The GSMA represents the interests of mobile operators worldwide. Spanning more than 220 countries, the GSMA unites nearly 800 of the world’s mobile operators with more than 230 companies in the broader mobile ecosystem, including handset makers, software companies, equipment providers and Internet companies, as well as organisations in industry sectors such as financial services, healthcare, media, transport and utilities. The GSMA also produces industry-leading events such as the Mobile World Congress and Mobile Asia Expo.

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

or Mobile World Live, the online portal for the mobile communications industry, at www.mobileworldlive.com

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Executive Summary

Asia Pacific is the world’s largest mobile region but also one of the most diverse regions in terms of the levels of both economic and mobile market development. Asia Pacific dominates the global mobile industry in terms of both unique subscribers and connections, having seen significant growth over recent years and with it set to remain the second fastest growing region over the period out to 2020 (during which time it will add over 750 million new subscribers).

The more developed markets in the region (the Digital Pioneers) are the global technological pioneers: with world leading adoption rates for the industry’s newest technologies, including 4G networks and smartphones. South Korea is the world’s most advanced 4G market, as the only country to have reached 100% population coverage and with over half of the total connections being 4G at the end of 2013. A number of Fast Grower markets are now seeing accelerating mobile broadband uptake and explosive growth in data volumes.

In the more developing markets (particularly the Discoverer markets), mobile has already had a profound impact in connecting previously unconnected populations, as well as helping to provide access to basic services. The impact of mobile ranges from helping provide access to essential services such as education and healthcare; to providing financial services to previously unbanked populations.

The mobile industry is playing a leading role in innovation and the development of a broader mobile ecosystem, with new business models and market entrants emerging across the region. Countries across Asia Pacific are moving rapidly up the adoption curve for new services and applications. Several online messaging service providers (including Kakao Talk, Line and WeChat) have emerged in the region and scaled rapidly, competing effectively for end users and building broader platforms that offer a growing range of services.
Mobile is reaching into untapped frontiers and meeting new customer needs, ranging from digital commerce to identity services. Mobile commerce is seeing rapid growth across all markets in the Asia Pacific region. Both South Korea and Japan have amongst the highest adoption levels of Near Field Communication (NFC); while there are also a number of mobile identity deployments in the region. The region is already the largest global market for machine-to-machine (M2M) connections, with growth rates well above the global average. By the end of 2013, China reached 50 million M2M connections and overtook the US as the largest M2M market.

The mobile industry in the region has seen strong growth in recent years, both in terms of subscribers and revenues. Whilst growth rates for both revenues and subscribers across Asia Pacific are slowing (in common with the trend in other regions across the world), the industry remains in good health. Revenue growth out to 2020 is forecast to be close to 5%, well ahead of the global average figure of 2.9%, reflecting both further subscriber growth but also the increasing importance of data revenues.

This strong growth and the transformational benefits of the mobile industry in the region have only been possible through significant investments by the mobile operators. Capital expenditure (capex) over the last six years has totalled US$ 430 billion. Capex growth is set to accelerate going forward, reflecting ongoing mobile broadband deployments and the explosive growth of data traffic, with capex out to 2020 set to total US$ 730 billion.

Despite the strong subscriber growth of recent years, perhaps the greatest challenge facing both the mobile industry and policy makers in the region is the need to connect the still unconnected populations. Subscriber penetration rates still lag behind global average figures, and for the Discoverer segment countries only a third on average of the population have subscribed to a mobile service. Incremental subscriber growth in these markets will come increasingly from rural and lower income populations, reinforcing the need to further improve the affordability of mobile services and to extend network coverage.

The mobile industry makes a significant contribution to economic growth in the Asia Pacific region. The mobile industry contributed US$ 864 billion to the region’s gross domestic product (GDP) in 2013, equivalent to 4.7% of the total. In addition, the industry directly supported 3.7 million jobs and contributed US$ 82 billion to public funding (even before considering regulatory and spectrum fees). By 2020, mobile will be an even greater driver of the region’s economy, contributing over 6.9% to the region’s GDP and directly supporting over 6.1 million jobs.

However, there remain a number of challenges to be overcome if the vision of the digital future is to be realised in full and the potential of new services, such as mobile commerce and mobile identity, are to be realised. Operators can deliver mobile commerce services by storing secure credentials (such as credit card details) on the SIM, although the provisioning of such services remains fragmented and slow. Mobile money interoperability is a particular challenge in developing markets, with many markets having more than one service. The GSMA has a number of activities and programmes aimed at addressing these challenges.
National broadband plans are an increasing focus across the region as business leaders and policy makers alike recognise the advantages of broadband connectivity in delivering both social and economic benefits. The lack of fixed line infrastructure in many parts of the region highlights the importance of mobile broadband in delivering these plans, with mobile already the main means of accessing the internet in many countries across the region.

There are many components of a successful national broadband plan that are highlighted in this report. However, certain policies are not conducive to a successful mobile market. For example, a number of countries have introduced mobile-specific taxes that affect adoption of new services, or have failed to make suitable and harmonised spectrum available in a timely and effective manner. Addressing these kinds of issues would help improve the operating environment for mobile operators and allow a more productive collaboration between industry and government. This in turn would have positive implications for achieving national ICT goals, particularly in bridging the digital divide and bringing internet access and a range of new services and applications to lower income and disadvantaged groups across the region.

South Korea is a leading example of what can be achieved through the delivery of a well designed and implemented national broadband plan, with the government prioritising digital industries and the deployment of broadband since the 1990s. Myanmar is at an earlier stage of its mobile market development, but the country has made remarkable progress in recent years in the creation of a national telecom policy. The government has followed a transparent and “best practice” process to license two new mobile operators, as well as taking steps to reduce the costs of mobile ownership. Both countries have recognised the potential of the digital economy as a catalyst for economic growth and job creation, and have developed national plans to help realise these goals.

The mobile industry has already had a profound impact on all aspects of life in the Asia Pacific region, but also has the potential to play an even more active role in delivering the digital future. Realising the full potential of this digital future will require collaboration between all players in the mobile ecosystem and broader online world, including mobile operators and other ecosystem players as well as through collaboration with governments, regulators and other industry stakeholders.
Asia Pacific is the largest and most diverse region of the globe, covering around 50 countries and territories with a broad range of languages and cultures. The region ranges from countries as large as China and India, already the two largest mobile markets in the world, to a number of small islands and territories. Referring to Asia Pacific in singular form without considering the intricacies and complexities among and within its countries ignores the wholeness and richness of this diversity. However, it would be impossible to profile each of the countries in this report in the thoroughness they deserve. Therefore, the focus of this report is on the 99% of subscribers in Asia Pacific who live in the 20 largest countries as shown below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Unique Subscribers (M)</th>
<th>Connections (M)</th>
<th>Population (M)</th>
<th>GDP Per Capita (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>628.8</td>
<td>1,233.8</td>
<td>1,390.0</td>
<td>7,325</td>
</tr>
<tr>
<td>India</td>
<td>405.5</td>
<td>886.3</td>
<td>1,256.0</td>
<td>2,563</td>
</tr>
<tr>
<td>Japan</td>
<td>115.0</td>
<td>153.5</td>
<td>127.1</td>
<td>33,596</td>
</tr>
<tr>
<td>Indonesia</td>
<td>103.7</td>
<td>314.9</td>
<td>251.3</td>
<td>6,728</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>62.9</td>
<td>114.3</td>
<td>157.6</td>
<td>1,311</td>
</tr>
<tr>
<td>Pakistan</td>
<td>56.1</td>
<td>134.8</td>
<td>183.6</td>
<td>2,594</td>
</tr>
<tr>
<td>Vietnam</td>
<td>51.2</td>
<td>123.7</td>
<td>92.1</td>
<td>2,589</td>
</tr>
<tr>
<td>Philippines</td>
<td>49.0</td>
<td>109.3</td>
<td>99.2</td>
<td>3,383</td>
</tr>
<tr>
<td>South Korea</td>
<td>44.3</td>
<td>56.0</td>
<td>49.4</td>
<td>24,803</td>
</tr>
<tr>
<td>Thailand</td>
<td>36.6</td>
<td>92.7</td>
<td>67.1</td>
<td>7,907</td>
</tr>
<tr>
<td>Taiwan</td>
<td>21.8</td>
<td>31.4</td>
<td>23.3</td>
<td>30,322</td>
</tr>
<tr>
<td>Australia</td>
<td>21.7</td>
<td>30.9</td>
<td>23.5</td>
<td>43,042</td>
</tr>
<tr>
<td>Malaysia</td>
<td>16.2</td>
<td>42.3</td>
<td>29.9</td>
<td>13,385</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>10.2</td>
<td>24.6</td>
<td>21.4</td>
<td>6,765</td>
</tr>
<tr>
<td>Nepal</td>
<td>10.2</td>
<td>21.6</td>
<td>28.0</td>
<td>3,397</td>
</tr>
<tr>
<td>Cambodia</td>
<td>7.8</td>
<td>21.1</td>
<td>15.3</td>
<td>1,818</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>6.5</td>
<td>13.7</td>
<td>7.2</td>
<td>52,722</td>
</tr>
<tr>
<td>Myanmar</td>
<td>6.2</td>
<td>7.6</td>
<td>53.5</td>
<td>1,040</td>
</tr>
<tr>
<td>Singapore</td>
<td>5.0</td>
<td>8.4</td>
<td>5.5</td>
<td>49,754</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3.8</td>
<td>5.4</td>
<td>4.5</td>
<td>30,493</td>
</tr>
<tr>
<td>Laos</td>
<td>3.1</td>
<td>6.4</td>
<td>6.8</td>
<td>2,054</td>
</tr>
</tbody>
</table>
Unique subscribers

- **2013**: 1.7bn
- **2020**: 2.4bn

**CAGR 2013 - 2020**: 5.5%

Half of the global subscriber base

Unique subscriber penetration by segment

<table>
<thead>
<tr>
<th>Segment</th>
<th>2013</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DISCOVER</strong></td>
<td>32%</td>
<td>52%</td>
</tr>
<tr>
<td><strong>DIGITAL PIONEER</strong></td>
<td>91%</td>
<td>93%</td>
</tr>
<tr>
<td><strong>FAST GROWER</strong></td>
<td>45%</td>
<td>59%</td>
</tr>
<tr>
<td><strong>APAC OVERALL</strong></td>
<td>43%</td>
<td>58%</td>
</tr>
</tbody>
</table>
### Total SIM connections

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>CAGR 2013-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3.4bn</td>
<td>4.9%</td>
</tr>
<tr>
<td>2020</td>
<td>4.8bn</td>
<td></td>
</tr>
</tbody>
</table>

### Connection type

<table>
<thead>
<tr>
<th>Generation</th>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2G</td>
<td>2013</td>
<td>2,452m</td>
</tr>
<tr>
<td>3G</td>
<td>2013</td>
<td>908m</td>
</tr>
<tr>
<td>4G</td>
<td>2013</td>
<td>90m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>1,819m</td>
</tr>
<tr>
<td>2020</td>
<td>1,637m</td>
</tr>
<tr>
<td>2020</td>
<td>1,358m</td>
</tr>
</tbody>
</table>

### Mobile broadband connections

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>969m</td>
</tr>
<tr>
<td>2020</td>
<td>2,972m</td>
</tr>
</tbody>
</table>

### Operator revenues

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>US$ 457bn</td>
</tr>
<tr>
<td>2020</td>
<td>US$ 633bn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>US$ 78bn</td>
</tr>
<tr>
<td>2020</td>
<td>US$ 112bn</td>
</tr>
</tbody>
</table>
Asia Pacific dominates the global mobile industry in terms of both unique subscribers and connections, having seen significant growth over recent years and with the region set to remain the second fastest growing over the period out to 2020 (during which time it will add over 750 million new subscribers).

