and mobile content, application and service providers. The direct economic contribution to GDP of these firms is estimated by measuring their value added to the economy, including employee compensation, business operating surplus and taxes. In 2015, the total value added generated by the mobile ecosystem was around $440 billion (or 1.8% of GDP), with network operators accounting for well over half of this total.
In addition to their direct economic contribution, firms in the mobile ecosystem purchase inputs from their providers in the supply chain. For example, handset manufacturers purchase inputs from microchip providers, and content providers require services from the IT sector. Furthermore, some of the profits and earnings generated by the ecosystem are spent on other goods and services, stimulating economic activity in those sectors. We estimate that in 2015, this additional economic activity generated a further $143 billion in value add (or 0.6% of GDP) in the region.
The use of mobile technology also drives improvements in productivity and efficiency for workers and firms. There are three ways in which this takes effect:

- The use of basic mobile voice and text services, which allows workers and firms to communicate more efficiently and effectively (for example, reducing unproductive travel time). The majority of countries in Asia Pacific have high levels of market penetration for mobile connections, meaning they all benefit from this effect.
- The use of 3G and 4G technology, which allows workers and firms to use mobile data and internet services (for example, facilitating improved logistics in services and manufacturing). The impact of the mobile internet is particularly significant in developing countries where fixed broadband penetration is relatively low, such as India, Indonesia and Laos.
- The potential of M2M and more broadly the Internet of Things to drive a range of efficiency gains to improve service provision in both the public and private sectors. Uses include using sensors to monitor the health of machinery; tracking real-time inventory so it can be replenished when needed; and improving energy efficiency. Such services are still in the early stages of development, but their impact is likely to grow materially in the coming years, particularly in countries that are early adopters of the technology such as South Korea and Japan.

We estimate that in total these productivity impacts were worth around $737 billion in 2015 (or 3% of GDP). Overall, taking into account the direct, indirect and productivity impacts, in 2015 the mobile industry made a total contribution of $1.3 trillion to the Asia-Pacific economies in value added terms, equivalent to 5.4% of the region’s total GDP.

**Figure 15**

**Total (direct and indirect) contribution to GDP**

$ billion, 2015

- Total: $1,320
- Productivity: $737 (5.4% of GDP)
- Indirect: $143 (1.1% of GDP)
- Mobile operators: $270 (0.7% of GDP)
- Related industries: $171 (0.6% of GDP)

Note: totals may not add up due to rounding
Source: GSMA Intelligence
2.1.1 Mobile ecosystem generating employment and public funding across the region

In 2015 mobile operators and the ecosystem provided direct employment to approximately 5.4 million people in Asia Pacific. In addition, economic activity in the ecosystem generates jobs in other sectors. Firms that provide goods and services as production inputs for the mobile ecosystem (for example, microchips and transport services) will employ more individuals as a result of the demand generated by the mobile sector. Furthermore, the wages, public funding contributions and profits paid by the industry are spent in other sectors, which provide additional jobs.

We estimate that in 2015, around 9.8 million jobs were indirectly supported in this way, bringing the total impact (both direct and indirect) of the mobile industry to 15 million jobs.

Figure 16

Employment impact

Jobs, millions

| INFRASTRUCTURE OPERATORS HANDSET MANUFACTURING DISTRIBUTION CONTENT, APPS & SERVICES DIRECT INDIRECT TOTAL |
|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| 0.3                                             | 1.3                                             | 1.2                                             | 2.2                                             | 0.3                                             | 5.4                                             | 9.8                                             |
| 15.2                                             | 9.8                                             | 5.4                                             | 2.2                                             | 0.3                                             | 1.2                                             | 1.3                                             |

Note: totals may not add up due to rounding
Source: GSMA Intelligence
The mobile ecosystem also makes a significant contribution to the funding of public sector activity in the region through general taxation. For most countries, this includes value added tax, corporation tax, income tax and social security from firms and employees. We estimate that the ecosystem made a tax contribution to the public finances of the region’s governments of $111 billion in 2015.

**Figure 17**

Contribution to public funding by the mobile industry, 2015

$ billion

Note: totals may not add up due to rounding
Source: GSMA Intelligence
2.1.2 Outlook and trends for the period 2015-2020

We forecast that the economic contribution of the mobile industry in Asia-Pacific will continue to increase. In value-added terms, we estimate that the ecosystem will generate around $1.7 trillion by 2020. Much of this increase will be driven by improved productivity, particularly from the adoption of the mobile internet by some of the offline population but also as countries adopt new technologies such as M2M.

![Outlook to 2020](image-url)

Source: GSMA Intelligence
2.2 Mobile driving innovation across the region

The global axis of mobile innovation continues to tilt towards Asia Pacific. The rapid adoption of smartphones and the willingness to embrace new apps and services are the common threads that link an otherwise highly diverse region. Asia is now building digital societies at a rapid rate. Citizens living within a digital society can access and interact with public and private services, such as utilities, education, health and transportation, anytime and anywhere, leading to increased efficiency and productivity not just for themselves, but for the institutions with which they engage.

Innovation extends from the regional technology leaders such as Japan, Korea and increasingly China, to the more developing countries that are embracing mobile technology and particularly smartphones as their access point to the digital future. As well as the growth of regional internet players, smartphone manufacturers have emerged in several markets, particularly China and more recently India, with growing ambitions to enter the developed markets of North America and Europe.

With India emerging as the key driver of subscriber and smartphone growth over the rest of this decade, its importance as an innovation centre will continue to build. Apple recently announced its intention to open an iOS developer centre in Bangalore, India’s main technology hub. Bangalore is also home to some of the country’s leading start-ups, such as Ola (a rival to Uber) and e-commerce company Snapdeal. These two companies are examples of the growing number of Indian ‘unicorns’ (start-ups with a valuation of at least $1 billion) operating in a range of sectors including data analytics, mobile advertising and digital wallets.

