



# The Mobile Economy Latin America and the Caribbean 2016



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The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai and the Mobile 360 Series conferences.

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# Executive Summary

With almost 150 million new mobile internet subscribers by 2020, up 50% from 2015, the Latin America and Caribbean mobile ecosystem is creating new opportunities for growth and innovation, and a flourishing start-up environment.

## One of the fastest growing regions, adding more than 100 million unique subscribers by 2020

Overall regional growth in unique subscribers will remain strong out to 2020 as many countries remain underpenetrated. This includes some of the largest countries in the region such as Brazil, Colombia, Mexico and Peru – all of which will end 2020 around 80% penetrated. Growth in these countries will see the regional penetration rate expand by more than 12 percentage points and an additional 100 million unique subscribers by the end of the decade. The region will grow more quickly over the remainder of the decade than any other region except Sub-Saharan Africa; annual subscriber growth from 2015 to 2020 is projected to be 4.8%, ahead of the 4.0% global average.

## Smartphone and 4G adoption growth to continue apace

Smartphone adoption has risen sharply in recent years, from less than 15% of connections in 2012 to just over 50%, and this growth is set to continue. By the end of the decade, the region will add around 262 million smartphone connections compared to the end of 2015. Some 70% of connections will be smartphones, with Brazil continuing to lead with an adoption rate of nearly 80%.

4G coverage is now rapidly expanding, reaching nearly 60% of the population across the region in mid-2016 and set to reach 80% in 2017. Coupled with growing smartphone adoption, this will drive an accelerating migration to 4G. 4G adoption is forecast to reach almost two-fifths of connections by 2020. However, this will still leave the region slightly behind the global average and well behind developed regions.

## Transition to IP communications is affecting traditional service revenues

A majority of subscribers across the region use IP messaging apps. In many markets, including Brazil and Mexico, survey respondents said they use the apps much more than SMS. More so than in developed regions, the loss of messaging revenues is significant for operators because a large majority – nearly 80% – of connections are on prepaid plans.

Declining traditional voice and messaging revenues highlight the need for operators to effectively monetise the growth in mobile data traffic. Cisco projects that total mobile data traffic in the region will grow at a 50% annual rate between 2015 and 2020, slightly below the 53% global rate but more strongly than mature regions. For the region as a whole, data revenues are forecast to grow at an annual rate of nearly 12% to 2020, with the proportion of service revenues generated by data increasing from 30% to nearly 45%.

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## Economic, regulatory and competitive pressures are taking a bite out of cashflow

Slowing global economic growth has caused a broad slowdown in the region and tipped some economies into recession. Meanwhile, many markets in Latin America are experiencing greater competitive pressures as well as regulatory impositions, such as the elimination of mobile termination rates for América Móvil in Mexico. The combination of increased competitive pressures, regulatory measures and slowing subscriber growth as markets mature has led to a more subdued outlook for mobile revenue growth in the region. Revenues will grow by just under 1% per year to 2020, compared to more than 4% over the previous five years and global growth of nearly 2%.

Across the region, EBITDA margins are projected to fall by more than three percentage points by 2020 from the 2015 level. Although capital investments peaked in 2015, the need to expand and deepen mobile broadband coverage – particularly 4G – will keep capex relatively elevated. Towards the end of the decade, the level of investment will begin to fall, allowing operating cashflow margins to begin to rise slightly – although at a level of around 10% compared to more than 20% at the beginning of this decade. Capex for the five years to 2020 will total more than \$76 billion, compared to \$74 billion in the five years to 2015.

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## The mobile ecosystem is a significant contributor to economic growth

In 2015, mobile technologies and services generated 5% of GDP in Latin America, a contribution that amounted to around \$250 billion of economic value. This will increase to more than \$315 billion (5.5% of GDP) by 2020.

The mobile ecosystem also supported approximately 1.9 million jobs in 2015. This includes workers directly employed in the ecosystem and jobs that are indirectly supported by the economic activity generated by the sector. The mobile ecosystem also makes a substantial contribution to the funding of the public sector, with approximately \$40 billion raised in 2015 in the form of general taxation. Moreover, almost \$450 million was raised in government revenue from spectrum auctions in 2015 alone.

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## Expanding mobile ecosystem is creating new opportunities for growth and innovation

The growth of the mobile ecosystem in Latin America and the Caribbean is creating new opportunities, particularly for new, local, small and medium-sized enterprises that can benefit from increased connectivity to develop content, applications and solutions to add value in new areas. The region has some of the world's highest rates of social media usage, with the vast majority occurring over mobile networks. A recent survey of 30 countries around the world found that Latin America was home to three of the top five markets for social media usage.

As in other parts of the world, the shift of consumer engagement in Latin America to mobile devices is driving significant growth in mobile commerce and mobile advertising. Total digital commerce in Latin America is forecast to double from its 2015 level to reach \$80 billion by 2020, with Brazil accounting for just under 40% of this. The growth in digital commerce is reflected in the emergence of regional players such as MercadoLibre – one of six Latin American 'unicorns' (start-ups valued at \$1 billion or above).

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## Mobile helps boost digital and financial inclusion

Latin America and the Caribbean has seen rapid growth in the number of mobile internet subscribers over recent years; more than 300 million individuals have a mobile internet subscription. As the importance of digital access and engagement increases, this figure will continue to grow strongly, to reach almost 450 million by 2020. By then, two-thirds of the population will be connected, still well behind the developed market average. Over 200 million people across the region will still be digitally excluded and unable to enjoy the socioeconomic benefits that the mobile internet can provide.

Mobile money services are a powerful tool for deepening financial access in developing markets. At the end of 2015, there were 37 live deployments across 17 Latin American and Caribbean markets. The majority of countries now have two or more live services, while several markets now have three. Three mobile money deployments in Latin America have more than 1 million active customers, and there are now 17.3 million registered mobile money accounts across the region.