Asia Pacific already accounts for around half of the global subscriber base, while the region itself is dominated by four major markets (India, Indonesia, China and Japan). These together account for three quarters of the region’s subscribers and over a third of the global subscriber base. Mobile trends in the region will increasingly be dominated by developments in these markets, and in particular China, which is already the world’s largest mobile market by subscriber numbers.

The Asia Pacific region is seeing an accelerating migration to higher speed networks. While a number of countries in the Digital Pioneer segment are leading the world on 4G deployments (such as South Korea and Japan), several Fast Grower countries are now seeing increasing deployments and uptake of 3G services. South Korea is the world’s most advanced 4G market, as the only country to have reached 100% population coverage and with over half of total connections being 4G at the end of 2013 (compared to around a quarter in both Japan and the US).
In common with the mobile industry across the world, growth rates for both revenues and subscribers across Asia Pacific have been slowing in recent years, a trend that is likely to continue. Competitive pressures and regulatory intervention are common themes across many markets in the region, whilst new online messaging service providers have already scaled rapidly and are likely to increasingly cannibalise voice and messaging revenues. Despite these challenges, revenue growth out to 2020 is forecast to be close to 5%, well ahead of the global average figure of 2.9%.

The strong growth and transformational benefits of the mobile industry in the region have only been possible through the significant investment by the mobile operators. Capex over the last six years has totalled US$ 430 billion, equivalent to 20% of operator revenues over the period. Capex growth is set to accelerate going forward, reflecting ongoing mobile broadband deployments and the explosive growth of data traffic, with capex out to 2020 set to total US$ 730 billion.

Perhaps the greatest challenge facing the mobile industry in the region is the need to connect the still unconnected. Subscriber penetration rates on average still lag behind global average figures, and for the Discoverer segment countries only a third of the population have subscribed to a mobile service. Incremental subscriber growth in these markets will come increasingly from rural and lower income populations, reinforcing the need to further improve the affordability of mobile services and to extend network coverage.

Given that many incremental subscribers will generate only modest ARPUs, regulators should foster investors’ interest by ensuring that mobile operators’ spending on both spectrum acquisition and network deployments is aligned with potential return on investment. Several alternative connectivity technologies that are currently being backed and promoted by big internet players could prove complementary to mobile networks in some areas. However, at this stage it is difficult to envisage larger scale commercial deployments, indicating that mobile networks should remain the key focus for connecting the still unconnected populations in the region.

By 2020, the Asia Pacific region will add more than 750 million new subscribers.
1.1 Asia Pacific the largest global mobile market

Asia Pacific is already the largest region in the global mobile market, with the total of 1.7 billion accounting for almost half of all the world’s unique subscribers at the end of 2013. Currently, just over four out of 10 people in the region have subscribed to a mobile service, compared to a global average of nearer half of the population and the average figure in developed markets of almost eight out of 10. These figures clearly indicate the potential for future subscriber growth in the region.

The unique subscriber base in the region is forecast to rise to 2.4 billion by 2020, with Asia Pacific set to remain the second fastest growing territory globally. The region’s subscriber base will grow at a CAGR of 5.5% out to 2020, well ahead of the global and second only to Sub-Saharan Africa in terms of regional growth rates.

Source: GSMA Intelligence

Subscriber growth rates (2013-20 CAGR)

Asia Pacific is a very diverse region in terms of its economic and social development, as well as in terms of mobile market development. The diversity of the region is well demonstrated by the broad range of mobile penetration rates. A number of countries already have penetration rates above the 90% level, including Japan, Australia, Taiwan and Singapore. In contrast, subscriber penetration in North Korea is still under 10%, and in Myanmar it stands at only 12% of the population.
Unique subscriber growth in Asia Pacific

Multiple SIM ownership is common across Asia Pacific, as it is in most global regions. As a result, SIM penetration rates (which refers to active SIM cards as opposed to actual subscribers) in a number of countries in the region already stand above 100%. Competitive factors play a role, with regular promotional activity focused on particular traffic segments, in encouraging the use of multiple SIMs amongst users. SIM per user patterns are particularly influenced by cost-conscious, low-usage consumers who tend to accumulate prepaid SIM cards depending on the latest and most affordable prepaid tariffs.

Analysis by GSMA Intelligence found that, on average, subscribers in developing markets had close to two SIM connections per user, more than in developed markets. However, this figure varies across regions and also changes over time. A recent survey by GSMA Intelligence indicated that the SIM ratio in India declined between 2012 and 2013 from 2.1 to 1.9 per user, due to the impact of mandatory SIM registration schemes. Hong Kong and Singapore have the highest SIM penetration rates in the region at 190% and 154% respectively. Both are competitive markets with a number of MVNOs in operation, while the success of mobile broadband data devices such as dongles, tablets and routers is also feeding the increase in multiple-SIM ownership in some of the more developed markets in the region.

1.1.1 Several major markets dominate the region

The four largest markets in Asia Pacific already account for three-quarters of the region’s subscriber base, and well over a third of the total global subscriber base. Mobile trends in the region will increasingly be dominated by developments in these markets, and in particular China. The Chinese market has added nearly 240 million subscribers over the past five years to reach a total of almost 630 million by the end of 2013, so that it is already the largest mobile market globally in terms of subscribers.

Whilst the Japanese market is relatively mature, with subscriber penetration rates over 90%, penetration rates in the other three major markets range from around a third of the population in India to 45% in China. These three markets are set to add a further 640 million subscribers by 2020, 85% of the total growth in the Asia Pacific region and over half of all subscriber growth across the globe.

Source: GSMA Intelligence

Four markets dominate the region

<table>
<thead>
<tr>
<th>Country</th>
<th>Unique Subscribers (M)</th>
<th>Subscriber Penetration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>628.7m</td>
<td>45.3%</td>
</tr>
<tr>
<td>India</td>
<td>405.5m</td>
<td>32.2%</td>
</tr>
<tr>
<td>Japan</td>
<td>115.0m</td>
<td>90.5%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>103.7m</td>
<td>41.2%</td>
</tr>
</tbody>
</table>
The Chinese market added nearly 240 million subscribers over the past five years to reach a total of almost 630 million by the end of 2013.
1.2 Segment analysis

The GSMA categorises all mobile markets across the globe into four different segments based on the degree of technological development of each market (using smartphone and 3G penetration rates as the main basis for classification). The four segments are Discover, Fast Grower, Connected Player and Digital Pioneers. In Asia Pacific, only two smaller island territories fall into the Connected Player segment, and so this segment has been excluded from the analysis in this report.

1.2.1 Discover segment

The Discover segment covers markets mainly in Southern Asia (including India, one of the largest mobile markets both in the region and globally), where subscriber penetration rates remain below the regional and global averages despite strong growth in recent years. Around a third of the population at the end of 2013 had a mobile subscription, compared to a figure of 43% for the region as a whole, clearly demonstrating that there is still significant growth in subscriber numbers to come.

The subscriber base grew at a CAGR of 19% in the period 2008-13, and is now forecast to grow at a rate of 8% per annum out to 2020. Over this period the markets in this segment will add a further 370 million new subscribers, by which time a little over half the population in these markets will have subscribed to a mobile service.

The markets in this segment are predominantly prepaid, with over 95% of total connections at the end of 2013 being in this category. In addition, the vast majority of connections are utilising 2G networks, 92% at the end of 2013. However, with 3G deployments gaining pace across the region and falling smartphone prices helping affordability, the proportion of 2G connections will fall to around two thirds by 2020. Voice remains the dominant source of revenues in this segment, with data typically only 10-20% of ARPU in most markets.

Revenue growth in this segment is now stabilising having fallen from high double digit growth rates. This is a result of both slowing subscriber growth but also lower ARPU, especially as increasing penetration amongst lower income populations will inevitably exert downward pressure on ARPU. In addition, high levels of competition have been a feature of a number of markets in the region, especially India, where it remains to be seen if current market structures and the number of players will prove sustainable. This in turn has had an impact on revenue growth and operator profitability in a number of markets.

For example, the HHI (Herfindahl-Hirschman Index) in India is one of the lowest in the world, indicating high levels of competition, and pricing in India on a per minute basis is extremely low. There have been regular price wars over recent years, which in turn have impacted the results and profitability of the mobile operators in the country.

There have already been some limited moves towards consolidation in the Indian market, and recent news suggests that more deals could be imminent. NTT DoCoMo has stated that it plans to exit the Indian market through the sale of its stake in a local operator, with some operators speculating that longer term the market will only support five or six players.
Asia Pacific dominates the global mobile industry

Source: GSMA Intelligence

Network technologies 2013 average

Prepaid

95%

92%

2G

3G

UNIQUE SUBSCRIBER PENETRATION

CONNECTION PENETRATION

DISCOVERER SEGMENT PENETRATION RATES

2012 2001 2020

69% 97% 52%

SEGMENT ANNUAL REVENUE GROWTH

2013

27% 6% 86%
1.2.2 Fast Grower segment

The Fast Grower segment includes the major market of China, as well as most of the south-east Asian markets such as Thailand, Malaysia, Indonesia and Vietnam. The subscriber penetration rate in this segment stands at 45% on average (close to the global average figure), and is forecast to reach 60% by 2020.

As with the Discover segment, these markets are also predominantly prepaid, accounting for 85% of all connections in this segment at the end of 2013. Revenue growth has slowed in recent years as rising penetration rates led to slowing subscriber growth; as well as some macro-economic impacts. However, revenue growth in the last couple of years has remained in double digits, helped by the more rapid adoption of mobile broadband services and stronger data growth. Mobile broadband penetration in this segment stood at just under 30% of the population at the end of 2013.

This in turn has driven a higher proportion of non-voice ARPU in operator revenues, ranging from 20% of ARPU in some markets to more than 50% in countries such as the Philippines. However, as for markets in the Discoverer segment, competition and increased regulatory intervention has also been a theme in a number of markets. Competition in Thailand has been impacted by the arrival of new entrants and the belated launch of 3G services in the country.

Consolidation is also likely to be a theme for some markets in this segment. For example, Indonesia remains a highly competitive market with 10 operators competing for market share. Indonesia’s Minister for Communications and Informatics is amongst those that have called for consolidation, although there has been limited progress to date.

The increasing adoption of mobile internet services and rising smartphone penetration rates could also provide challenges for operators in this segment, particularly with the growth of online messaging services across the region. The rapid growth of these services is likely to contribute to the ongoing slowdown in revenue growth, especially for voice and basic data services (with operators in markets including Thailand and Indonesia having reported declining voice revenues in recent quarters).
Asia Pacific dominates the global mobile industry | 17

Source: GSMA Intelligence

Network technologies 2013 average

Prepaid

- 85% Prepaid
- 3G: 69%
- 2G: 31%

FAST GROWER SEGMENT PENETRATION RATES

- UNIQUE SUBSCRIBER PENETRATION
- CONNECTION PENETRATION

SEGMENT ANNUAL REVENUE GROWTH

- 2012: 41%
- 2020: 59%
- 2001: 125%
- 2013: 36%
- 2020: 13%
1.2.3 Digital Pioneer segment

The Digital Pioneer segment covers more economically developed markets including Japan, South Korea, Australia, New Zealand and Taiwan. These are amongst the most advanced telecom markets in the world. All of these markets have subscriber penetration rates that are above 80-90%, the level at which subscriber growth tends to stall. These markets are largely contract based and have some of the world’s highest levels of greater speed network adoption. Smartphone penetration rates are also amongst the highest in the world, ranging from 48% in Japan to almost 80% in South Korea.

The launch of LTE and high levels of smartphone and tablet adoption have helped drive both data growth and overall revenue trends in these markets, as many operators in this segment have successfully monetised the strong data traffic growth. This is helping to drive positive ARPU trends in markets such as South Korea. SK Telecom reported a 4G ARPU in the third quarter of 2013 that was a third higher than its blended ARPU at the time. Operators in Japan have reported non-voice ARPU as high as 70% of total ARPU.