The India government has recognised the transformative potential of technology with the development of its Digital India initiative, which looks to empower 1 billion people by providing Internet access to all and to make broadband a utility for every citizen. Mobile operators and the broader mobile ecosystem in the country have the capacity to make a significant contribution to achieving these goals and are seeking a greater role in the overall programme.

4. The Mobile Economy India 2015, GSMA, November 2015
2.2.1 Platformisation – from messaging to payments and beyond

Momentum in the growth of IP messaging platforms has continued across the world and particularly in Asia Pacific. The trend is significant for its scale and its strategic importance in terms of the control point for internet users. Combining company-reported data with estimates for other active platforms, the global messaging user base stood at 3.5 to 4 billion as of December 2015, equating to 50% population penetration and bringing it almost on a par with the number of mobile subscribers (4.7 billion, equivalent to 63% penetration).

As highlighted in an earlier report by GSMA Intelligence, the messaging platform market has bifurcated into two groups:

- a small number of high-scale platforms with global (WhatsApp, Facebook Messenger) or regional (mostly in the CJK triangle) footprints
- a long tail of smaller platforms offering niche propositions or primarily competing in a single national market (Snapchat, BlackBerry Messenger and Kik, for example).

The dominant big three platforms in Asia – WeChat (China), Line (Japan) and Kakao Talk (South Korea) – now collectively account for around 960 million users, an increase of 30% on 2014. On an absolute number basis, this is less than WhatsApp (1 billion) and Facebook Messenger (800 million), although penetration rates in primary national markets are higher, at 40-50% for WeChat and Line and a virtual saturation of 96% for Kakao in South Korea.

The rising penetration figures underscore the extent to which messaging platforms in Asia have become synonymous with mobile internet access. Smartphone penetration in many markets, particularly China, Japan and Korea, is not far off that of IP messaging services. Adjusting for messaging users from other platforms besides the big three in Asia and multiple user accounts would bring it in line. In other words, in Asia, once you are a smartphone owner, you’re also a user of an IP messaging platform. Core messaging continues to be a main use case, driven to some extent by price arbitrage with SMS but more by an enhanced and continually evolved user interface, re-imagining what messaging could be. Most of the regional messaging platforms also offer VoIP and video calling, often ahead of the western players such as WhatsApp and Facebook Messenger.

---

5. Global Mobile Radar, GSMA Intelligence, September 2015
Most of the innovation in the last 12 months has come from incorporating feature sets and use cases that extend beyond core communications – something that has been termed ‘platformisation’. To varying extents depending on the country, this includes gaming, emoji, maps, news and entertainment content, restaurant and taxi bookings, and in some cases search. This strategy uses core messaging and voice as a loss-leading hook into the platform with a wide and growing array of digital services, with payments the common underpinning. WeChat has amassed a merchant base of 30 million connected with its payment systems – mostly SMEs but also large enterprises – through concerted marketing and by opening up its APIs. When combined with its consumer user base of 700 million, it is not hard to see the prodigious network effects that become available.

The business model for payments is commission based, with Tencent recently disclosing a fee structure of 0.1% per transaction and monthly revenues of RMB 300 million (around $46 million) in January 2016. That would extrapolate to an overall transaction value over the WeChat payment platform of $500 billion per year (or roughly $1,666 per personal bank card registered). This puts it below the market leader (Alipay from Alibaba) but above several major US companies including PayPal, an impressive achievement for a platform that is only five years old.

Line is similarly expanding, albeit at a national scale lower than WeChat given the smaller size of its domestic market. Its flagship payments service, LinePay, has grown to 68 million users since launch 18 months ago, or 31% of its global user base. The company recently announced an expansion of offerings beyond its core use case in P2P transfers, with scale top of mind. In its mobile wallet, it has increased bank partnerships from five to 10 in Japan, and added an auto top-up feature in which increases in the LinePay balance are debited directly from a current account. Concurrent to this, it has announced plans for a prepaid cash card for offline transactions, with 10 million retail points signed up in Japan and a further 20 million in international markets.
2.2.2 Mobile as the platform for content and video

Video continues to drive overall mobile data traffic, helped by rising smartphone penetration and greater localisation of content sourcing and delivery. Strategic importance is now directly correlated with time spent, and as such video has become the second key medium for user engagement besides messaging. This is of particular relevance in many markets in Asia Pacific, with a number of countries where there are now almost as many smartphones as televisions (and in some cases more), while online video consumption is typically via mobile devices rather than laptops.

Online and mobile video content providers include some of the familiar global players, with YouTube of particular relevance at the regional level, and Facebook also used to distribute video content. While these are free to users and rely on advertising for revenues, subscription-based video services are now becoming more common in the region. Netflix has launched its subscription-based services in a number of markets across the region, including India, Singapore, South Korea, Vietnam, Pakistan, the Philippines and Indonesia.

There is also a growing range of both national and regional content providers, with a mix of advertising-funded and subscription-based models. The Chinese mobile video content market is currently dominated by the local internet players, including Tencent, Alibaba (through its Youku video platform, which Alibaba recently took full control of) and Baidu (with its iQiyi service). India has seen a number of players emerge, including the recently launched Voot, an ad-funded platform that is a joint-venture between the Viacom group and local Indian conglomerate Reliance Industries.

The response from the mobile operators to the growing shift to mobile video has been varied, but can be divided into two broad categories:

- Bundling third-party content: this includes partnerships with existing VOD platforms (such as Netflix or Hulu). For subscription-based services, operators typically take a revenue share, while other content is bundled in order to drive data traffic.
- Building their own video content platforms: a number of Asian operators are looking to develop their own content platforms, with business models mainly split between freemium and subscription.