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## Lack of digital skills and locally relevant content are significant barriers to adoption

Across Latin America, the two most important barriers to mobile internet adoption are the lack of digital skills and lack of locally relevant content. Affordability is also a significant barrier in some markets, partly due to high levels of inequality and mobile-specific taxation. Addressing these barriers and the issue of digital inclusion in Latin America will require collaboration and action from players across the mobile ecosystem, with important roles for both mobile operators and governments. Mobile is already the primary technology for accessing the internet in the region, highlighting the central role of mobile networks in improving internet access.

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## Regulatory modernisation and removing barriers to deployment remain critical

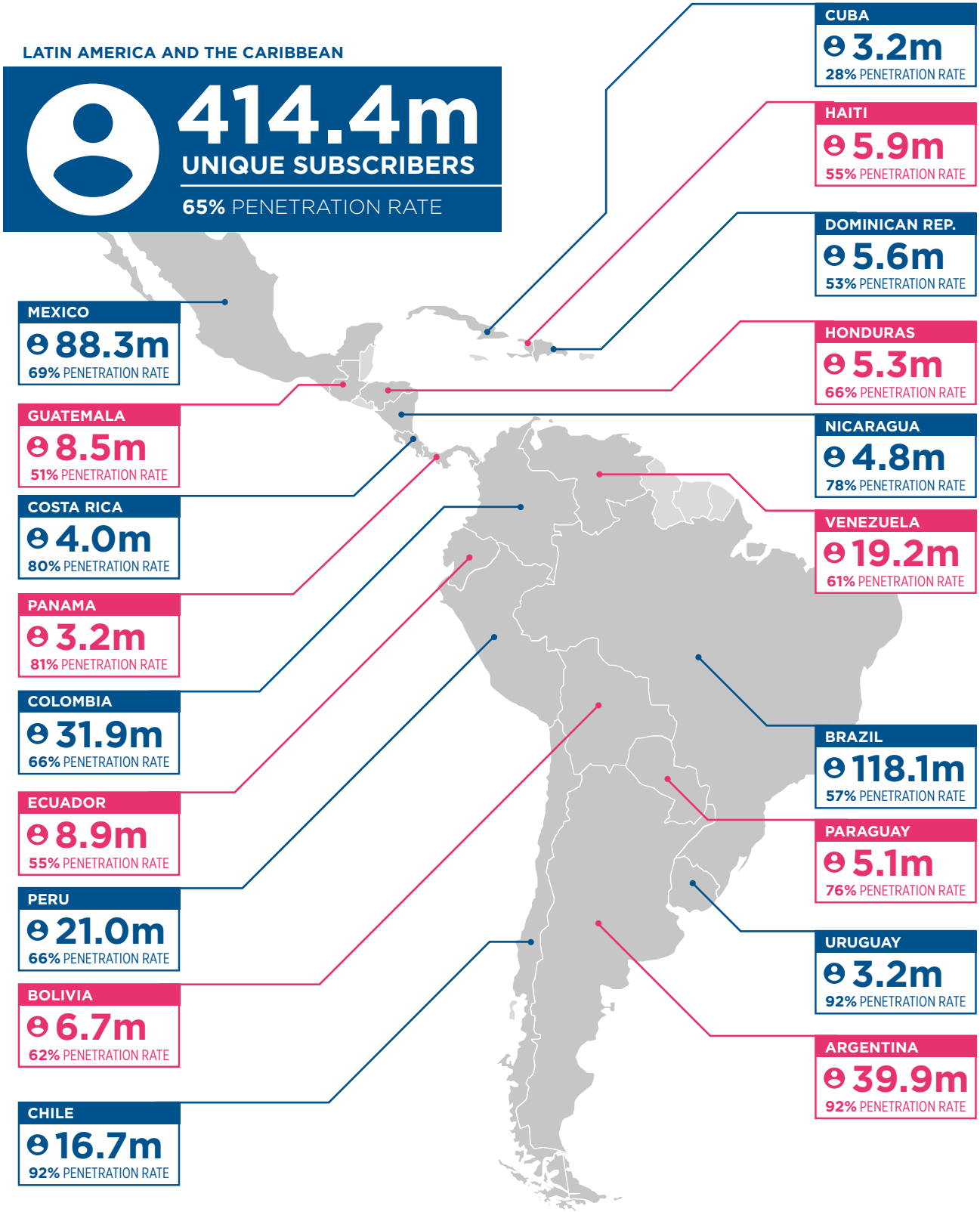
Removing barriers to infrastructure deployment and investment is key to enabling future growth of the industry in Latin America. This necessitates a thorough modernisation of the framework that governs the mobile industry, taking into account the global, digital and highly competitive nature of the markets. Policymakers need to take a fresh look at their regulatory approach, discarding unnecessary legacy regulations and creating a level playing field on which all players can compete. This is particularly relevant in light of new areas such as the Internet of Things, and key challenges around security, privacy and consumer protection.