Revenue growth in recent years has been in the low single digit range, although this compares favourably with developed markets in much of Western Europe, where overall revenues have fallen over the same period. These generally positive revenue trends have been delivered despite increased competition in a number of these markets; with the HHI index in Japan falling by 17% and in New Zealand by 25% over the last four years. Both of these markets have seen periods of revenue contraction as a result.

Online messaging service providers have seen strong uptake in several markets in this segment, including both South Korea and Japan. Kakao Talk has estimated that 93% of smartphone users in South Korea are using its messaging app. However, in the case of South Korea, the growth of online messaging service applications has had limited impact on mobile operator revenues, as operators appear to have successfully monetised the demand for data traffic whilst looking to diversify their revenue streams.

2. Nielsen; KoreanClick (2013)
Asia Pacific dominates the global mobile industry | 19

Source: GSMA Intelligence

**Network technologies 2013 average**

- 4G: 29%
- 3G: 62%
- 2G: 9%

**Prepaid**

- 13%

**UNIQUE SUBSCRIBER PENETRATION**

- 2012: 90%
- 2013: 5%

**SEGMENT ANNUAL REVENUE GROWTH**

- 2001: 9%
- 2013: 5%
1.3 Asia Pacific showing rapid migration to mobile broadband networks

The Asia Pacific region is seeing a rapid migration to higher speed mobile broadband networks, both 3G and 4G. While a number of countries in the Digital Pioneer segment have already seen extensive 4G deployments (such as South Korea and Japan), several Fast Grower countries are now seeing the increasing deployment and uptake of 3G services.

For example, 3G licences were auctioned in Thailand in late 2012, with both AIS and DTAC indicating that they had reached 70-80% population coverage by the end of 2013. The fast pace of network build outs has seen a rapid migration to 3G devices, with 3G connections accounting for 37% of the total connection base at the end of 2013, a figure that is expected to increase to just over half by the end of 2014 and over 70% by 2020.

For Asia Pacific as a whole, just over a quarter of total connections were 3G at the end of 2013, while for 4G, the figure was only 3%. However, by 2020 these figures are forecast to rise to 34% and 28% of total connections respectively.

Source: GSMA Intelligence

Shift to 4G underway in Asia Pacific

As highlighted in a recent report by GSMA Intelligence, South Korea is the world’s most advanced 4G market. It is the only developed market to have reached 100% population coverage and over half of total connections being 4G at the end of 2013 (compared to around a quarter in both Japan and the US).

1.3.1 China’s shift to 4G is now underway

Recent research from GSMA Intelligence indicated that the take-up of 4G-LTE services in China is likely to be at twice the rate of the earlier move to 3G. China’s Ministry of Industry and Information Technology (MIIT) awarded the first TD-LTE licences in late 2013. These licenses were all of the RD-LTE variety, with FDD-LTE licenses due to be issued in 2014. However, rather than being seen as competing technologies, the two variants are complementary and interoperable, which means that the entire global 4G ecosystem stands to benefit from the launches in China.

China Mobile became the first operator to launch its service in December of 2013, with a high level of initial coverage that included the major cities on China’s east coast, potentially covering as many as 500 million people. The company is reportedly set to offer over 200 4G compatible handsets this year, including one priced as low as US$ 165.

With large scale roll outs by both China Mobile and China Telecom, the Chinese market is expected to have the fastest initial migration rates outside of South Korea. There will be almost 100 million LTE connections in China by the end of 2014, equivalent to just over 7% of the total connection base in the country. By 2020, 4G connections will account for over half of the mobile connections in the country, well ahead of both the regional and global average figures at that date (28% for both regions by 2020).

Source: GSMA Intelligence

China will see rapid shift to 4G

Mobile operators across the Asia Pacific region have invested US$ 430 billion over the past six years, equivalent to 20% of revenues over the period. These significant investment levels have been driven by a range of factors: improving network coverage, especially in more developing and remote areas; to increase network capacity to accommodate both the ongoing growth in the subscriber base as well as accelerating levels of data growth; and finally to deploy higher speed mobile broadband networks (both 3G and 4G).

Capex levels are forecast to grow at just over 5% per annum out to 2020 and set to total US$ 730 billion. This will be fueled by ongoing subscriber growth, but more so by an increasing rate of mobile broadband deployments, which in turn will drive accelerating data volumes.

Source: GSMA Intelligence

Asia Pacific mobile network operator capex (US$ B)

5.2% CAGR
2013-2020
1.5 Revenue outlook: growth is slowing but still robust

Over the last five years Asia Pacific has seen the strongest revenue growth of any region, recording a CAGR of 9.4%, almost twice the global average figure of 5%. Growth has been fuelled by a combination of a strong subscriber increase as well as the ongoing migration to mobile broadband and higher speed services.

Going forward, revenue growth is likely to slow in the region, reflecting trends evident in mobile markets across the globe. These include slowing subscriber growth, increasing competition and regulatory intervention, as well as the entry of new inline messaging service providers such as Line, WhatsApp and Kakao Talk. These services are already impacting voice and traditional data messaging revenues, and this trend is likely to accelerate as smartphone penetration increases across the region. This in turn will increase the pressure on mobile operators in the region to diversify their revenue streams and to find effective ways to monetise the ongoing growth in data traffic.

Overall revenues in the region are forecast to grow at a CAGR of just under 5% over the period out to 2020. Whilst this is a clear slowdown on historic growth rates, the figure remains well above the global average of 2.9%, with Asia Pacific set to remain the fastest growing region globally.

Source: GSMA Intelligence

Revenues (US$ B)

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<td>555</td>
<td>579</td>
<td>602</td>
<td>618</td>
<td>633</td>
</tr>
</tbody>
</table>

4.8% CAGR 2013-2020
1.6 Connecting the unconnected

The history of the mobile industry in Asia Pacific is a story of rapid and transformational growth, with mobile having had a profound impact on individuals across the region. The region also contains some of the most advanced mobile economies in the world, home to markets with the highest levels of 4G network deployments and smartphone usage.

Affordable mobile phones and the services they bring allow increased access to communications and information for poorer communities in some of the more developing economies in the region, delivering substantial socio-economic benefits in the process (as we explore in more detail in the next section of this report).

However, despite the strong subscriber growth over recent years, overall penetration rates in the region still lag behind global average figures. Indeed, for many of the developing markets in the region, penetration rates are substantially lower than the regional average. For the Discoverer segment countries reviewed earlier in the report, on average, only a third of the population have subscribed to a mobile service. Even after adjusting these figures to get a more accurate sense of the ‘addressable’ population (for example by excluding children under the age of 145), this implies significant headroom for further subscriber-led growth in these markets.

Mobile is playing a crucial role in bridging the digital divide in the Asia Pacific region, delivering internet access to previously unconnected populations. The absence of alternative (fixed line) infrastructure means that in many countries mobile devices are the only way people are able to access the internet. Increasing mobile internet access for under-served communities in developing countries has been shown to deliver widespread social and economic benefits, improving productivity and economic growth for populations and economies and local populations. In India, commercially profitable mobile advisory services have helped boost the productivity and incomes of smallholder farmers by up to 50%6.

Some of the most under-penetrated parts of the region are also the most populous, highlighting the sheer size of the still unconnected populations. As the chart opposite shows, growth in the mobile internet usage base will increasingly come from lower income users in emerging markets, both at a global level and particularly within the Asia Pacific region.

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6. GSMA: the rise of connected devices will drive mobile operator data revenues past voice revenues by 2018
Growth in the mobile internet will come from emerging markets, especially in Asia Pacific.
However, there remains a section of the population in the region that still has limited or no mobile network coverage. These individuals are largely located in rural and often geographically remote regions. This is often the result of an unfavourable cost-benefit equation faced by the mobile operators in which geographic impediments, vast distances and the lack of electricity grid access collectively create a significantly increased cost base for the roll out and maintenance of networks which is not compensated for in revenue terms by a predominantly low income customer base.

One solution to help address the challenge of network coverage in more remote areas is for operators to share elements of the network infrastructure. Commercially driven network sharing deals are an increasing feature of the mobile landscape in a number of developing regions, including parts of Asia Pacific. A number of operators in the region are already sharing passive elements of their networks, with several independent tower companies offering their services to operators. These deals can reduce both capital expenditure and operating costs for the operators, so improving the economic case for network deployments. Network sharing has become a particular feature of the Indian market, reflecting a combination of factors including significant competitive pressures, a rapidly growing subscriber base and limited spectrum allocations (particularly in the lower frequency spectrum bands).

1.6.1 Sizing the gap: improving affordability is key to connecting marginalised populations

Mobile networks are increasingly ubiquitous across the Asia Pacific region, especially in the more developed markets. Continued investment by the mobile operators means that coverage levels have also increased markedly in developing countries, with 2G coverage in most markets now generally over the 90% level.
However, the previous chart would indicate that with the exception of Myanmar (where licences have recently been awarded to two foreign-owned operators, of which one has promised to deliver 90% population coverage within the next five years), the real issue for the unconnected populations is not that of geographic network coverage (with mobile coverage rates in the other four markets averaging 90% of the population). Even adjusting penetration rates for the ‘addressable’ population (i.e. the proportion of the population aged under 14, who are typically unable to subscribe to mobile services), on average less than half the population have to date subscribed to a mobile service.

This suggests that affordability is the key issue for raising levels of mobile access. Prices for mobile services have fallen substantially over recent years, driven by a number of factors including increasing competition in many markets in the region, falling equipment prices, as well as growing scale benefits for the operators. The mobile operators themselves have played an important role by introducing new service offerings that can attract lower income subscribers, particularly the range of prepaid plans that have played a major role in contributing to the growth in basic voice connectivity.

However, further steps need to be taken in order to improve the accessibility of mobile services. Incremental subscribers will increasingly come from lower income groups, many of whom will live in high levels of poverty (classified as living on less than US$ 2 per day). These subscribers will need to spend a significant portion of their income to access mobile services compared to subscribers with higher income levels.
1.6.2 Closing the gap: mobile ecosystem working to make mobile more affordable

Both the mobile operators and players in the broader mobile ecosystem (such as handset manufacturers) are contributing to making mobile services more affordable. A range of flexible tariffs are now available from operators focusing on mobile data, that, for example, allow users to access the internet for a period of time or alternatively allow access to a particular web property.

Handset prices continue to fall, both for more basic feature phones as well as smartphones, which is a key factor in bringing mobile services to lower income segments. The sub-US$ 100 smartphone has already become a reality, and Mozilla announced at the 2014 Mobile World Congress a reference design for a low-cost smartphone that could sell for as low as US$ 25. This is of particular relevance in emerging markets, where the handset subsidy model (which reduce the upfront cost of ownership for customers) that has been prevalent in many developed markets has seen very limited application8.

There has been a general decline in the average selling price (ASP) of smartphones across the world in recent years, and this trend is likely to continue. However, with the average smartphone ASP still standing at US$ 293 in 2013, such devices remain unobtainable by the vast majority of the population in developing countries. Data from Strategy Analytics shows the growing importance of the more affordable smartphone in emerging markets, with this ‘entry tier’ of devices (with an ASP of US$ 36–99) expected to account for over a third of total smartphone sales in markets such as India by 2017. The emergence of ‘ultra-low end’ tier will also make a small but growing importance to improving smartphone affordability.

Source: Strategy Analytics

India smartphone sales by wholesale price tier

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However, governments and regulators should recognise that they also have an important role to play in further improving the affordability and reach of mobile services. Regulatory fees, ranging from spectrum licence fees to taxes on mobile devices and usage can hinder efforts to improve the affordability of mobile services across developing regions.

Given that many incremental subscribers will generate only modest ARPUs, regulators should foster investors’ interest by ensuring that mobile operators’ spending on both spectrum acquisition and network deployments is aligned with potential return on investment. As has been previously noted in other markets—from Europe to India—mobile retail prices will climb in the face of unrealistically high spectrum prices and high taxation, slowing the pace of mobile adoption.