Netflix has already entered into partnerships with a number of operators in the region, including Telstra and Softbank, and is expected to enter further deals in the more developing markets of South-East Asia. Operators across the region continue to expand their range of content partners.

On the platform side, two leading examples are PCCW’s Viu platform and Singtel’s HOOQ. PCCW has developed Viu based on the freemium approach. The service offers a limited selection of content for free and a full range for a flat monthly fee. It is being rolled out across a number of Asian countries, having already launched in India, Hong Kong, Singapore and Malaysia. Viu offers a mix of international and local content, with the latter sourced through joint ventures or licensing agreements with local production houses. In India, for example, the company has signed content agreements with a number of local production houses and content owners such as Reliance Big Entertainment, Sony Music and Zee Digital Convergence.

Singtel’s HOOQ platform uses a subscription model with varying and flexible pricing in different markets. In some market such as the Philippines, tariffs are available that include bundled data to be offset against the streaming of content. Content is primarily sourced from partners, namely Sony Pictures Television and Warner Bros, as well as regionally based local content providers. The company is also looking to broaden its content sources with a move into proprietary content, for example with local partner Globe in the Philippines and a local entertainment company to produce a mini-series.
The ongoing digitisation of products and services is disrupting a broad range of traditional industries including financial services, transportation, energy and utilities, healthcare, education and housing. While it is transforming the way consumers access these services, at a holistic level it is also helping governments address the many challenges of urbanisation, such as traffic congestion, pollution, waste disposal and rising energy usage.

ICT is being used to deliver smart city initiatives that improve quality of life, make public services more efficient, generate new sources of revenue and fuel economic growth. A number of cities in Asia Pacific, including several such as Songdo, Seoul, Singapore, Tokyo and Hong Kong in the more economically developed countries, have already been pioneering smart city initiatives.

Many developing countries in the region have recently announced plans to launch smart city initiatives. The government of India has announced plans to build 100 smart cities, with an investment of $7.6 billion and more funding to be raised from private companies and through monetisation of services. In Thailand, the Provincial Electricity Authority (PEA) is planning to roll out a smart grid pilot project in Pattaya by early 2018 with an investment of THB1 billion. Under the project, the PEA will install 120,000 smart meters in homes and construct a data centre for data processing.

These developments create clear opportunities for mobile operators as well as other ecosystem players. However, business models need to be adapted so that the network is used more as a strategic platform. For mobile operators there is an opportunity to play a role using the industry’s unique assets – the network, identity, location and billing, for example. Partnerships with industry players to integrate technology into everyday business operations represent a further strategy for mobile operators. The benefits that can be realised from digitisation are real and significant.
**Smart metering, KDDI Japan**

By enabling utilities and their customers to monitor and control electricity and gas usage in real-time, smart meters are transforming the energy industry. Mobile technologies and services can provide cost-effective, reliable and secure connectivity between smart meters and the utility’s IT systems. In Japan, mobile operator KDDI is using 4G mobile networks to provide nine leading utilities with advanced metering infrastructure services, designed to ultimately support more than 10 million smart meters and process around half a billion meter reads each day. Beyond smart metering, mobile connectivity is also yielding other benefits for Japan’s utilities. They are using KDDI’s Internet of Things solutions to increase workforce safety, improve the management of their field staff and remote assets, as well as cutting costs and delivering a better service to consumers.

For more information, see [KDDI’s 4G Empowers Japan’s Utilities](#).

---

**Intelligent transport systems (ITS) – a potential case for Thailand**

Among the key emerging markets in Asia, Thailand – and specifically the city of Bangkok – faces many transportation challenges around congestion and safety. On average, commuters in Thailand spend nearly 1.5 hours travelling to work per day.

A GSMA Intelligence report estimates that implementing ITS solutions could lead to a reduction in total travel time of between two and four days per commuter per year. In addition, CO2 emissions from road traffic could be reduced by 10–20%, or 3–5 million metric tonnes per year. This is approximately equivalent to the total annual CO2 emissions in neighbouring country Cambodia. The number of road accidents could be reduced by up to 8,000 per year. This could help save up to 100 lives, which is nearly a quarter of the annual road traffic deaths reported in Bangkok in 2013.

For more information, see [Building digital societies in Asia: Making transportation smarter](#).
2.2.4 Mobile Connect – driving economic growth

Mobile Connect is the global, mobile industry-led, single log-in solution that delivers secure consumer access to websites and apps. It uses the consumer’s unique mobile number to verify and grant online access anywhere they see the Mobile Connect logo. Mobile Connect can play a significant role in driving growth within digital economies, and is experiencing early traction within highly populated developing regions, particularly those in South and South-East Asia.

Mobile Connect provides clear advantages to consumers, such as eliminating the ever-increasing number of passwords needed to securely maintain online identities, and giving consumers control over their data, helping them make online interactions with confidence. Mobile Connect can reduce the risk of fraud for service providers when users access their services, and can reduce the number of abandoned online transactions.

The Mobile Connect solution is already available to more than 2.8 billion consumers globally, including all the major markets in Asia Pacific. While initially focused on secure and convenient log-in to digital services, Mobile Connect is evolving to deliver secure authorisation of digital transactions and to add context and attributes about the user and the transaction to increase convenience, trust and security for users and online service providers, while respecting users’ privacy.

India:

Mobile Connect India is a collaborative effort by the six leading operators in India (Bharti Airtel, Aircel, Idea, Tata Teleservices, Telenor and Vodafone India). The operators account for around 85% of the Indian market, with more than 800 million connections as of March 2016 (all of which are Mobile Connect enabled). These operators are in the process of launching Mobile Connect across all of their circles.