Figure 1

# Latin America: unique subscribers by country

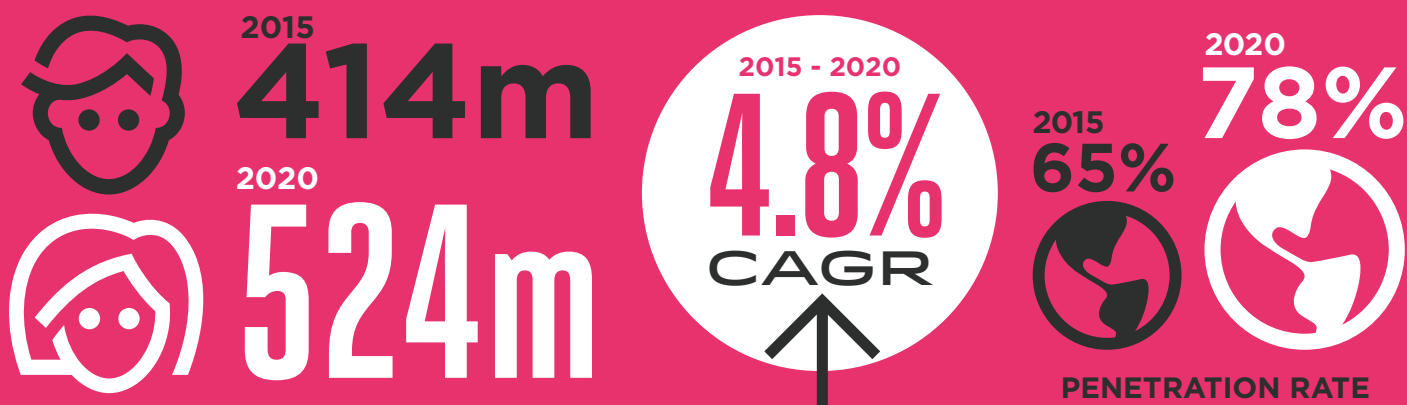
Q4 2015



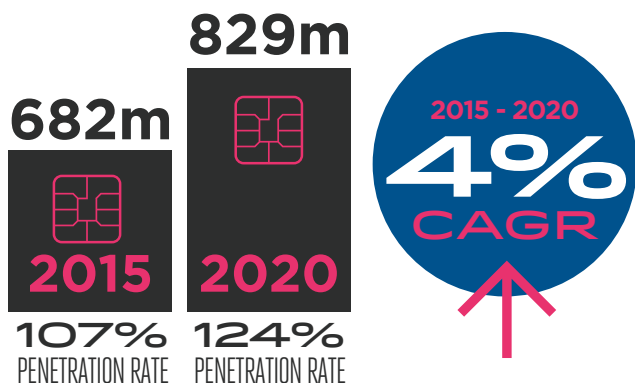
Source: GSMA Intelligence

# MOBILE ECONOMY LATIN AMERICA

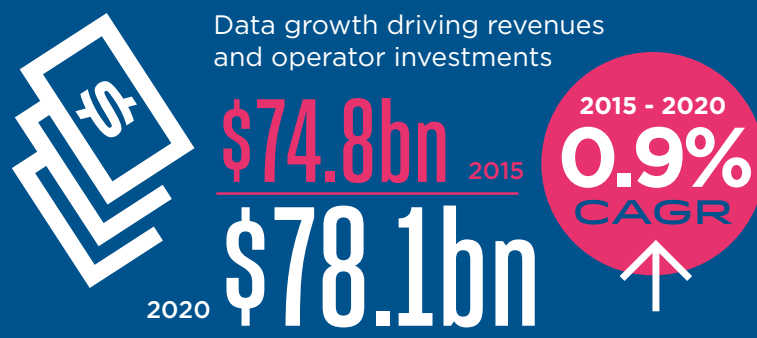
## Unique subscribers



## Connections Note: Excluding M2M

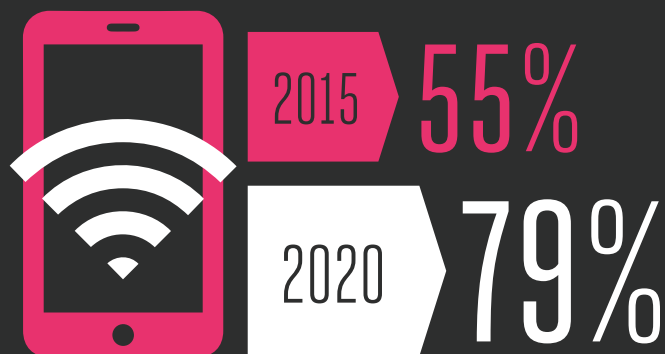


## Mobile operator revenues

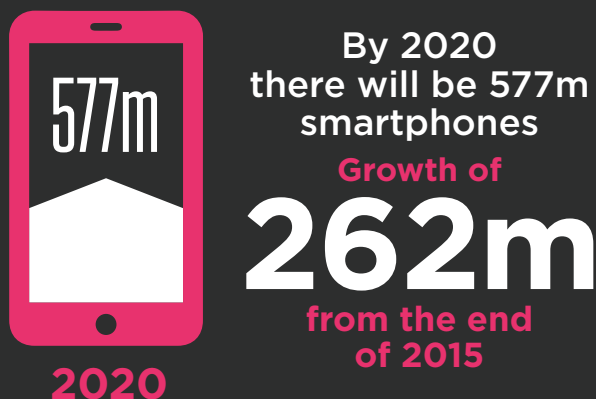


## Accelerating moves to mobile broadband networks and smartphone adoption

### MOBILE BROADBAND CONNECTIONS



### SMARTPHONES





## Mobile contributing to economic and social development across the world



### Delivering digital inclusion to the still unconnected populations

Mobile internet penetration  
2015: 47%  
2020: 66%



### Delivering financial inclusion to the unbanked populations

in 17 markets in Latin America and the Caribbean via 37 service providers as of December 2015