High taxation is another factor in some emerging markets that is hindering current and future market growth. For example, Bangladesh has one of the highest sector-specific taxation levels in the world, with operators paying up to 52% of their revenue in tax\(^9\). In addition, since 2006, mobile operators have been paying an upfront tax on every new SIM connection—a tax that was revised from US$ 10-8 per SIM in 2011 and further reduced to US$ 4 per SIM last year. Therefore, moving to a sustainable level of taxes and other state charges on the ICT sector is a prerequisite to rapid mobile broadband adoption in the country.

Another important issue is the release of lower frequency spectrum (sub-1GHz) for mobile broadband networks, as this spectrum allows more cost effective deployments. As the digital switchover is a long and complex process, it is important that governments take a leadership role to facilitate dialogue between all stakeholders including broadcasters, the mobile industry, set-top box manufacturers and consumers. The adoption of harmonised band plans for this spectrum will also be critical to achieving economies of scale, which, in turn, reduce handset costs and limit interference, enabling more consumers to harness the numerous social and economic benefits of mobile broadband.

### 1.6.3 Mobile likely to remain the key access technology: other technologies more complementary

A recent report by GSMA Intelligence looks at the usage case for several alternative connectivity technologies that are currently being backed and promoted by big internet players, including Google. Aerial networks and the use of TV white space spectrum are the most prominent of these. On their merits, there may indeed be several use cases—for example in expanding internet access to remote rural regions and in disaster response zones. They may also have a role in supporting backhaul capacity in some remote areas. In such cases these new technologies could prove effective supplements to existing mobile infrastructure in proving access to communications services and internet access. However, their viability and disruptive potential on a wider commercial scale in the short to medium term is harder to see given i) the high costs of rolling out a network from pilot to scale and the implications for affordability, ii) operational and technical challenges, and iii) regulatory uncertainty.

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AN INDUSTRY
EMPOWERING PEOPLE
AND SOCIETY

Gross domestic product

2013 mobile industry impact

US$ 864bn

6.9%

By 2020 the mobile industry is estimated to contribute around 6.9% of regional GDP

Jobs

2013 → 3.7m DIRECT JOBS

2020 → 6.1m DIRECT JOBS

Public funding

US$ 82bn in 2013
(plus over US$ 10bn in spectrum fees)

Rising to

US$ 135bn by 2020

South Korea and Japan have the world’s highest levels of NFC adoption.

Asia Pacific leading mobile innovation and development of a new and broader mobile ecosystem.

Mobile Identity

‘au ID’ in Japan is one of world’s leading identity services.

Social Benefits

Over 20 mHealth deployments in the region; other services help in the delivery of basic utilities and access to jobs.

M2M connections

New players such as online messaging service providers gaining scale.

Mobile money

>60% of adults in developing markets in the region remain unbanked.

Greater financial inclusion would bring economic benefits as well as enhance the welfare of the currently unbanked and under-banked in the region.

Active mobile money users in Asia Pacific as of June 2013

13.8m

China has the largest M2M market.
Asia Pacific leading mobile innovation and development of a new and broader mobile ecosystem

M2M connections
New players such as online messaging service providers gaining scale

NFC
South Korea and Japan have the world’s highest levels of NFC adoption

Mobile Identity
‘au ID’ in Japan is one of world’s leading identity services

Social Benefits
Over 20 mHealth deployments in the region; other services help in the delivery of basic utilities and access to jobs

New Players
New players such as online messaging service providers gaining scale

Asia Pacific is the largest regional market with 40% of total connections; 71m at the end of 2013

China has the largest M2M market
11.5m 2010
50m 2013

Mobile money
Greater financial inclusion would bring economic benefits as well as enhance the welfare of the currently unbanked and under-banked in the region

>60%
of adults in developing markets in the region remain unbanked

13.8m active mobile money users in Asia Pacific as of June 2013
Mobile enabling economic growth and innovation in Asia Pacific

The rapid development of the mobile industry has had a transformative impact on individuals and countries across the Asia Pacific region. The impact is as broad as it is deep, impacting both the economic and social aspects of life. Both developing and developed markets across the region are adopting new technologies at a rapid rate, whilst an increasing number of innovative new services and applications are emerging and rapidly building scale.

The mobile ecosystem already makes a significant contribution to economic growth in the Asia Pacific region. The mobile industry contributed US$ 864 billion to the region’s GDP in 2013, equivalent to 4.7% of the total. In addition, the industry directly supported 3.7 million jobs and contributed US$ 82 billion to public funding (with additionally over US$ 10 billion in spectrum fees in 2013 alone). By 2020, mobile will be an even greater driver of the region’s economy, contributing over 6.9% to the region’s GDP and directly supporting over 6.1 million jobs.

Asia Pacific is playing a leading role in mobile innovation and the development of a new and broader mobile ecosystem, with countries across the region moving rapidly up the adoption curve for new services and applications. New players are emerging, such as online messaging service providers that are scaling rapidly, competing effectively for end users and building broader platforms that offer a range of services. The region has also seen the emergence of e-commerce players such as the Alibaba Group and social networking platforms such as Weibo. Web-only retailers, with mobile e-commerce an increasingly important driver, are a particular feature of many markets in the region.
Both South Korea and Japan have amongst the world’s highest adoption levels of Near Field Communication (NFC), while there are also a number of mobile identity deployments in the region, in markets ranging from Sri Lanka to Japan. The region is already the largest global market for machine-to-machine (M2M) connections, with growth rates well above the global average. By the end of 2013, China reached 50 million M2M connections and overtook the US as the world’s largest M2M market.

There has been an explosion in mobile-enabled products and services in developing countries across Asia Pacific, often enabling the provision of basic services to previously excluded populations. The impact of mobile ranges from providing access to essential services such as education and healthcare; to basic utilities such as water and electricity. There are already over 200 active mHealth deployments across the region, whilst innovative services such as Babajobs are helping disadvantaged individuals access skills training and to find employment opportunities.

Mobile is also addressing the issue of financial inclusion by bringing payments and other services to previously unbanked populations in the region. As of June 2013, Asia Pacific was home to almost 30% of the developing world’s mobile money users and accounted for 22% of mobile money transactions in the developing world.

Despite the progress and significant impact to date, there remain a number of challenges to be overcome if the full potential of new products and services is to be realised. In developed markets operators can deliver mobile commerce services by storing secure credentials (such as credit card details) on the SIM, though the provisioning of such services remains fragmented and slow. Mobile money interoperability is a particular challenge in developing markets, with many markets having more than one service.

There is a need to define future network requirements and capabilities to allow operators to support the strong growth of the Internet of Things (IoT)/ M2M devices and services in the region; as well as to ensure the adoption of an Embedded SIM that addresses remote provisioning requirements10. Mobile operators can play an active role in facilitating the further growth of e-commerce and other online services through the provision of seamless mobile identity services. The GSMA has a number of activities and programmes aimed at addressing these challenges, supported by a number of the leading mobile operators in the region.

In 2013, the mobile industry made a total contribution of 4.7% of GDP in the Asia Pacific region. This includes a direct contribution from the mobile ecosystem of US$ 320 billion (1.7% of GDP). This contribution is measured on the basis of ‘value add’, estimated as the gross profit of the industry (calculated as revenues less direct costs). Within the mobile ecosystem, the largest contribution came from the mobile operators themselves, equivalent to 1.4% of GDP. The contribution from the content and services component reflects only those that are exclusively provided by mobile networks, and as a result the figure may be smaller than that highlighted in other studies that include services delivered by other technologies (such as fixed broadband networks).
The industry’s economic contribution can be measured both in terms of supply and demand-side effects. The supply-side effects include the direct contribution from the mobile operators, as well as adjacent industries in the broader mobile ecosystem. In addition, there is the indirect impact of the mobile industry on the wider economy (known as the ‘multiplier effect’). This demand-side impact comes from the productivity gain from workers using mobile technologies for their work.

The productivity gain in the Asia Pacific region comes from two key areas. In more developed markets and the formal sector of the economy, this comes from ‘highly mobile’ workers (around 34% of workers in the region are classified as mobile workers11) and their use of mobile technology. In the informal sector, there is a productivity uplift for small-holding based agricultural and fisheries services.

In addition, there is a 20% uplift factor from the mobile ecosystem, which accounts for the broader range of goods and services in the economy used by the mobile ecosystem. These indirect factors and productivity increases together add a further 2.9% to the region’s GDP.

The mobile ecosystem also makes an important contribution to employment across the region, adding directly 3.7 million jobs. Of this, the mobile operators again contribute the largest share (1.2 million), followed by infrastructure and support services and handset manufacturers. For the distributors and retailers, the jobs figure only includes those working mainly in the sale of mobile handsets and services. There is also a substantial number of indirect jobs supported through the sale of airtime top-ups and other mobile accessories. For some countries, especially in developing regions, this may equate to between five and 10 times the number of direct jobs. For the region overall this could equate to a further 5.5 million indirect jobs supported by the mobile industry12.

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11. IDC Mobile Worker Population 2011-15
12. Based on a scale factor of 1.5x the number of mobile ecosystem direct jobs, as per Mobile Economy Asia Pacific report 2013
Finally, the mobile ecosystem makes a material contribution to public funding across the Asia Pacific region. In 2013, this totalled US$ 82 billion, with payments coming from a range of sources including VAT and other indirect taxes, corporation taxes, social security and other employment taxes. Note that this figure excludes regulatory and licence fees on spectrum, with spectrum fees in the region totalling in excess of US$ 10 billion in 2013 alone.

Mobile ecosystem contribution to public funding
With Asia Pacific’s mobile industry still offering significant growth potential, helped by the ongoing uptake of mobile broadband, further LTE build outs and the launch of new services and applications, the economic contribution of the mobile ecosystem in the region will increase in the future. By 2020, forecasts indicate that mobile will contribute over 6.9% to the region’s GDP. In addition, the sector is forecast to directly support over 6.1 million jobs and contribute over US$ 135 billion to public funding by the same date.

Total mobile contribution to GDP will increase further out to 2020

Source: GSMA Intelligence; annual reports; EIU; BCG Analysis
2.1.1 Rapid development of the broader mobile ecosystem in Asia Pacific

The Asia Pacific region is leading the way in the development of a new and broader mobile ecosystem, both in terms of new entrants and the range of services and applications available. In emerging markets in the region, mobile is playing an important role in extending access to basic services for previously excluded sections of the population. In the more developed economies of the region, such as Japan, South Korea and Australia, mobile is delivering a range of innovative and new services to consumers, often boosting economic growth and productivity in the process.

Across the region, these trends have facilitated the entry of a number of new entrants into the mobile ecosystem, with a broad range of new business models. These include players from adjacent industries, including technology and content providers, as well as innovative start-up companies. These new players are emerging and competing successfully to attract customers and end users.

For example, the region has been home to the development of a number of innovative new online messaging service providers. These include Kakao Talk (South Korea) and Line (Japan), as well as WeChat (China). In addition to seeing explosive growth in their user bases, these online messaging service providers are noticeable for the broader ecosystems they are developing. Many of these messaging services have evolved into broader platforms through integrating with games and increasingly through developing other forms of mobile commerce and digital content. For example, Kakao Talk has tended to dominate the games app charts for both downloads and revenues in South Korea.

Source: Company announcements

Online messaging service provider subscriber base (m)

<table>
<thead>
<tr>
<th>Provider</th>
<th>Subscriber Base (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line (11/13)</td>
<td>300</td>
</tr>
<tr>
<td>Viber (02/14)</td>
<td>300</td>
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<tr>
<td>WeChat (03/14)</td>
<td>396</td>
</tr>
<tr>
<td>Kakao Talk (12/13)</td>
<td>110</td>
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</tbody>
</table>
Other companies have developed collaborative platforms that allow the delivery of mobile-enabled services, such as mobile payments and information services. South Korea in particular is emerging as a start-up hub in the region, encouraged by supportive government policy. Extensive mobile broadband network deployments and high levels of smartphone adoption have also proved effective catalysts for innovation and the development of an increasingly important ‘app’ economy in the country. The Korean government has clearly recognised the potential of the digital economy to spur growth and jobs, whilst consumers have proved themselves to be willing adopters of innovative new technologies.