Use cases are being developed by operators and service providers to address some of the pertinent issues faced by the industry. These include helping banks complete two-factor authentication (mandatory in India for transactions) without the need for complicated security questions or SMS; helping customers to authenticate in-person without actually giving away personal data, including the mobile number, for example with e-commerce home deliveries; and detecting advertising fraud.
Mobile driving growth and innovation across the region
Mobile is already enabling access to basic services in many parts of Asia Pacific. The number of individuals accessing the internet over mobile devices in the region grew from around 660 million subscribers in 2010 to nearly 1.8 billion at the end of 2015.
3.1 Mobile addressing the challenge of unregistered populations across Asia Pacific

The international community recognises identification as a fundamental enabler for socioeconomic and political development. Without proof of identity, citizens cannot access services, assert rights or fully participate in the digital and analogue worlds. The identification gap - the 1.5 billion people who the World Bank estimates lack a proof of official ID - has been identified as a key challenge to progress. This is reflected in the UN Sustainable Development Goal to “provide legal identity to all by 2030, including birth registration”. The identification gap is particularly acute in Asia Pacific and disproportionality affects those in rural areas, vulnerable populations and women, compounding challenges such as asserting property rights, or gaining access to financial services or subsidies.

Robust digital identity systems can produce huge savings for citizens, governments and business, increase transparency and accountability, and drive innovation. A global survey conducted by Boston Consulting Group found that digital identity systems create gains in efficiency and convenience that could save taxpayers up to $50 billion per year globally by 2020.6 Well implemented digital identification systems can have a significant positive impact on financial inclusion, gender equality, access to health services and social safety nets, and governance.

Identification is assuming even greater relevance in the increasingly digitised global economy, with individuals requiring a digital identity if they are to participate in the digital societies of the future. As highlighted throughout this report, the mobile ecosystem and smartphones are providing innovative ways of accessing a growing range of services and content. However, recent research from the GSMA has highlighted the additional trend of countries in the region implementing mandatory mobile SIM card registration, which requires proof of identity.

---

6. SIA eGov study, based on analysis from Boston Consulting Group, 2013
This provides a clear challenge for the substantial population that lacks a formal identity: these individuals will not be able to access mobile communications, further exacerbating digital, social and economic exclusion. Although mobile registration databases should not substitute a national identity registry, they may provide an effective functional registry that could be used for authorising consumers’ access to other services:

- In Pakistan, the government in 2014 introduced the requirement for biometric identity validation for all newly provisioned SIMs linked to the National Database and Registration Authority (NADRA) national identity register. An accelerated implementation was agreed following a terrorist incident in December 2014, with 108 million SIMs registered across the five operators in Pakistan by the three-month deadline.

  There was an agreement between the Financial Regulator and the Telecoms Regulator that the ‘know your customer’ regulations for a mobile wallet would be satisfied through this new SIM verification, which has had a positive impact on the financial inclusion agenda.

- The Bangladesh Telecommunications Regulatory Commission (BTRC) and the government in September 2015 decided to introduce mandatory SIM registration using biometric identity with verification against the National Identity Register. The plan covers new and existing subscribers, with the target that 80% of the subscriber base would be registered. There are ongoing discussions with the financial regulator as to whether the verified biometric registration can be used for financial services (or whether a separate registration is still required).

The GSMA Digital Identity programme is working with mobile operators, governments and the development community to demonstrate the opportunities, barriers and value of mobile as a scalable and trusted solution to enable a unique and secure identification. The goal is to use mobile to enable a trusted and robust digital identity for the underserved, leading to greater social, political and economic inclusion and bringing visibility to the people and places where it matters most.

Mobile technologies can play a key role in addressing these challenges and enabling a digital identity. A recent report commissioned by the GSMA highlighted three particular use cases:

- enabling civil registration (births, deaths and change of marital status)
- enabling access to government payments and accelerating the uptake of e-government services
- enabling access to financial services.

In the case of civil registrations, birth registration is an important stepping-stone in ensuring the provision of an official identity. Birth registration is mandatory in the majority of developing countries across the region, including for example Bangladesh, India, Indonesia and the Philippines, and will be mandatory in Pakistan by 2024. However, even in markets where registration is mandatory, a substantial proportion of births are not registered. Mobile technology is well placed to address these challenges, given high penetration levels and geographic coverage, particularly in rural areas. Mobile solutions remove the need for individuals to travel to registration centres and can allow for much more efficient registration processes.
Several mobile-based solutions address the issue of birth registration. One example is run by Telenor in Pakistan, in partnership with UNICEF. A simple SMS-based solution is used to report birth counts, while the actual birth registration details are reported through authorised community members such as health workers and marriage registrars, or through Telenor Pakistan’s distribution nodes using an Android application. The data coming in from both the SMS and Android application is made accessible through simple web-based dashboards to stakeholders, which will help create heat-maps for areas requiring the most attention.

Mobile is already making a significant contribution to delivering financial inclusion, with almost 130 million registered users across 33 countries in the region. However, even in those countries where mobile money services are scaling, overall financial inclusion rates often remain low. A key challenge on this front is the increasing regulatory requirements for financial institutions and regulated financial services providers to perform due diligence to authenticate/validate the legal identity of their customers. These barriers themselves highlight the clear opportunity for mobile operators and the broader mobile ecosystem to address the issue of ensuring citizens have a secure digital identity and in turn access to a broader range of key services.