### Delivering innovative new services and apps

Number of cellular M2M connections to reach 52m by 2020

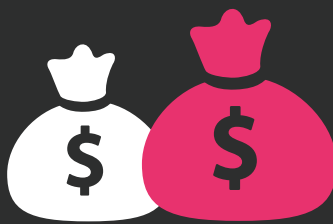
## Mobile industry contribution to GDP

2015

**\$255bn**

GROWING TO, BY 2020

2015  
**5.0%**  
GDP



**\$315bn**

2020  
**5.5%**  
GDP

## Public funding

Mobile ecosystem contribution to public funding before regulatory fees



2015

**\$39bn**

## Capex

OPERATOR CAPEX OF

**\$76bn**

for the period 2016-2020

## Employment

Jobs directly supported by mobile ecosystem in 2015

**750,000**



Plus an additional 1.1M indirect jobs supported in 2015

# 1 Industry overview

## 1.1 Unique subscriber penetration in line with global average

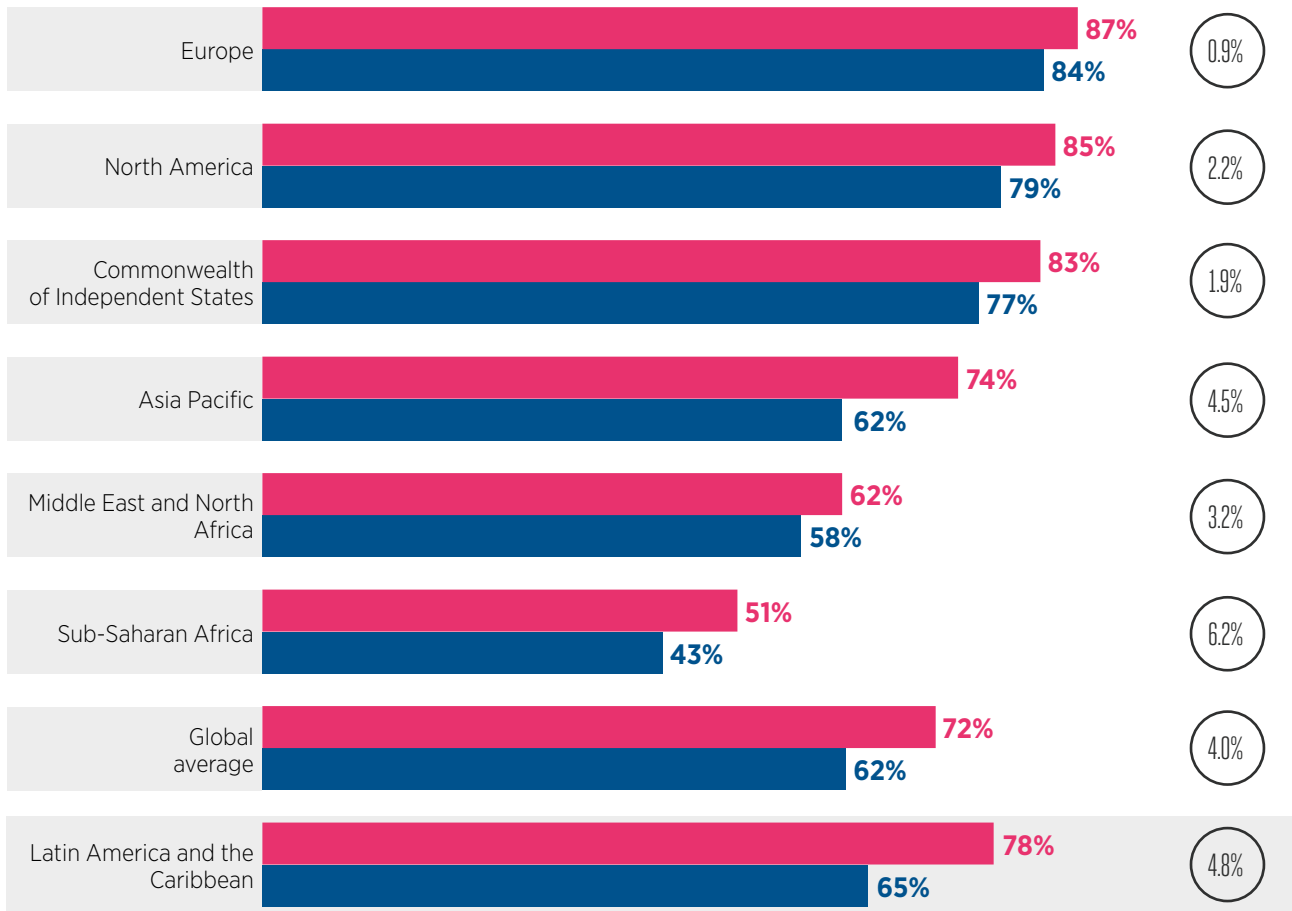
At 65%, unique mobile subscriber penetration in Latin America and the Caribbean stands slightly ahead of the global average (62%) and behind only more developed regions such as Europe and North America (with a developed market average of 84%). The region will grow more quickly for the remainder of the decade than any other region except Sub-Saharan Africa. Overall connections, excluding M2M, are projected to reach about 830 million by 2020, 22% growth from 2015.

Annual unique subscriber growth between 2015 and 2020 is forecast to be 4.8%, ahead of the 4.0% global average. By the end of the decade, unique subscriber penetration for the region as a whole will stand at 78%, closing the gap on the developed market average (88%).