The Asia Pacific region has also seen the emergence of major e-commerce players such as the Alibaba Group and social networking platforms such as Weibo. For both these companies, mobile is an increasingly important access technology, with China in particular seeing an increasing shift for users of social networking sites to mobile devices.

These new entrants to the mobile ecosystem benefit from the significant investment levels by the network operators, both to deploy mobile broadband networks and then to accommodate the resultant strong growth in data traffic. This highlights the benefit to all players in the mobile ecosystem from increased collaboration and cooperation. Mobile operators are already partnering with a range of industry players, ranging from equipment to other technology providers. A more collaborative approach could benefit all players and allow the ecosystem to develop on a more sustainable basis.
2.2 The Internet of Things in Asia Pacific

There are a number of challenges facing communities across the Asia Pacific region, including those arising from high levels of population growth and rapid urbanisation and the challenges this brings in moving to a more sustainable growth path. The Internet of Things (IoT) will offer a range of innovative new services to consumers whilst also helping to address some of these broader challenges.

The automotive and consumer electronics sectors have already started to take off with many new connected devices and propositions being launched across the region. In South Korea there are already over 52 smart city projects in 39 municipalities. Smart metering initiatives in a number of cities across the country should help the government meet its objective of having 30% of the population actively engaged in a real time energy trading market by 2030.\(^{13}\)

The GSMA’s vision for the IoT is the ‘Connected Life’. The term ‘Connected Life’ refers to a world in which consumers and businesses use many different devices to experience compelling new services and ubiquitous internet access delivered via mobile networks. These devices include the next wave of smartphones, tablets and consumer electronics, as well as machines, vehicles, monitors and sensors equipped with machine-to-machine (M2M) communications.

Asia Pacific is already seeing a range of IoT deployments, with the region already the largest market for M2M connections and with growth rates well above the global average. As highlighted in a recent research note by GSMA Intelligence, the M2M market is an increasingly important source of connection and revenue growth for operators across the globe. In addition, the market is now moving from a period of ‘hype’ and market development to one with an increasing focus on real commercial deployments, with the Asia Pacific region providing a clear example of these trends.

Global M2M connections reached 188 million in 2013, growing at almost 40% per year between 2010 and 2013. Asia Pacific is the largest regional M2M market accounting for almost 40% of global M2M connections, and has recorded the largest gain since 2010, with 51 million net additions over the last three years.

The region’s share of global M2M connections increased from 26% to almost 40% between 2010 and 2013, although this is largely due to the rapid growth of the Chinese market. China alone added almost 39 million M2M connections over this period while a number of other Asian markets recorded a substantial net increase. By the end of 2013, China reached 50 million M2M connections and overtook the US (32.5 million) as the largest M2M country worldwide in terms of connections, while Japan remained the third-largest market with 9.3 million connections.

### Leading M2M markets by connections (m)

<table>
<thead>
<tr>
<th>Country</th>
<th>2010</th>
<th>2013</th>
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<tbody>
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</tr>
<tr>
<td>Italy</td>
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Source: GSMA Intelligence

2.2.2 The GSMA’s role in delivering the IoT

The GSMA through its Connected Living programme will focus on two key areas in order to help further the development of the IoT market, both within the Asia Pacific region and at the global industry level:

- To define future network requirements and capabilities that are required to allow operators to support IoT devices and services.
- The definition of a Machine (embedded) SIM that addresses remote provisioning requirements and advocacy for a differentiated regulatory treatment. This may also require a different regulatory treatment for Machine SIMs. One of the major barriers to the success of M2M/IoT is the common view that an M2M connection is the same as a traditional mobile connection.

The initial focus of the Connected Living programme is to addresses key barriers and challenges that are prohibiting the development and growth of M2M/IoT connections and services across the world. In October 2013, GSMA published a ‘Call to Action’, inviting mobile operators to engage as ‘lead’ operators to shape the programme definition. A number of operators in the Asia Pacific region have already offered to take a lead role, including China Mobile, China Unicom and NTT DoCoMo. In December 2013, the GSMA published specifications for the embedded SIM that should help accelerate the deployment of innovative solutions across the region.

http://www.gsma.com/newsroom/gsma-publishes-embedded-sim-m2m-services/
Digital commerce and NFC see strong growth in Asia Pacific

Mobile commerce is seeing rapid growth across Asia Pacific. The Japanese market has seen strong uptake of mobile commerce applications for a range of products and services, helped by the availability of a number of mobile wallet applications. Ratuken is a leading e-commerce player in Japan which is increasingly focusing on mobile commerce, which the company has stated already accounts for almost a third of its revenues. Ratuken has been acquiring a number of other companies (including the online messaging service provider Viber) to build its own mobile ecosystem, whilst also looking to expand its footprint internationally.

However, the growth of mobile commerce is not only a feature of the region’s developed markets. Increasing smartphone adoption in the region’s developing economies means that mobile commerce is growing strongly in these countries as well. China, in particular, is seeing strong growth in e-commerce but also increasingly mobile commerce, helped by the lack of traditional retail infrastructure in many smaller towns and cities across the country. iResearch forecasts that the gross merchandise value of the mobile payment segment in China would hit 11.9 trillion yuan in 2017, a huge jump from 1.2 trillion yuan recorded in 2013.

India is another market that is also seeing strong growth in mobile commerce. More affordable smartphones and rising adoption rates will further stimulate the growth of mobile commerce in the country, with recent research suggesting that mobiles already contribute up to 20% of traffic to e-commerce sites16.

Several countries in Asia Pacific have already emerged as the world’s leading adopters of NFC services17, well ahead of the levels seen in both Europe and North America. For example, in South Korea the three major mobile operators had sold over 10 million NFC phones by the end of 201218. The most popular NFC services in South Korea today are related to transport, according to the country’s mobile operators. SK estimates more than two million people have used their mobile handsets to pay transit fares via the T-money prepaid system, which is accepted by buses, subway trains and some taxis in Seoul and other parts of South Korea.

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17. A contactless technology that can be used for applications such as mobile payments and ticketing
There have also been high levels of NFC adoption in Japan (though this often involves a proprietary version of the technology which is not compatible with deployments in other countries). The three main operators in Japan had sold a total of 14 million NFC-enabled handsets and SIMs by January 2014, maintaining the country’s leading role in the adoption of the technology.

China appears poised to see major pick up in contactless and NFC-enabled payments. For example, there are already approximately 1.47 million NFC-enabled point-of-sale terminals in China, whilst the country’s leading mobile operators and payment service provider UnionPay have recently reached an agreement on common standards for payment systems in the country.

Other examples of mobile commerce and NFC deployments across Asia Pacific

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<th>SK Planet launched its Smart Wallet in 2010 to help build an e-commerce platform and to attract both consumers and service providers to the company’s developing ecosystem, and now is preloaded on around half of the handsets sold by SK Telecom. By mid-2013, SK Planet reported having 10 million subscribers, with over 2.5 million active users per day.</th>
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19. NFC Times
20. http://www.globaltimes.cn/content/837028.shtml#Uwc5TYWJ_iRM

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The GSMA’s role in fostering further growth of digital commerce in Asia Pacific

Digital commerce faces various challenges in different markets across the Asia Pacific region, often reflecting the level of local market development. To address these differing challenges, the GSMA’s Digital Commerce initiative is focusing on two key areas:

**Business-to-business (B2B) wallet interfaces:** mobile operators can play an important role in mobile commerce by storing secure credentials (such as credit card details) on the SIM card. However, the provisioning of these secure credentials is currently a relatively slow and fragmented process. Addressing this problem requires an interoperable solution between operators and service providers, which will reduce integration costs and time to market. A number of leading global operators have already committed to support this goal, including China Mobile.

Many developing markets have more than one mobile money service, although most are not interoperable. Mobile money interoperability is a key focus area if the full potential of these services is to be realised. The GSMA’s Mobile Money Interoperability (MMI) programme is a global programme which focuses on helping operators to successfully launch and scale interoperable mobile money services through identifying and sharing best practices, guidelines and processes, creating performance benchmarks, and providing regulatory support.
2.4 The potential for mobile identity in Asia Pacific

With the rapid growth of online commerce, social media, gaming and other online activities in countries across Asia Pacific, there is a growing need for individuals to be able to manage and authenticate their identities when accessing these online services.

Consumers across the region need convenient, secure and privacy protecting digital identities to make it both safer and easier to access online services. These are common requirements across both developed and developing markets across the region. However, in an often fragmented content and application market, consumers can be frustrated by complex authentication processes.

Mobile operators are well placed to act as the link for their customers between their mobile and online services. Growing exposure to identity-based fraud and theft are beginning to bring to light the inherent weaknesses in traditional methods for online login and access. Examples of mobile identity deployments in the region include the following:

**Dialog Connect:** Dialog, a leading mobile operator in Sri Lanka launched this service in 2012. Since that date the service now has over 400,000 subscribers, of which 3,000 use the service on a daily basis. Dialog Connect allows users to log onto a range of third party services, including those offering e-commerce and digital content. Dialog Connect offers a service that is both easy to use for consumers (allowing access in one easy step) and secure. Dialog Connect will also allow users to add the cost of purchases to a user’s phone bill, an important development in a market where only a minority of the population have credit cards.

**au ID:** KDDI in Japan launched ‘au ID’, which acts as a gateway to a wide range of services. au ID users can make use of online storage, manage third party loyalty schemes, and pay for goods and services via their mobile bill. The service already has more than 15 million au IDs, making it one of the most successful identity services launched to date. It was launched by KDDI in response to both the rapid growth of mobile commerce in Japan, as well as growing concerns over online fraud and identity theft. The service has succeeded in delivering access to a broad range of service and content providers, with over 500 services available for Android users and over 300 for Apple users.

2.4.1 The GSMA’s role in further developing mobile identity services

Reputation and trust are emerging as key themes for both consumers and service providers in the online world. As a result, they are increasingly turning to organisations with sufficient customer loyalty, trust and the operational capacity to deliver secure access services. In some cases service providers default to the large, global names in the online world, such as Facebook, Google and others. While these companies offer quick access to a global audience; the registration process behind each identity carried by these and other companies is cursory, and unable to provide the same level of assurance and relevance as a mobile identity service.

The use of mobile identity services offers benefits to consumers, mobile operators and other mobile ecosystem players. It establishes the SIM card and the mobile medium as a frontline identity management service provider. Mobile operators are well placed in many markets to provide identity services, given their strong customer relationships which in some cases have been enhanced by the provision of other trusted services such as mobile banking.

The GSMA’s Personal Data programme is working with the majority of mobile operators who have launched mobile identity services, both in the Asia Pacific region and across the globe to help realise the potential of mobile identity services. The mobile industry needs to deliver common and consistent interfaces to a range of service providers, which at the same time need to offer seamless and convenient solutions to consumers.

The use of standards and interoperability are therefore key, in particular the need to create a common, industry-wide set of identity-related ‘APIs’ (application programming interfaces). The GSMA is also working closely with operators to establish a uniform set of APIs to underpin key mobile identity services. To help realise this goal, the GSMA has launched its ‘Mobile Connect’ initiative which aims to deliver broad interoperability across a range of mobile operators and service providers. The initiative is supported by a number of leading operators in the Asia Pacific region, including KDDI, China Mobile, China Telecom and Tata Teleservices.