3.2 Delivering digital inclusion and addressing the digital divide

The penetration of the mobile internet in Asia Pacific has increased 2.5 times over the last five years, reaching 45% of the population by the end of 2015. Over the next five years, an additional 800 million people are expected to gain access to the mobile internet, bringing the total to 2.6 billion, and accounting for just over 60% of the Asia Pacific population. However, despite the impressive progress, this will still leave a huge digital divide in many parts of the developing world. By the end of the decade, more than 35% of the population will still lack internet access, with most of the excluded population living in rural areas.
Digital inclusion – defined as the expansion of global connectivity and mobile Internet adoption – can extend various economic and social benefits to previously unconnected populations, fuelling a virtuous circle that reduces poverty, improves infrastructure and services, and further increases internet access and usage. By extension, unconnected and underserved communities risk falling further behind, widening the digital divide, if the barriers to digital inclusion remain unaddressed.

The GSMA Connected Society programme works with and on behalf of the mobile ecosystem to address the four key challenges to increasing digital inclusion:

- **Network coverage**: expanding the commercially sustainable coverage of mobile broadband networks to underserved population groups (typically in rural or remote communities) by promoting infrastructure sharing, regulatory best practice and technical innovation.
- **Affordability**: addressing key issues such as mobile-specific taxation to help make internet access more affordable, especially for “bottom of the pyramid” citizens.
- **Digital skills and awareness**: providing training to people so they understand the benefits and opportunities of being online and have the skills to use the mobile internet.
- **Locally relevant content**: encouraging and promoting the development of content and services relevant to underserved population groups.
3.2.1 Highlighting the key barriers to digital inclusion in Asia Pacific

A recent report by GSMA Intelligence\(^8\) shows that more than 2 billion people in Asia who could subscribe to mobile broadband services as they have coverage do not currently do so. Over 70% of the population in the region is covered by 3G networks, so while quality of service and coverage in rural areas continue to be barriers to inclusion, the availability of network coverage has improved in the last four years. To better understand why adoption of the mobile internet lags behind its availability, the report analysed the results of the GSMA Intelligence Consumer Survey 2015. This survey covers 54 countries globally, including six of the largest countries in Asia Pacific: China, India, Indonesia, the Philippines, Thailand and Vietnam. The key regional findings from the survey were as follows:

- A lack of awareness and locally relevant content is the most important barrier to internet adoption: 72% of non-internet users felt this was a barrier.
- Mobile services still remain unaffordable to many, and a lack of digital literacy means that many do not know how to use the internet. A quarter of non-users considered these barriers.
- The gender gap in internet usage is typically higher than the gender gap in mobile phone ownership.

### Table 1

Lack of awareness and local content, affordability and lack of digital literacy and skills among top barriers for non-internet users

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>LACK OF AWARENESS AND LOCALLY RELEVANT CONTENT</th>
<th>LACK OF DIGITAL LITERACY AND SKILLS</th>
<th>AFFORDABILITY BARRIER</th>
<th>LACK OF NETWORK COVERAGE</th>
<th>SECURITY AND TRUST BARRIER</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHINA</strong></td>
<td>30%</td>
<td>89%</td>
<td>11%</td>
<td>0%</td>
<td>2%</td>
<td>15%</td>
</tr>
<tr>
<td><strong>INDIA</strong></td>
<td>80%</td>
<td>21%</td>
<td>23%</td>
<td>3%</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td><strong>INDONESIA</strong></td>
<td>75%</td>
<td>10%</td>
<td>46%</td>
<td>2%</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td><strong>PHILIPPINES</strong></td>
<td>51%</td>
<td>27%</td>
<td>13%</td>
<td>8%</td>
<td>1%</td>
<td>22%</td>
</tr>
<tr>
<td><strong>THAILAND</strong></td>
<td>88%</td>
<td>23%</td>
<td>22%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>VIETNAM</strong></td>
<td>80%</td>
<td>20%</td>
<td>24%</td>
<td>0%</td>
<td>1%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Note: Represents the share of respondents that identified that factor as a barrier to mobile internet adoption. Respondents could choose more than one answer. Source: GSMA Intelligence Consumer Survey 2015

---

\(^8\) Consumer barriers to mobile internet adoption in Asia, GSMA Intelligence, June 2016
Addressing these barriers requires collaboration and action from players across the mobile ecosystem, and governments in particular, to ensure that relevant content is available in languages that people understand. Mobile operators can provide local talent with opportunities to incubate and scale start-ups and innovations, opening up their APIs to developers or investing directly in local companies. Governments also need to recognise the importance of developing a local content ecosystem in creating a thriving digital economy as well as in increasing awareness about the benefits of internet and improving the digital skills of users. Providing a progressive policy environment is essential; this includes developing a national digital agenda or strategy.

Investments will need to be made in digital skills training to ensure that non-users have the ability to come online. Governments, mobile operators and NGOs all have a role to play in increasing awareness about the benefits of the internet and improving the digital skills of users:

- Governments should bring ICT into schools and other educational establishments to ensure citizens have the skills necessary for the modern economy.
- Operators can use their agent and retail networks to introduce new customers to the mobile internet. The value of familiarising customers with digital services has already been demonstrated in other areas, such as digital financial services. For mobile operators, this will help drive an increase in data consumption. However, operators do not have the skills or capacity to solve this problem alone. There is also a clear role here for NGOs, working in partnership with operators and independently, to provide more in-depth training.

**GSMA’s Mobile Internet Skills Training Toolkit and Telenor India**

In recognition of the lack of digital skills among many mobile users in the developing world, the GSMA’s Connected Society programme recently developed a training tool to assist organisations interested in addressing the problem. The Mobile Internet Skills Training Toolkit (MISTT) has been developed for mobile operators, NGOs, development organisations and governments that want to provide training to improve people’s basic knowledge and understanding of the mobile internet. It provides an introduction to using the mobile internet on an entry-level smartphone through three services: WhatsApp, YouTube and Google, with information about safety and cost included throughout. The MISTT was developed with end-users in Maharashtra state in India, with mobile industry partners Idea Cellular and Telenor India, the NGO Digital Empowerment Foundation and other industry experts. It includes an accompanying ‘How To’ guide to help organisations customise training sessions for their audiences in different contexts.