Figure 2

### Unique subscriber penetration by region



Source: GSMA Intelligence

## 1.2 Strong growth in unique subscribers to come from large countries in region

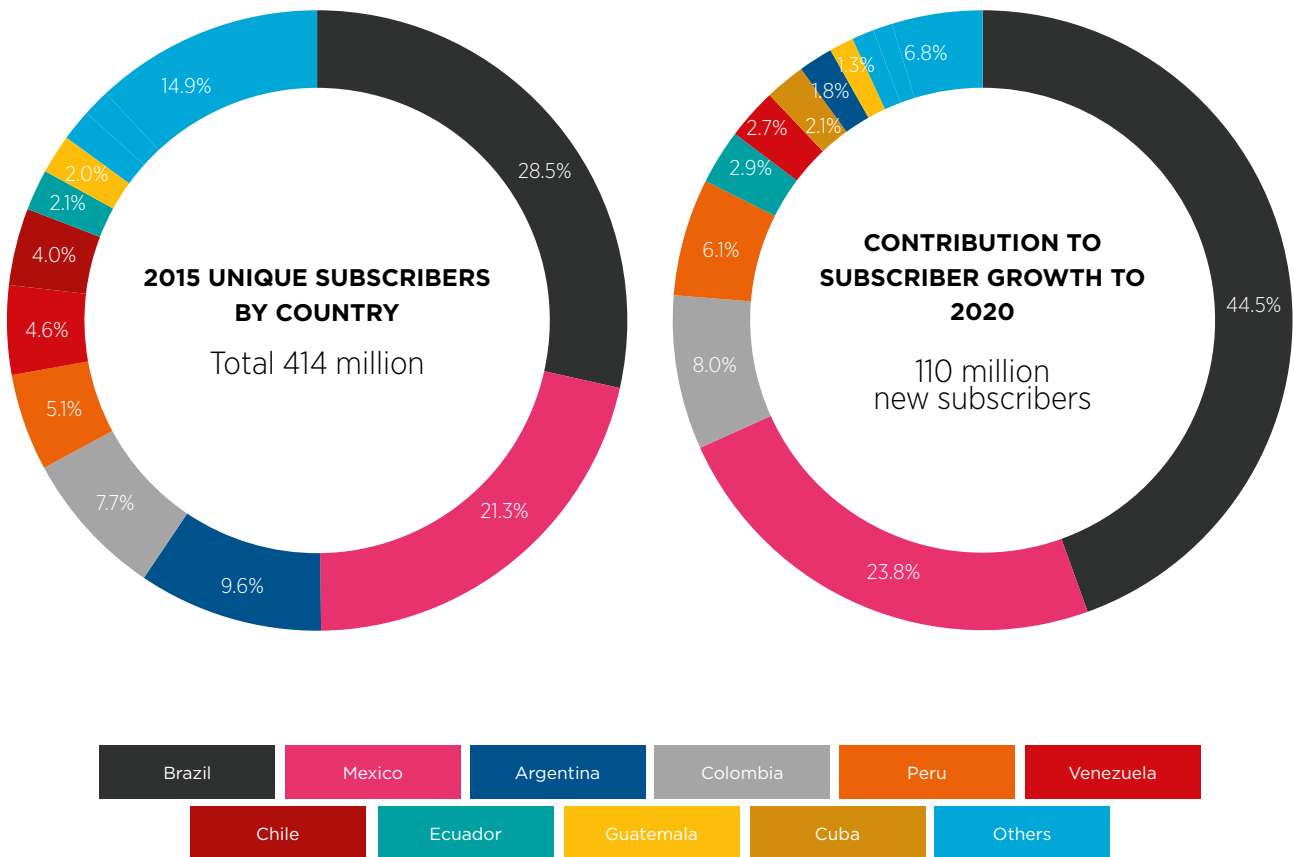
Latin America and the Caribbean is a more heterogeneous region than most others in terms of subscriber penetration. A number of countries have reached a level of maturity, with penetration rates around 90%, leaving little room for further growth in subscribers. This includes Argentina, Chile, Costa Rica, El Salvador, Nicaragua, Panama and Uruguay. In contrast to other regions, the countries at the higher end of the penetration scale include some of the region’s wealthiest (such as Chile) alongside

those with more widespread poverty (such as El Salvador and Nicaragua).

Nevertheless, overall regional unique subscriber growth will remain relatively strong to 2020 as many countries remain underpenetrated and will see healthy growth. This includes some of the largest countries in the region – namely, Brazil, Colombia, Mexico and Peru – all of which will end 2020 close to or above 80% penetrated.

Figure 3

### Unique subscribers by country and contribution to growth to 2020



Source: GSMA Intelligence

Table 1

## Connections (excluding M2M) and connections penetration rates

	Connections excluding M2M (millions)		Connections penetration	
	2015	2020	2015	2020
<b>Latin America and the Caribbean</b>	<b>682</b>	<b>829</b>	<b>107%</b>	<b>124%</b>
Argentina	63	70	144%	153%
Bolivia	10	12	96%	107%
Brazil	248	304	119%	140%
Chile	26	29	144%	151%
Colombia	51	62	105%	124%
Dominican Republic	9	10	83%	92%
Ecuador	13	18	81%	101%
Guatemala	17	20	104%	111%
Haiti	9	10	80%	92%
Honduras	8	10	99%	110%
Mexico	104	129	81%	96%
Paraguay	8	9	115%	126%
Peru	33	44	104%	131%
Venezuela	31	35	98%	106%