2.5 Mobile is already delivering social benefits in developing markets across the region

A diverse range of players, including mobile operators; entrepreneurs; corporates; governments; investors and non-profit organisations have together driven an explosion in mobile-enabled products and services in developing countries across the Asia Pacific region. The following chart shows that the number of new service launches in developing markets has increased consistently over recent years, particularly in the areas of health, learning and mobile money.

Source: M4D Impact Tracker, GSMA Intelligence Analysis

Mobile-enabled products and services in Asia Pacific (cumulative)
2.5.1 Transforming healthcare across the region

Innovative mHealth applications are transforming healthcare in both the developing and developed world. In the developing world, mobile technologies are bringing healthcare to underserved populations, increasing its effectiveness and reducing the costs of its delivery.

In many developing countries in Asia Pacific, the ability to overcome serious health challenges and improve the quality of healthcare is hindered by several critical obstacles such as shortage of health professionals and access for remote patients to the large hospitals. The chart below illustrates the scarcity of health care infrastructure; with as low as 0.02 health centres per 100,000 people in Bangladesh. But the growing ubiquity of mobile technology offers new hope for remote access and promotion of quality healthcare through mHealth solutions.

Source: World Health Organization

Health centres per 100,000 people
In Asia there are over 200 live mHealth deployments across categories such as diagnosis, disease prevention, remote monitoring, wellness and remote health worker empowerment.

Hospital Booking: 12580, China – China Mobile’s ‘12580’ service is a hospital booking system which connects 93 hospitals across nine Chinese cities. In China, hospitals also fulfil the role of a primary care provider thus increasing the frequency of hospital visits and exacerbating the challenges arising from the shortage of healthcare personnel. Patients can call ‘12580’ from their mobile phone and book an appropriate hospital appointment, across a network of hospitals in the nearby area. Appointments can be made up to seven days in advance, and patients can use their mobile money accounts to pay for hospital fees. Remote booking and payment has increased access to healthcare services. To date, the system has approximately served over 4.25 million patients.

Remote Diagnosis: Teledoctor 24/7, Pakistan - Remote diagnosis made possible by mobile connectivity is radically improving the lives of rural populations who are unserved or underserved by existing healthcare infrastructure. Telenor’s ‘Teledoctor 24/7’ is one such service which connects a mobile user with certified healthcare personnel. Mobile callers also have the option to speak to male or female doctors in their native language. The service provides callers access to affordable medical advice and emergency medical response. The timeliness of emergency medical advice can be hugely beneficial in saving lives, especially in rural areas where patients need to travel long distances to the nearest clinic. Teledoctor receives around 1,500 calls per day and reaches almost 95% of Pakistan’s population.

Empowering Health Workers: BBC Media Action’s Mobile Kunji, India – BBC Media Action has developed a range of communication intervention tools, which equip and train community health workers who then provide healthcare provide crucial medical advice to seven million pregnant women and young mothers in Bihar. One tool is an audio-visual job aid which can be used by health workers during counselling sessions with rural families. The tool consists of an interactive voice response (IVR) system and a deck of 40 cards illustrated with health issues faced by pregnant women and young mothers. Each card has a printed mobile short code. Then when the health worker dials the code on her mobile phone, rural women are able to hear a health message which is relevant to their condition. These easy to access tools have empowered health workers to enhance their own knowledge and deliver critical healthcare information in a friendly manner.
2.5.2 Providing access to water and electricity

With mobile networks covering more than four out of five persons in Asia, mobile infrastructure is now reaching places not currently served by the national electricity grid. There are more than 255 million people in Asia who have access to mobile networks yet do not have access to electricity in their homes. Similarly, there are more than 95 million people who do not get clean drinking water yet have access to mobile phones. Mobile technology combined with innovative business models are paving the way for mobile enabled access to energy and water.

**Mobile Enabled Water-ATM: Sarvajal, India** - In a country where 700 million do not have access to clean water and 60% of the diseases in adults and 85% of diseases in children are caused by contaminated water, Sarvajal equips a local entrepreneur with a ‘water ATM’ which provides safe drinking water at an affordable cost. The ATM is embedded with 25 sensors and a SIM card, transferring information in real-time in order to monitor water pressure and filtration, and enhance maintenance of these systems. Customers pay for water using prepaid smart cards. Sarvajal is selling a litre of water for as little as INR 0.25 (<US$ 0.01), cheaper than large bottled containers or small water pouches. In India, where water is available but unsafe, such kiosk solutions are critical to increasing clean water access. As of 2013, Sarvajal has served 75,000 regular customers, while creating more than 400 jobs across six states.

**Mobile Enabled Pay-As-You-Go Electricity: Simpa Networks, India** - In India, a quality home solar system retails for US$ 200-400, including a solar panel, battery, charge controller, three or four lighting points and a phone charger port. Without external financial support, a majority of the population living off-grid cannot afford this amount upfront. Simpa Networks operates with a unique lease-to-hold scheme which allows the user to progressively purchase energy in small, user-defined increments. The revenue model is similar to prepaid mobile airtime which the target customer is usually familiar with. Simpa’s customers make an initial down payment of 10-30% for installation of a solar home system (SHS) and they can then purchase energy credit or ‘top-up’ through SMS on a mobile phone. An SMS recharge code is then used to unlock the installed electronic device. A part of the customers energy ‘top-up’ goes towards repayment of the SHS itself. Once the entire amount is paid, the controller unlocks permanently allowing the customer to fully own the SHS. This repayment typically takes two to three years. Simpa has run pilots in Karnataka and expects to have sold 20,000 SHS’s in six states by the end of 2014. By 2015, the company expects to reach 63,000 rural households as well as small and medium enterprises in India.

23. The Synergies between Mobile, Energy and Water Access: Asia, GSMA Mobile for Development
Addressable market for mobile-enabled access to water and energy
2.5.3 Improving the quality of education and employment opportunities

Mobile technology is playing a key role in improving the quality and access to education in many Asian countries. Along with education, youth unemployment has become a growing concern for many economies in Asia Pacific. The region has more than 700 million young people of which only about half have jobs. According to the World Bank, youth unemployment rates range from just over 10% in India to nearly 20% in Indonesia. Many of the 300 million that do have jobs are forced to accept them in the informal sector, which often offer poor pay, unsuitable working conditions and weak future prospects. Unemployment further hinders and degrades the role of people in society and the economic development of their countries.

Mobile employment solutions (mEmployment) are playing a vital role in bridging this gap by providing access to better job opportunities, skills training and mobile certifications. Some examples of such services:

**Mobile Job Matching: Babajobs, India** – This service leverages mobile technology to connect disadvantaged job seekers with employers. Through their mobile phones, job seekers can create profiles, search for jobs, and receive premium updates about job opportunities using SMS, IVR and WAP technologies. Babajob’s call centre staff also encourages employers to post job openings relevant to these jobseekers. Since its launch in 2007, the service has listed 2.2 million jobs and has 163,000 listed jobseekers. This type of service not only increases the availability of jobs but also improves the socio-economic livelihood of lower income or more marginalised workers. For example, users of this service have reported an average 20% increase in salary and a 14 minute reduction in their commute to work.

**Skills Training: BBC Janala, Bangladesh** – BBC Janana is a large-scale mobile-based English teaching tool which has effectively transformed mobile phones into a low-cost educational tool. Users can dial a short code and access bi-lingual audio-lessons and also test their English language skills through their mobile phones. The service is easily accessible on any handset, across all networks and costs as low as US$ 0.004 per lesson. In Bangladesh and much of South East Asia, English language proficiency is considered critical to improve employment and income opportunities. A user Mishti who lives in western Bangladesh and works for an insurance company, describes the transformative impact of learning English has had on her life and work. By learning English through this service, she is no longer afraid of interacting with foreigners and her bosses and says “I need English because if I want to do well in my career, knowing how to speak English is critical.”
2.5.4 Addressing gender inequality in the region

As of 2010, 21% fewer women than men owned a mobile phone in low- to middle-income countries. This suggests a gender gap of 300 million women without access to this potentially life-enhancing tool. Resource-poor women play a catalytic role in the economic and social development of emerging and developing countries. Empowering women is crucial, both for the well-being of individuals, families and communities, and for the overall economic productivity, especially in developing countries. Mobile offers a well-documented contribution to women’s improved livelihoods and empowerment in developing and emerging markets.

MAMA, Bangladesh: Globally, more than 800 women die of childbirth or pregnancy-related complications every day, and 3.1 million newborn deaths occur every year. Through the Aponjon programme, MAMA aims to reach three million pregnant women, new mothers and their families in Bangladesh within three years, achieving sustained improvements in knowledge, healthy behaviours and health outcomes. Substantive research showed that in Bangladesh men and other household’s decision makers can be the champions or detractors to any approach. MAMA tackled this issue by including them within their mobile maternal health services. Creating awareness amongst household decision-makers about the specific needs of women during pregnancy resulted in improved nutrition and more frequent antenatal visits and better preparation for delivery, having a direct positive impact on the women. When these gatekeepers see the value in the product, they are more likely to grant women access to their mobile phones, resulting in women’s increased technical literacy and comfort with the phone.

Dialog’s 5 Star Programme, Sri Lanka: Mobile ownership and use in Sri Lanka still tends to be concentrated in the more urban areas. Against this backdrop, Dialog launched the ‘5 Star Partner’ training programme to create a rural network of male and female ‘Infomediaries’ (Information Intermediaries): retailers trained to drive penetration of mobile and value-added services among the remaining underserved, most of whom are women. The programme showed that female customers find female mobile retailers more approachable, whilst improving a retailer’s customer service expertise helps them to attract female customers. Training therefore empowers female retailers and helps them to build their businesses.

2.5.5 Delivering financial inclusion

Developing markets in the Asia Pacific region are home to a high proportion of people who do not have a bank account and those who despite having a formal account do not live within close proximity of banks and are thus effectively excluded from the financial system. These populations are forced to rely on cash or informal financial services that are typically unsafe, inconvenient and expensive. However the ubiquity of mobile phones in these countries provides the basis for mobile money, whereby mobile technology is used to deliver convenient and affordable financial services to the underserved.

As well as enabling payments, mobile technology can be used to extend the reach of financial services such as insurance, credit and savings. Through effective relationships with banks and other financial institutions, mobile phones can meet a broader range of customers’ financial needs and thereby deepen financial inclusion.

Asia is home to the first few mobile money deployments globally predating the success of mobile money in Kenya (M-PESA). According to the Mobile Money Deployment Tracker, Asia has 68 mobile money deployments, of which 28 are more than three years old. The GSMA’s Global Adoption Survey of Mobile Financial Services indicates that as of June 2013, the APAC region (South Asia, East Asia and Pacific) was home to 29% of the developing world’s mobile money users and accounted for 22% of mobile money transactions in the developing world.

While Asia has seen successful mobile money deployments, the full potential of mobile money remains untapped due to regulatory barriers in a number of Asian countries. For example in India, in order for mobile money services to scale and become sustainable it is necessary to permit cash-out (withdrawal) at third party agents with reasonable transaction limits. Moreover excessive ‘know your customer’ requirements inject unnecessary costs into the mobile money model, which can be mitigated through regulatory reform. Additionally, Indian regulators require banking correspondents to be located within a 30 kilometre radius of a bank branch, which further limits the extension of mobile money services in rural areas.

However, recent cases of regulatory reform in Sri Lanka have led to large-scale adoption. Similarly, many Asian markets are starting to gain traction and more regulatory reform will go a long way in helping the industry achieve its full potential.

**eZ Cash, Sri Lanka** - Dialog launched its telco-led mobile money service called ‘eZ Cash’ in June 2012, after several years spent overcoming local regulatory challenges. eZ Cash customers can transfer money, pay utility bills, and other types of payments to merchants and institutions through a simple, safe and secure method. In the first month alone, over 300,000 customers signed up and after one year after launch, eZ Cash had more than one million customers. As a benchmark, in June 2012, only 16 mobile money deployments globally reported to have more than 200,000 active customers.