In 2015, as part of its mandate to provide ‘Internet for All’, Telenor India began to establish dedicated spaces for customer engagement and education. As of June 2015, 26% of Telenor India’s customers were active mobile data users, which it aims to increase to 50% by 2017. To do this, it is converting sections of its 2,000 stores across the country into customer education hubs that aim to improve customers’ mobile internet skills and awareness of what is available online. Nearly 300 of these have been established to date, with 500 planned by July 2016. Customers not currently using the internet will be invited to receive training built on the MISTT curriculum. They also receive free Internet trial packs to familiarise themselves with the mobile internet and learn which mobile data packs best suit their needs.
3.2.2 Addressing issues of affordability and tax

Affordability is the second most important barrier highlighted by the survey. Mobile operators in Asia currently offer some of the world’s most competitive mobile internet tariffs, but the average cost of mobile ownership, which includes both the cost of the device and the cost of mobile services (voice, SMS and data) as a share of income varies considerably by income group. Those in the top 20% would, on average, expect to spend 2% of their income, while those in the bottom 40% would spend 13%. As a result, owning and using a phone is unaffordable for many. Mobile operators in Asia Pacific have been creatively managing their pricing plans to suit customer needs. They will need to continue to work to ensure that data packages are affordable for all segments, particularly lower income groups.

Figure 21
Cost of mobile ownership (after tax) as a share of monthly income

Note: Mobile broadband is based on a 500 MB prepaid plan. Handset cost is based on an entry-level smartphone (Nokia 215). Monthly income is expressed as GNI per capita PPP (current $) Source: GSMA Intelligence, World Bank, ITU, Strategy Analytics
Among the biggest barriers to greater digital inclusion are taxes levied specifically on the mobile sector, such as airtime excise and SIM taxes. Such taxes run counter to the widely recognised principles of taxation outlined by the International Monetary Fund and other expert organisations. Mobile-specific taxes place a disproportionate burden on people across the developing countries such as Thailand, Indonesia, Bangladesh, Malaysia and Pakistan, particularly low-income segments, as well as women who tend to earn less than men, excluding them from the benefits of digital and financial inclusion. Governments should ensure that taxation of mobile is aligned with best-practice principles: taxation should be broad-based; easily understandable and enforceable; and should not disincentivise industry investment.

**Vietnam: tax reductions lead to growth in smartphone and internet usage**

In recent years, Vietnam has seen a rapid decrease in mobile taxation. Tax as a proportion of total cost of mobile ownership fell from 10% in 2011 to 0% in 2014. In addition, the country now has no import tax rates on mobile handsets. This reduction was passed onto consumers, and in 2014 smartphone connections grew 47% compared to the previous year. In the same year, there was a rise of more than 7 million mobile internet subscribers compared to 2013, coupled with 41% growth in active social media accounts.

### 3.3 Delivering financial inclusion: the scaling of mobile money services in Asia Pacific

Despite earlier challenges in scaling mobile money services, operators in Asia Pacific are now exploring new opportunities to scale by widening the ecosystem. Mobile money is now available in 93 countries globally, and 33 countries in Asia via 87 service providers. Growing annually by 42%, the total number of registered accounts in Asia increased to 128 million as at the end of December 2015. Of these, 31 million were active accounts.

---

9. GSMA Mobile Money Tracker
10. Ibid
11. GSMA Mobile Money estimates
12. An active account refers to an account that has made at least one transaction within 90 days
A third of all new registered accounts opened globally were in South Asia (which includes markets such as India, Pakistan and Bangladesh), making it the fastest growing sub-region in terms of registered accounts. Consumers are now beginning to see the value of transacting using mobile money accounts of their own, rather than relying on an agent-assisted transfer (often called ‘over the counter’ transactions). In South Asia, registered accounts grew 47% in 2015, while OTC transactions grew at a much slower rate of 19%.13

However, the number of registered mobile money accounts as a percentage of total mobile connections is still low at 8% in South Asia, and only 2% in East Asia. There is clearly a significant opportunity to scale mobile money in Asia Pacific as a whole.

13. GSMA Mobile Money Global Adoption Survey
3.3.1 Unique challenges and opportunities

Several regional complexities and market realities are shaping the development of mobile money in Asia Pacific. Providers in the region are having to adjust to a range of competitors from both the formal and informal sectors. While traditional money transfer agencies such as pawn shops and padalas in the Philippines have been meeting domestic needs for person-to-person (P2P) transfers for decades, formalised banking systems are strong in many markets in South and East Asia. In these sub-regions, 45% and 69% of adults respectively report having an account at a financial institution, which is significantly higher than in other parts of Asia and Africa. A booming fintech landscape across much of the region has also given rise to ‘over the top’ players such as PayTM in India that offer new digital transaction accounts for the purchase of digital content and other goods and services. Meanwhile, there are several ‘mega markets’ in Asia such as Indonesia, India, China and the Philippines that are underpenetrated in terms of formal banking facilities and provide opportunities to target a variety of market segments at scale.

Source: World Bank Findex

Percentage of adult population with an account at a financial institution

- South Asia: 45%
- East Asia & Pacific (developing only): 69%
- Europe & Central Asia (developing only): 51%
- Sub-Saharan Africa (developing only): 29%
- Latin America & the Caribbean (developing only): 51%
In nine out of 22 markets in Asia there is a lack of an enabling policy and regulatory environment for mobile money. This includes some of the larger markets in the region, such as Indonesia and Bangladesh. The regulatory environment has limited the number of non-bank providers that can offer mobile money services, or curtailed providers’ ability to scale the business through viable cash-in/out networks. Providers are advocating for change in the regulatory frameworks, or are forced to find imperfect solutions and partnerships to develop mobile money.