Source: GSMA Intelligence

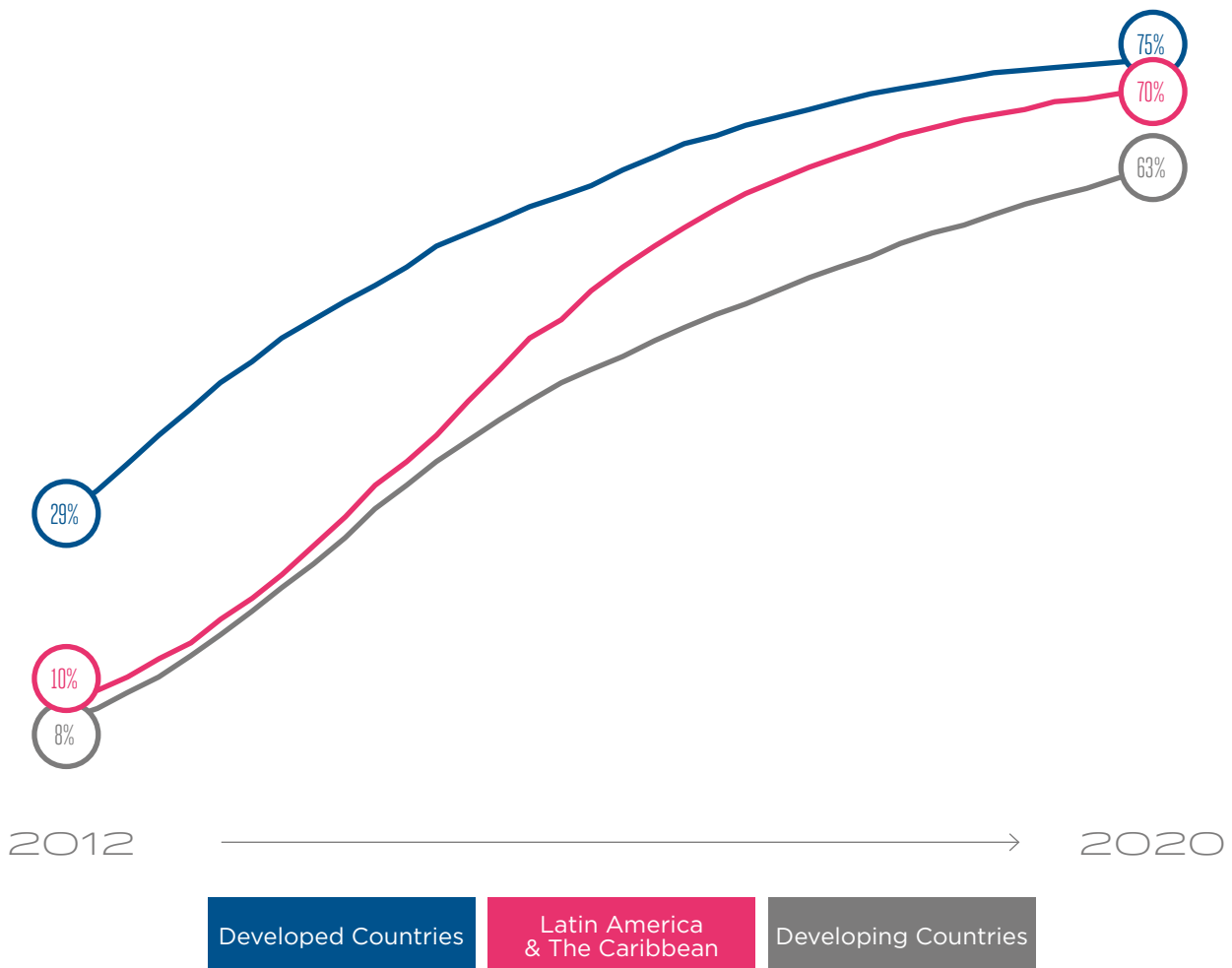
## 1.3 Smartphone adoption is increasing rapidly

At the regional level, smartphone adoption has risen from less than 10% in 2012 to just over 50% by July 2016, with Brazil at nearly two-thirds of total connections. By the end of the decade, the region will add around 260 million new smartphone connections from the end of 2015. By then, 70% of connections will be smartphones, with Brazil continuing to lead with adoption at nearly 80%.

Figure 4

### Smartphone adoption

(Percentage of connections, excluding M2M)



Source: GSMA Intelligence



By the end of the decade, the region will add around 260 million new smartphone connections

The sharp rise in smartphone adoption has been facilitated by the global fall in smartphone prices, with a growing range of mid- and low-end devices, subsidies by operators and greater credit available following the end of the global financial crisis. Crucially for those on the lowest incomes, sub-\$50 devices are now becoming a reality. Operators are also taking steps to improve the affordability of smartphones. For example, in Mexico entry-level smartphones are now available for less than \$100, while mobile operators (such as Telcel) and other players (such as Micel) offer finance deals to those with no credit history to help them buy smartphones.

In the short term, however, smartphones may become less affordable for the lower income segments, who are the least likely to own one. This is because many phone components, and virtually all fully assembled phones, are imported into the region. Many currencies, including the Argentine, Colombian and Mexican pesos and the Brazilian real, have depreciated by double-digit percentages in the past year, which will directly affect smartphone prices. In addition, the economic slowdown in the region, particularly in markets such as Brazil, will affect the affordability of smartphones and push consumers towards more low-end devices. Although Latin America has a large and fluid secondary handset market, this may also be affected by fewer handset upgrades than previously.

## 1.4 4G adoption beginning to accelerate but challenges remain

Mobile broadband coverage, in the form of 3G, breached the 90% of population level in 2015 across the region and continues to rise. 4G coverage, now at nearly 60% of the population, is rapidly expanding. It is set to reach 80% of the region's population, or some 520 million people, by 2017. There are now 64 live LTE networks across the region, up from 39 at the end of the first quarter of 2015.

This expansion in coverage, coupled with growing smartphone adoption, will encourage increasing 4G adoption, notwithstanding the currency challenges and economic climate in many countries in the short term. From only 2% of total connections at the end of 2014, the proportion has increased sharply to reach 11% by mid-2016. Operators across the region are increasingly focused on driving 4G adoption as they build out networks, focusing on the higher value subscribers that drive incremental data usage and revenue growth.

4G adoption is forecast to reach almost two-fifths of connections by 2020. However, this will still leave the region slightly behind the global average, and well behind the developed market figure of 65% by that date. The industry faces a range of challenges if it is to further close this gap and allow consumers to benefit from the widespread use of 4G networks and devices. For example, import restrictions in Ecuador limit the range of handsets available to consumers. The widespread imposition of import duties can lead to higher smartphone prices

overall, particularly given the general lack of local production value chains.

The release of appropriate spectrum can also boost 4G adoption in the region. For example, Argentina auctioned spectrum in the AWS band in October 2014. All three mobile operators acquired spectrum in the band. Just one year later, 4G connections reached 7% of total connections, from virtually zero at the end of 2014.

Governments in the region now recognise the importance of licensing new spectrum for mobile services. Since 2014, there have been 19 spectrum auctions in the region, focused on 4G bands – AWS (nine countries), 700 MHz (nine countries) and 2.6 GHz (one country).