“The use of the mobile phone to send and receive money and engage in transactions with the broader retail and enterprise sectors of the economy has increased efficiency and expedited the time taken to conclude a business transaction, thereby giving a big boost to the national economy.”

**Anusha Palpita**, Director General, Telecommunications Regulatory Commission of Sri Lanka (TRCSL)

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25. Developing world includes Asia Pacific, MENA, SSA and LatAm. It excludes Europe and North America
2.5.6 Reducing the agricultural productivity gap

Farmers in developing countries are less productive than their peers in developed markets. One of the reasons for this is their lack of access to critical information such as weather forecasts and tips on combating pests and diseases. This is an important concern across many South Asian economies which rely heavily on agriculture. The following examples illustrate how mobile technologies are bridging the information gap by providing actionable information that boosts their productivity and income.

Information and Advisory Service: mKisan, India - This mobile based agriculture advisory service overcomes the traditional capacity barriers of advice provision to smallholder farmers. It provides farmers in India with practical, up-to-date advice and information on crop agronomy, animal health, weather forecast and market price information. The service is delivered through SMS and an IVR helpline, which due to high rural mobile penetration in India allows for greater and easier access for farmers. The service, launched in January 2013, is operated by a mobile provider Handygo and has received funding from the GSMA’s mFarmer initiative.27

In its early phase the mKisan advisory has benefited farmers by providing crucial information around pest control and new methods of increasing productivity. Around 30% of repeat users find the service useful and have acted on the information provided. A user says that, “I received some information on potato crop through SMS alert... I used the spray suggested in the SMS. I can say that it worked 50 percent in controlling the retardation.”

Another user, who benefited from market price information says that, “Earlier we used to believe the rates offered by the merchants or the middlemen for our produce...Now, I can check the rates and show the same to the merchants/middlemen also. So, they are not able to deceive us anymore.”

M2M Applications: Smart Fish Farming, China - A pilot project run by China Agricultural University and supported by Ericsson’s M2M technology demonstrated the benefits of using mobile phones to monitor and control the water quality of crab ponds in real-time. Crab breeding is highly susceptible to small changes in the levels of oxygen in their living environment. As part of this pilot, a remote monitoring system was linked to a smartphone mobile application, through which farmers were able to closely monitor the quality of water in which their crabs breed. This pilot allowed farmers to control breeding conditions remotely, thereby lowering energy consumption, labour costs and enhancing overall productivity.

27. GSMA Mobile for Development, mFarmer Initiative
Case studies

One of the least developed mobile markets in the region, now looking to leapfrog to a more advanced stage. Amongst other targets, the government’s master plan aims to achieve a mobile connection penetration of 45% by 2015.

The leading example of what can be achieved when policy makers set a clear path for the ICT industry and national goals.

Number of countries in Asia Pacific with national broadband plans:

- 33 with plans
- 24 no plans
- 4 planned

Source: International Telecommunication Union
The case for national broadband plans

1. Develop a clear roadmap for future spectrum releases

112 licences across 9 countries due for renewal over the next decade.
Ensure the availability of suitable and harmonised spectrum at an affordable price.

2. Remove sector specific taxes and review universal service funds

TAX BURDEN AS A PROPORTION OF TOTAL REVENUES

- Bangladesh: 56%
- Thailand: 29%
- Sri Lanka: 17%

3. Remove barriers to deployment of infrastructure

Follow WHO guidelines on EMF exposure and enable infrastructure sharing.

4. Facilitate the normal functioning of competition in the mobile sector rather than over-regulating it

Number of countries in Asia Pacific with national broadband plans:

- 33 with plans
- 24 planned
- 4 no plans

Source: International Telecommunication Union
The case for national broadband plans

Broadband is rising up the agenda for business leaders and policy makers alike as it becomes evident that the quality and coverage of a country’s telecoms infrastructure is now a key competitive differentiator in the global economy. Broadband connectivity is already delivering significant benefits in markets across the region, in both economic and social terms. For countries with sparse broadband coverage, there is little time to lose.

By mid-2013, there were 134 national broadband plans in force in countries around the world, according to a report by the Broadband Commission for Digital Development28 entitled Planning for Progress: Why National Broadband Plans matter. These plans take different forms – some are enshrined in legislation, others are essentially a policy framework/strategy and others are realised through a series of regulations. They also vary in scope – some plans are focused solely on broadband, while others encompass IT, as well as connectivity, and constitute a comprehensive roadmap towards an ‘Information Society’.

Although many national broadband plans are in their formative stages, there are signs that they are producing results. The Broadband Commission report concluded that the introduction or adoption of a broadband plan can lead to 2.5% higher fixed broadband penetration, and 7.4% higher mobile broadband penetration, on average. The difference in those figures reflects the key role of wireless technologies, which can be deployed quickly and at relatively low cost, typically play in enabling countries to achieve their national broadband goals.

By mid-2013, there were **134** national broadband plans in force in countries around the world.
3.1 Engage industry in a national broadband plan

Realising the full potential of broadband to increase national competitiveness and empower citizens depends on a strong partnership between government, industry and other stakeholders. Ideally, governments will engage in a consultative, participatory approach that involves all key stakeholders in the development of a national broadband plan and the associated policy making process.

To ensure a national broadband plan is more than a set of aspirations, a government needs to create a structure and process that will enable its provisions to be implemented. Ideally, the plan will be owned and championed by a high-level ministry and will be overseen by a government agency with clear responsibility for its implementation. This coordinating agency needs to be empowered to work with all the relevant branches of national and local government to implement policies, address related legislation and specific obstacles, such as cumbersome planning processes. The government will also need to make appropriate funds available and measure progress at regular intervals.

Policy makers should also consider demand-related factors. For example, they need to ensure that citizens have the skills to make full use of broadband networks and that there is a broad selection of digital content available in local languages.

3.2 Four guiding principles for a national broadband plan

This section takes a closer look at the policies that will need to underpin a national broadband plan to ensure that a country and its citizens can realize the full benefits of digital technologies and services. It considers four key principles that should guide a national broadband plan:

01. Ensure availability of suitable and harmonised spectrum: In many countries, mobile has already emerged as the dominant technology for internet access, and it is often too expensive or impractical to provide fixed broadband connectivity. As a result, policy makers should explicitly recognise the central role of mobile broadband technologies in delivering national broadband plans, which in turn depends on the availability of suitable spectrum.

02. Keep costs down: As broadband services are crucial to the competitiveness of a country, they should not be subject to sector-specific taxes, levies and other fees that increase operators’ costs and deter investment and take-up of the services.

03. Remove barriers to the deployment of infrastructure: A national broadband plan needs to consider whether existing legislation or regulations, such as those relating to electromagnetic frequency (EMF) exposure, may prevent it from achieving its goals.

04. Ensure sufficient competition: A national broadband plan needs to contain provisions to ensure that the telecoms market is sufficiently competitive to fuel innovation and drive efficiency.
### 3.2.1 Ensure enough spectrum is available

Rolling out mobile broadband successfully is intrinsically linked to the amount of spectrum available to mobile operators. In South Korea, mobile operators have rolled out LTE in several different frequency bands, boosting coverage and uptake. At the end of 2013, South Korea was the most advanced LTE market.

By contrast, LTE penetration in India at the end of 2013 was just 0.01%. A key reason for that is an acute shortage of suitable spectrum. In its Mobile Economy India report, the GSMA called on the Indian government to allocate and release more harmonised spectrum in larger blocks. The report found that India has yet to allocate approximately 60% of the relevant spectrum and large blocks specifically identified for mobile are occupied by other sectors. The report also called on the government to adopt lower spectrum reserve prices and create a transparent and predictable spectrum regulatory framework.

More generally, governments need to ensure that they allocate spectrum in a way that encourages the rapid deployment of mobile broadband infrastructure. There is no ‘one size fits all’ approach to allocating spectrum, as market circumstances and the specific objectives of the government vary from country to country. Auctions, for example, are an efficient way to allocate spectrum when demand is expected to exceed supply.

### 3.2.2 Renew licenses and refarm spectrum

In the Asia Pacific region, many of the original 2G spectrum licenses issued by governments are coming up for renewal in the next few years, with 112 licenses in total due for renewal over the next decade. This spectrum can usually be refarmed to provide mobile broadband services. Ideally, renewed mobile licenses should be technology and service neutral, enabling the mobile operator to choose the optimum technology for that specific spectrum. Moreover, new licenses should be granted for at least 15 years to give investors adequate time to realise a reasonable return on their investment.

To minimize uncertainty for operators (enabling them to make rational, long-term investment decisions) and ensure continuity of service, national regulatory authorities need to take a transparent, predictable and coherent approach to license renewal. Moreover, industry stakeholders need to be involved at all stages of the decision process.

Failure to effectively manage the process can delay investment in new services and affect mobile services for potentially millions of consumers and business users.

Ideally, the approach for licence renewal should be agreed at least three to four years before licence expiry. Governments and regulators should work on the presumption of licence renewal for the existing licence holder: Exceptions should only apply if there has been a serious breach of licence conditions in advance of renewal. If a government decides to reappraise the market structure at the time of a license renewal, it needs to ensure that service is maintained for consumers and network investments are not stranded. Governments should not discriminate in favour of, or against, new market entrants, but establish a level playing field.

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3.2.3 Prepare for future demand

Across the Asia Pacific region, both the number of mobile connections and the volume of data moving through mobile networks are growing rapidly. In most countries, the amount of radio spectrum that is currently allocated and in use by the mobile industry is between 300 MHz and 550 MHz. Although specific spectrum requirements will vary from market to market, by 2020, the industry is likely to require between 1600 MHz and 1800 MHz of spectrum to keep up with demand and ensure widespread access to mobile broadband services. The mobile industry can deliver mobile broadband using either TDD or FDD implementations, as best suited to local interoperability and market requirements.

Unless additional appropriate and commercially viable spectrum is allocated to mobile, the industry will find it increasingly difficult to provide the quality of service and data rates that consumers want and expect, at an affordable price. If provisions are not made now to address rising data demand, the mobile sector could be constrained for many years, given the time it takes to achieve international consensus on spectrum.

In advance of the World Radiocommunication Conference 2015 (WRC-15), ITU study groups are investigating how much and what spectrum will be needed to meet the demand for mobile services in the future. Governments in the Asia Pacific region need to be actively involved in the WRC-15 process to ensure that sufficient harmonized spectrum will be identified to meet the longer-term goals set out in the national broadband plans. Although individual countries can release new spectrum as and when they need it, a failure to identify internationally harmonised spectrum would result in a dramatic increase in costs for both mobile operators and their customers due to the lack of economy of scale.

By 2020 the industry will require between 1600 MHz & 1800 MHz of spectrum to keep up with demand
3.3 Keep costs down

A national broadband plan needs to ensure that telecoms operators are incentivised to invest in new network infrastructure and services. Where applicable, the plan should consider how to phase out sector-specific taxes and fees that impact the business case for deploying broadband infrastructure.

3.3.1 Remove mobile-specific taxes

Several Asia Pacific countries impose sector-specific taxes on the mobile industry and/or its customers above and beyond the standard taxes that apply across the economy. These include special communication taxes, such as excise duties on mobile handsets and airtime usage, and revenue-share levies on mobile operators.

A recent GSMA study of mobile taxes in 19 countries found that nearly 40% of the tax revenues raised from the mobile sector come in the form of mobile-specific taxation. In some Asia Pacific countries, this figure is considerably higher – between 70-90% in Sri Lanka, Thailand and Bangladesh. For example, in Thailand, operators are subjected to a 30% revenue sharing tax.

These sector-specific taxes are counter-productive as they curb the roll out of infrastructure and services that are a key enabler for the wider economy. In effect, sector-specific taxation limits the positive impact of mobile broadband on economic and social development, employment, productivity and the lives of citizens. There is evidence that the reduction or removal of mobile-specific taxes can increase GDP, and hence tax revenues, outweighing any short-term impact on governments’ budgets. In countries, such as Kenya, where governments have lowered or removed mobile-specific taxes, consumers, private enterprise and governments have benefited.