### 3.3.2 Operators collaborate to ensure interoperability and explore new opportunities

Despite continued policy and regulatory barriers, operators in Asia are demonstrating a continued energy and dynamism as they continue to grow their mobile money businesses. Operators are exploring new ways to meet client needs, for example through collaboration, developing e-commerce and merchant payment services, and further driving the take-up of smartphones.

A notable highlight is that Asia is home to five live interoperable mobile money markets. Mobile money providers in these markets have worked together to establish the technical, commercial and compliance framework to allow users to send money from one mobile money account to another mobile money account on another platform, and in certain cases between a mobile money account and a bank account. Thailand and the Philippines piloted interoperable mobile money in 2015, joining Pakistan, Indonesia and Sri Lanka, where interoperability had already been established.

This collaboration is also apparent as mobile money providers in Asia expand into new use cases such as merchant payments and e-commerce. In Pakistan, mobile money providers are pursuing their own merchant acquiring solutions (such as uFone’s mPOS device), while also collaborating between themselves and with third-party merchant acquirers (such as with Easy Paisa, Mobicash, and Keenu) to grow the critical merchant acceptance network.

Although still nascent, the use of mobile money for merchant payments presents a valuable new use case, as the size of the global market for e-commerce is projected to reach $1.05 trillion in 2018. There is a significant opportunity to integrate payment platforms using mobile wallets or companion cards. Smart’s PayMaya and Globe’s GCash MasterCard in the Philippines are targeting e-commerce with companion cards geared at online purchases. Smartphone applications continue to be the second most offered channel by mobile money providers, after USSD. Delivery via smartphone allows for an enhanced user experience for mobile money that is more convenient and offers easier integration.

In 2016, providers will continue to pursue these opportunities to collaborate and develop next-generation mobile money services to broaden reach and activity. The Asia Pacific region should also see the full launch of operator-led mobile money services in Myanmar and re-launches under the new Payments Banks framework in India.

---

15. e-Marketer
3.4 Mobile addressing social challenges in developing markets

Countries across the developing world face a range of social and developmental challenges. Rapid population growth and youthful populations create challenges in providing access to basic infrastructure and services, including education and healthcare. In September 2015, the UN introduced the Sustainable Development Goals – a 17-point plan to end poverty, combat climate change and fight injustice and inequality. Mobile networks have the power to accelerate this journey in a way no other technology can. The GSMA and mobile operators are united in helping tackle the Sustainable Development Goals and ensuring that connectivity plays a key role in helping achieve the 17 targets on poverty eradication, agriculture, health, education, gender equality, water resource management and sanitation, affordable energy access, employment, infrastructure, inequality reduction, safer cities and climate change, by 2030.16

### Sustainable Development Goals and mobile operator initiatives

<table>
<thead>
<tr>
<th>CASE STUDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AGRICULTURE</strong> - End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.</td>
</tr>
<tr>
<td>Kisan Mitra, Vodafone India</td>
</tr>
<tr>
<td>Launched in May 2015, Vodafone India’s Agri VAS Kisan Mitra (Farmer’s Club) now has a base of 500,000 users. The service offers agricultural information and news, market prices and localised weather forecasts via SMS. Available in nine languages, the service allows farmers to receive three to six SMS alerts per day. A Vodafone study, Connected Farming in India, released in May 2015 claims that simple mobile service interventions can increase a farmer’s income by $128 per year for more than 60% of Indian farmers by 2020.</td>
</tr>
<tr>
<td><strong>HEALTH</strong> - Ensure healthy lives and promote well-being for all at all ages.</td>
</tr>
<tr>
<td>Easypaisa Sehat Sahara, Telenor Pakistan</td>
</tr>
<tr>
<td>Easypaisa Sehat Sahara Health Insurance is Pakistan’s first mass-market health insurance product, launched in partnership with MicroEnsure. The service aims to improve access to healthcare by providing financial assistance for inpatient hospitalisation and disability as well as income support when ill, for $10 per year. The service has a life insurance component whereby a user needs to maintain a minimum balance in their Easypaisa account. Since launch of Easypaisa Sehat Sahara there have been 100,000 subscribers for the health insurance and a total of 1.5 million subscribers for both the life and health insurance.</td>
</tr>
</tbody>
</table>

Sustainable Development Goals and mobile operator initiatives

**CASE STUDIES**

**EDUCATION** - Ensure inclusive and equitable quality education, and promote lifelong learning opportunities for all.

Mobile operators are working to support students and teachers in integrating mobile technologies into the classroom. Mobile also enables access to greater learning opportunities for youth in urban hubs and remote locations.

**BBC Janala, Bangladesh**

In Bangladesh, a large-scale mobile-based English teaching tool, BBC Janala, has effectively transformed mobile phones into a low-cost educational tool. Users can dial a short code to access bilingual audio-lessons and can test their English language.

**WOMEN EMPOWERMENT** - Achieve gender equality and empower all women and girls.

200 million fewer women than men own mobile phones in low- and middle-income countries. The mobile industry is working to close this gender gap and deliver socio-economic benefits to women, such as increased access to financial, health, education and employment services and opportunities.

**Project Sampark, Telenor India**

Telenor India (formerly Uninor) launched Project Sampark in August 2014 to help bridge the gender gap in rural India. A product called Bandhan SIM Plan was piloted comprising a pack of two paired SIMs, one to be used by a woman and the other by a male member of the household. With this product, Telenor has attempted to overcome the cultural barriers that keep women from owning a mobile connection and encourage men to recognise the value of it for women in their household. Having determined that women retailers serve women customers more effectively, Telenor has also recruited a network of local women retailers to market and sell the Bandhan SIM Plan. The project was piloted in the Aligarh district of Uttar Pradesh West. Within five months of launch, Telenor saw a 30% rise in new subscribers in the pilot area. This product is now being scaled to three more towns.