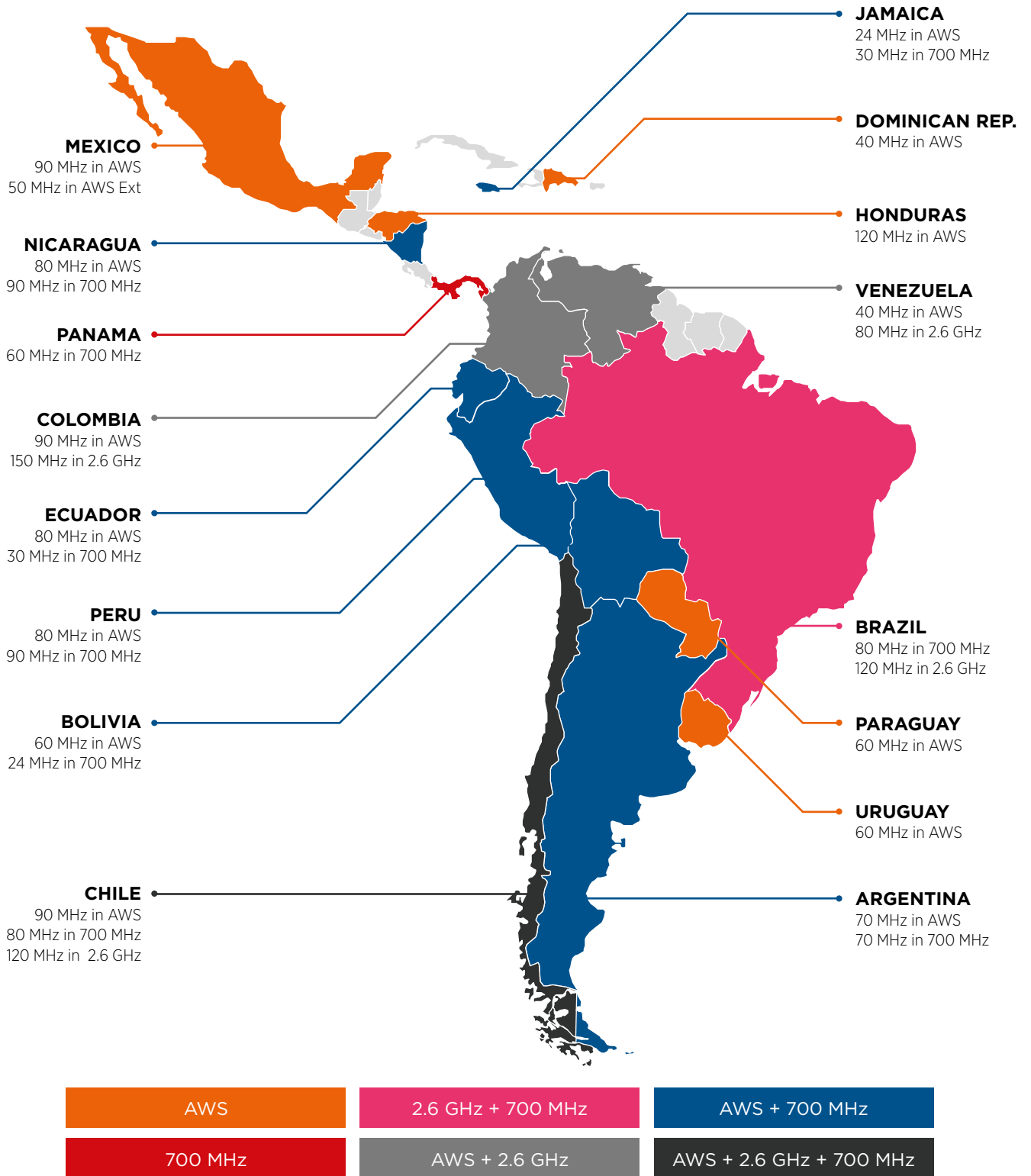
The overall situation of spectrum allocation for the mobile industry has improved in the region. Today's average country allocation of MHz stands at 303 MHz, 40% higher than in 2002. Central America is lagging behind; Guatemala, El Salvador, Costa Rica and Panama have still to license key 4G bands. Research by GSMA Intelligence has highlighted the challenges to 4G deployments in the region, which stem from the generally slow allocation of spectrum in the lower frequency 'coverage' bands, as well as the onerous coverage obligations that typically accompany spectrum awards.<sup>1</sup>

1. "Towards a sustainable approach for 4G deployment in Latin America", GSMA Intelligence, May 2015