Countries in the Asia Pacific region need to align their approach to taxing mobile broadband with the objectives of their national broadband/ICT plan. If broadband connectivity is a key social and economic objective, taxes that create an obstacle to broadband investment and adoption should be removed. Lowering the taxation burden on the sector increases mobile take-up and use, creating a multiplier effect in the wider economy.

In Asia Pacific, some progress is being made. For example, Bangladesh recently announced plans to reduce levies on new mobile subscriptions and Thailand is in the process of transitioning to a new regulatory framework that is set to reduce the tax/fees burden and increase regulatory certainty.

3.3.2 Review universal service funds

Many countries have created so-called universal service funds to finance the rollout of affordable telecoms services to remote communities. A national broadband plan should review these mechanisms to determine whether they are effectively supporting the provision of broadband. Research by the GSMA has found that many universal service funds are, in fact, counterproductive as they typically levy fees on the telecoms sector and damage the business case for investment in new infrastructure. A national broadband plan should consider alternative approaches, such as private/public partnerships or the imposition of licence conditions on operators.

A 2013 report commissioned by the GSMA, found that less than one-eighth of the 64 universal service funds studied are achieving their targets, and more than one-third have yet to disburse any of the funds they have collected. Together, the 64 funds covered in the report contained more than US$ 11 billion waiting to be disbursed. Nevertheless, they continue to collect levies on the telecoms sector.

Many funds receive contributions that appear to be far in excess of their actual needs or capabilities, while other funds seem unable to develop enough projects to adequately utilise the levies collected (for example, India, which has accumulated US$ 3.9 billion in unused funds).

The report found that the underlying legal frameworks for many funds were ill-conceived from the outset. For example, they are biased towards specific technologies or services, excessively bureaucratic, lacking oversight or hampered by inadequate authorisation to manage the fund. Even in funds where there is a degree of autonomy and independence, there are many cases where political intervention or interference from other government agencies affect the fund’s performance (this has been the case in India, Indonesia, Pakistan and The Philippines). For example, in Indonesia, the Ministry of Finance insisted that the universal service fund may be used only for the acquisitions of goods and services and not for the provision of subsidies. In Pakistan, in the absence of a full-time Minister of IT, the Prime Minister has been head of the fund’s board, resulting in extensive delays in decision-making, further impacted by the dismissal of the Fund’s CEO.

In summary, a national broadband plan should ensure that existing universal service funds are targeted, time-bound and managed transparently. The funds should be allocated in a competitive and technically neutral way, in consultation with the industry. Moreover, governments should consider incentives that facilitate market-based solutions - the vast majority of coverage expansion is driven by private investment, following the provision of new spectrum and the availability of more efficient technologies.

31 Universal Service Fund study conducted by Ladcomm Corporation on behalf of the GSMA, April 2013.
3.4 Remove barriers to the deployment of infrastructure

A national broadband plan needs to consider whether existing planning regulations may prevent it from achieving its goals. For example, excessive limits on electromagnetic frequency (EMF) exposure (that go beyond those set by the World Health Organization) can make it difficult for mobile operators to deploy base stations and improve broadband capacity and coverage.

Regulators should therefore follow international standards for the management of EMF concerns. A national broadband plan needs to be supported by explicit, nationally-consistent planning approval processes for mobile base stations that ensure that networks can be deployed without lengthy delays.

To fulfill its objectives, a government may need to introduce mechanisms that reduce bureaucratic inefficiencies, including exemptions for small installations, co-locations or certain site upgrades, ‘one-stop shop’ licensing procedures and tacit approval.

Additional restrictions related to local environmental impact should be avoided – broadband services should have a net positive impact on the environment as they increase efficiency and reduce the need for people to travel.

3.4.1 Enable infrastructure sharing

A national broadband plan should take into account the fact that operators may need to share infrastructure in some areas to ensure the commercial viability of their services. To that end, governments should have a regulatory framework that allows voluntary sharing of infrastructure among mobile operators.

Ideally, a country’s regulatory framework should facilitate all types of infrastructure sharing arrangements, involving the sharing of both passive and active components of mobile networks.

Moreover, access to government-owned trunk assets should be available on non-discriminatory commercial terms, at a reasonable market rate.

However, any network sharing should be the result of commercial negotiation, not mandated or subject to additional regulatory constraints or fees - network coverage and capacity can be a source of competitive advantage in mobile markets and operators should not, therefore, be forced to share infrastructure.
A national broadband plan needs to contain provisions to ensure that the telecoms market is sufficiently competitive to both fuel innovation and drive efficiency. At the same time, policymakers should be wary of creating an environment that may result in excessive competition that will deter investments.

A report by the Broadband Commission for Digital Development32 entitled Planning for Progress: Why National Broadband Plans Matter found that a competitive market is associated with a higher broadband penetration, with a stronger impact for mobile broadband – competitive markets may be associated with broadband penetration levels some 1.4% higher on average for fixed broadband and up to 26.5% higher on average for mobile broadband (where markets are generally more competitive).

Governments should facilitate the normal functioning of competition in the mobile sector rather than over-regulating it. Excessive regulation can stifle innovation, raise costs, limit investment and harm consumer welfare due to the inefficient allocation of resources, particularly spectrum.

Because the industry is capital-intensive, sufficient scale is needed for mobile operators to function profitably while keeping prices affordable for their customers. Allocating spectrum to organisations that don’t have the ability to deploy or heavily invest in infrastructure will not necessarily increase competition.

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Most countries in the Asia Pacific region have established a national broadband plan but the region as a whole lags behind Europe, in particular, in this respect. In Europe, 38 countries (88%) have national broadband plans, whereas in Asia, 27 countries have a national broadband plan and 20 do not, according to International Telecommunication Union (ITU) figures cited in a recent report by the Broadband Commission. In Oceania, six countries have a plan, three are preparing one and four do not have a plan.

However, the proportion of countries with national broadband plans in Asia Pacific (and elsewhere) is likely to grow further. The Broadband Commission says more and more developing countries are including broadband in their definitions of universal service. The Commission reports that Asia Pacific, and the Americas, are the regions most likely to combine a national broadband plan with a universal access and service definition.

Source: ITU World Telecommunication/ICT Regulatory Database

Regional status of countries with national broadband plans

Africa | Americas | Asia | Europe | Oceania
---|---|---|---|---
Yes | Planned | No

Fifty years ago, South Korea was an impoverished country trying to recover from the war that ravaged the Korean Peninsula in the early 1950s. Today, South Korea is one of the most prosperous countries in the Asia Pacific region. That turnaround has been achieved with the help of a very advanced ICT infrastructure.

Thanks to a relentless government focus on extending access to ICT, South Korea ranks number one worldwide in terms of the proportion of households with internet access, according to the World Economic Forum. In terms of mobile broadband Internet subscriptions, the Forum ranks South Korea 4th globally, behind Singapore at number one and Japan at number two.

South Korea’s embrace of ICT has fuelled rising prosperity and advances in living standards. Since 1995, South Korea’s per capita income has more than doubled (from US$ 11,620 in 1995 to US$ 25,050 in 2012) according the IMF’s World Economic Outlook (April 2013), according to the Broadband Commission.

The development of South Korea’s ICT sector was not an accident. Korean policy makers have set a very clear path for the industry, establishing well-publicized national goals. Since the 1990s, the Korean government has prioritised the development of ‘informatization’ and digital industries and the deployment of broadband. The government introduced the 1995 Framework Act on Informatization Promotion which was revised several times in the wake of the Asian financial crisis of 1997. That Act was followed by the First Master Plan for Informatization Promotion and Cyber Korea 21, which set out a vision for the 21st century.

The Korean government’s early focus on broadband paved the way for a forward-looking spectrum licensing policy, which has enabled the country’s telecoms industry to deploy the latest mobile broadband technologies ahead of many other countries. Korean mobile operators launched commercial LTE services in Seoul and other metropolitan areas as early as July 2011. During 2012, South Korea became the first country in the world to have nationwide LTE coverage, according to the Korean Communications Commission – all three of the country’s mobile operators had LTE networks by the end of that year.

In January 2014, South Korea’s Ministry of Science, ICT and Future Planning (MSIP) outlined plans to almost quadruple the bandwidth allocated for mobile network operators by 2023, according to Yonhap News Agency. The Ministry said an additional 1,190 MHz of spectrum will be freed up for use by mobile providers, on top of the 390 MHz that is currently in use. The MSIP’s ‘Mobile Gwangaeto Plan 2.0’ is designed to accommodate the rapid growth in LTE network subscribers – at the end of March 2014, South Korea had more than 32 million LTE connections, according to GSMA Intelligence.
South Korea’s embrace of ICT has fuelled rising prosperity and advances in living standards. Since 1995, South Korea’s per capita income has more than doubled.
3.6.2 Myanmar – impressive progress in recent years

One of the poorest and least developed countries in the Asia Pacific region, Myanmar has one of the lowest levels of mobile and broadband usage in the world. However, since 2011, a new government has been implementing wide-ranging political and economic reforms. Myanmar’s policy makers regard improvements in the country’s telecoms infrastructure as critical to integrating Myanmar into the global economy and lifting the prosperity and welfare of its citizens, and impressive progress has already been made in a relatively short period of time.

The government has committed to ensuring that all of Myanmar’s citizens have access to effective wireless broadband services, as well as encouraging a content-rich environment that will facilitate a growing online community. In 2011, the government issued the Myanmar ICT Development Master plan (2011-2015). This plan followed the 2005-2010 master plan which was credited with increasing teledensity from 1% to 5.4%.

The key objectives of the 2011-2015 master plan are:

- Achieve 15% teledensity by 2015 in both fixed and broadband;
- Achieve 45% connection penetration (30 million connections) by 2015 in mobile;
- Strengthen ICT security;
- Construct proactive ICT infrastructure;
- Establish efficient migration strategy for network operator;
- Be prepared for possible disasters for public safety; and
- Set up a network management and maintenance system.

With technical assistance from the ITU, the Ministry of Communications and Information Technology plans to create and update (at least every five years) a comprehensive and publicly available National Table of Frequency Allocations for Myanmar. The Table will show the ITU allocations for each spectrum band and which frequencies have been allocated in Myanmar for use by which telecoms services, and which frequency bands are available for use by devices that are exempt from licensing.

The Ministry has also taken steps to open up Myanmar’s mobile market which has been monopolised by a single state-owned operator.

In June 2013, the Ministry auctioned spectrum using an open and transparent process that attracted more than 90 bidders for the qualification round and 12 bidders in the final round.

International telecoms groups Telenor and Ooredoo won the auction and, in January 2014, were granted formal licenses to operate networks in Myanmar. Telenor said at the time it plans to launch services within eight months. Ooredoo, which has pledged an investment of US$ 15 billion to develop Myanmar’s telecoms sector, said it will deliver services within six months, and that the network will reach 97% of Myanmar’s 60 million people in five years, according to the Wall Street Journal. The Ministry plans to issue two more licenses, including one for a foreign joint-venture partner for Myanmar’s incumbent operator Myanmar Posts and Telecommunications.

The formal granting of the licenses to Telenor and Ooredoo followed a public consultation on the government’s proposed legislation for the country’s telecommunications sector. These draft laws cover a number of areas including licensing, access and interconnection, spectrum, numbering, and competition have won praise from legal specialists.

In the meantime, Myanmar’s government has been bringing down the cost of the SIM cards issued by the incumbent operator, fuelling growth in mobile usage. At the beginning of 2011, Myanmar had less than two million mobile subscribers. By March 2014, that figure had risen to more than 6.6 million.
For the full report on The Mobile Economy: Asia Pacific 2014 please visit the GSMA website at www.gsma.com/mobileeconomyasia