**ENERGY** - Ensure access to affordable, reliable, sustainable and modern energy for all.

More than half of the 1.2 billion people who lack access to electricity are covered by mobile networks. Mobile technology can increase the access to and efficiency of reliable energy services through mobile payments and smart energy metering solutions.

**GSMA Mobile for Development Utilities Programme**

To date, GSMA’s Mobile for Development Utilities Programme has awarded £1.6 million in grants to 12 organisations across eight countries in Asia Pacific, as well as additional funds to other regions, that are testing and scaling the use of mobile to improve or increase access to energy, water and sanitation services.

These grants have delivered proofs of concept, encouraging significant investment, particularly into the energy sector. Mobile for Development Utilities estimates that since 2014 $63 million has been invested in off-grid energy providers that leverage mobile technology in Asia Pacific. These organisations use various mobile services and technologies including mobile money for payment collection, M2M connectivity for remote monitoring of assets, and voice, data and SMS for customer communication.

**WATER** - Ensure availability and sustainable management of water and sanitation for all.

262 million people without access to an improved drinking water source live in areas covered by mobile networks. Mobile networks and services can improve the efficiency of water and sanitation services and extend their reach.

**GSMA Mobile for Development Utilities Programme**

To date, GSMA’s Mobile for Development Utilities Programme has awarded £1.6 million in grants to 12 organisations across eight countries in Asia Pacific, as well as additional funds to other regions, that are testing and scaling the use of mobile to improve or increase access to energy, water and sanitation services.

These grants have delivered proofs of concept, encouraging significant investment, particularly into the energy sector. Mobile for Development Utilities estimates that since 2014 $63 million has been invested in off-grid energy providers that leverage mobile technology in Asia Pacific. These organisations use various mobile services and technologies including mobile money for payment collection, M2M connectivity for remote monitoring of assets, and voice, data and SMS for customer communication.
4 Enabling digitisation through effective policies and regulation

The earlier sections of this report highlight the rapid evolution of the mobile ecosystem, and the impact of new digital technologies, leading to the emergence of new services and applications that are transforming the way people live, work, play and communicate across the entire Asia Pacific region. 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 use 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.
If the full potential of digital societies is to be realised, policymakers need to identify the complex adjacent elements required to build 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.

The level of digitisation of a country defines the primary focus of its digitisation agenda. The GSMA report *Advancing Digital Societies in Asia* examined the challenge of realising the potential of digital societies across Asia Pacific.17 The report outlined three broad categories of digital society development – emerging, transition and advanced. Emerging digital societies mainly see digitisation as a tool for accelerating socioeconomic development, particularly in relation to improving social and financial 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.

Countries in Asia Pacific 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 way of doing things. However, common core governance structures and regulatory settings (including those addressing consumer protection, competition, privacy and data protection, network security, taxation, and universal service and accessibility) must be in place for countries to develop meaningfully as a digital society.

*Advancing Digital Societies in Asia* examined the digitisation status and plans of seven Asian countries, covering the three categories of digital development, and highlighted the 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’.

---

17. Advancing digital societies in Asia, GSMA Intelligence, April 2016
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.

### 4.1 Moving up the digitisation value chain

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.
4.1.1 Government needs to create the right environment for digitisation

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 include the following:

- **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 use of digital services.
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* presents 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.

There are four key areas that require particular attention: connectivity, spectrum management, data and privacy, and e-governance.

**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; it is also essential in providing universal access in developing nations. Spectrum is a critical input in 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 availability of spectrum for mobile-based digital services (see Figure 24).

**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

---

Enabling digitisation through effective policies and regulation

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. The 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. 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 promotes competition through a stable and level regulatory environment.

Connected vehicle radio frequency allocations

<table>
<thead>
<tr>
<th>Country</th>
<th>Allocated</th>
<th>Planned</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPAN</td>
<td>5.770 GHz</td>
<td></td>
</tr>
<tr>
<td>AUSTRALIA</td>
<td>5.850 GHz</td>
<td>5.875 GHz</td>
</tr>
<tr>
<td>SINGAPORE</td>
<td>5.905 GHz</td>
<td>5.925 GHz</td>
</tr>
</tbody>
</table>

Source: IDA ‘Connected Vehicle Technology Development in Singapore’ Jaya Shankar

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 service providers to create and deliver mobile applications that enable users to directly access personalised and relevant public services.

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 swaths 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.

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 swaths 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 service providers to create and deliver mobile applications that enable users to directly access personalised and relevant public services.

4.1.2 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: recommendations for countries at each level of development

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.

The GSMA identified three key pillars that governments can enable to support the growth of a digital society and create an environment wherein business can thrive and deliver digitisation solutions. The first is Digital Citizenship, which refers to the interactions between government and its citizens (secure digital identities and e-government services). The second pillar is Digital Lifestyle, where the focus is on the integration and interconnection of multiple devices, and the ability of individuals to interact with them (IoT solutions and smart cities). The final pillar is Digital Commerce, which refers to financial transactions (mobile financial services, online banking and e-commerce).

In terms of connectivity, emerging digital societies need to focus on improving nationwide connectivity first, by focusing on 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.
### Roadmap for growth for countries at each level of development

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

Source: Advancing digital societies in Asia, GSMA Intelligence

More specific examples of country-level recommendations, grouped according to their level of digital society development, can be found in the report *Advancing digital societies in Asia*. 
4.3 The importance of regional collaboration

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. Two existing multilateral bodies, 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 its 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 to avoid the fate of producing diplomatic platitudes.

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 harmonise the use of 698–806 MHz (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 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.