Figure 5

### 4G spectrum allocation in Latin America



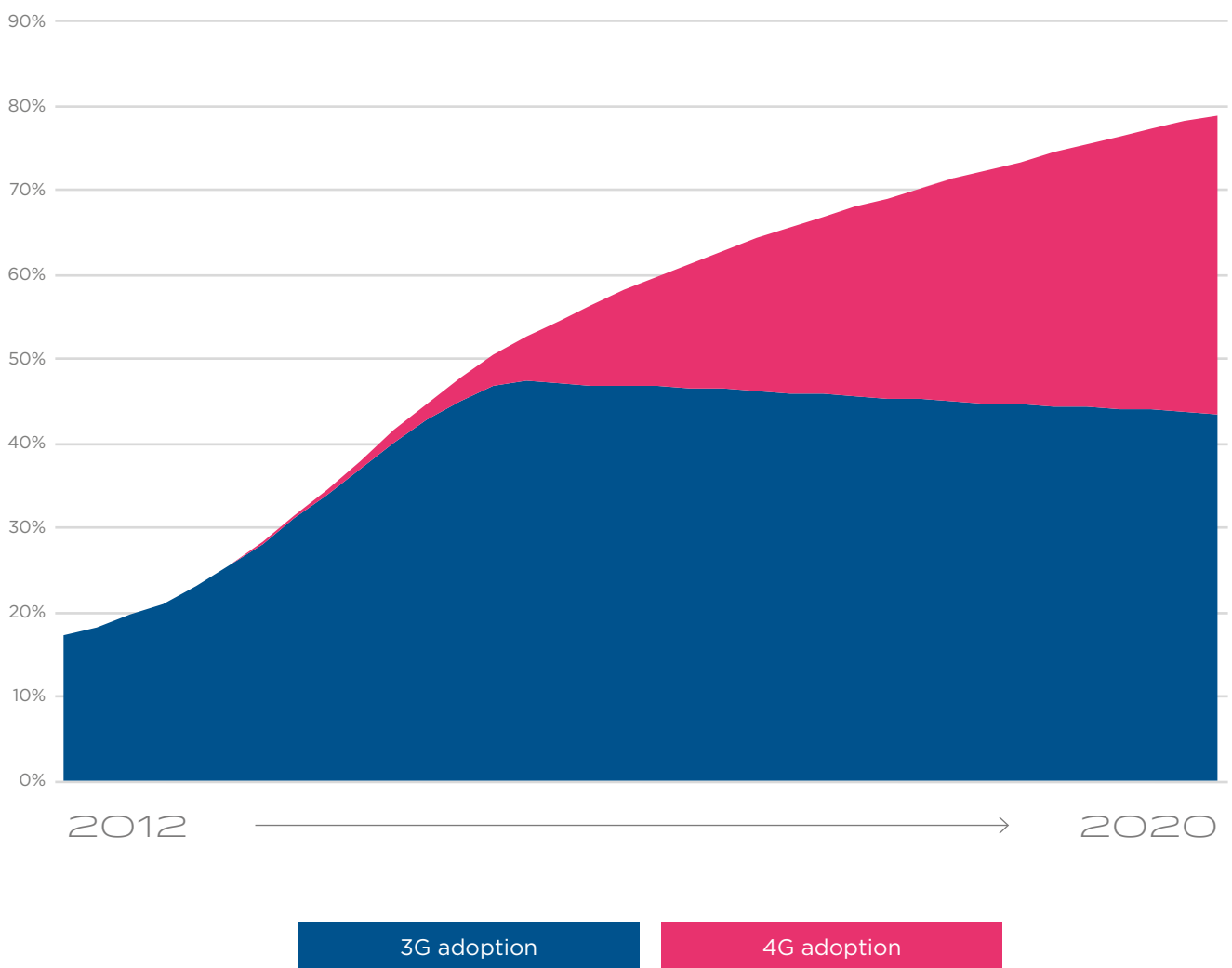
Source: GSMA Latin America, March 2016

As with smartphone adoption, Brazil leads in 4G adoption with a current rate approaching 20%, rising to nearly 50% by the end of 2020. Operators in Brazil have in recent years invested heavily in 4G network rollout and are increasingly focusing their commercial efforts on migrating users to 4G. New mobile plans are being offered to customers, with more data, unlimited calls and text messages, zero-rated access to social networks, and the ability to use these in other countries. The elimination of roaming charges between Mexico and the US and in Central America are also examples of such tariff changes.

Figure 6

## Mobile broadband adoption across Latin America and the Caribbean

Percentage of total connections



Source: GSMA Intelligence



# 1.5 Data traffic growth accelerating, helping offset declines in traditional messaging

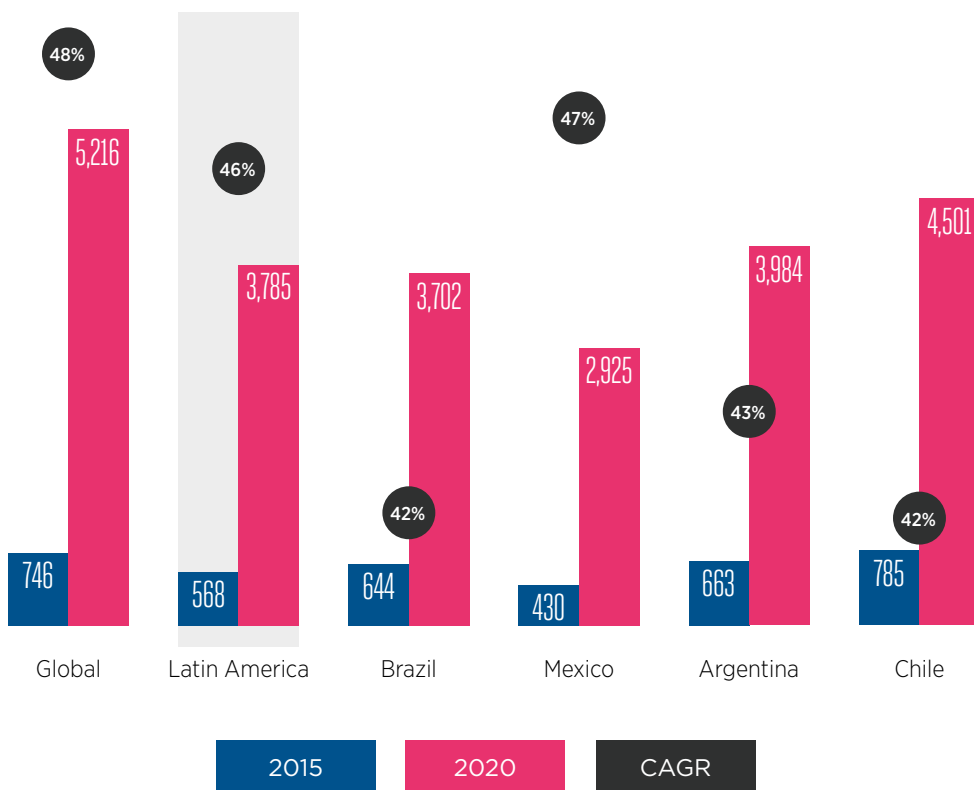
Cisco forecasts that mobile data traffic in the region will grow at a 50% annual rate from 2015 to 2020, slightly below the 53% global rate but more strongly than mature regions such as Western Europe and North America in the low 40s. Growth will be driven by migration to both smartphones and mobile broadband networks, with the move to 4G in particular likely to lead to an uplift in data consumption, mirroring the trends seen in other regions.

On a per-user basis, data traffic will grow from just over 0.5 GB per month in 2015 to nearly 4 GB in 2020, again growing slightly more slowly than the global average. Mexico, where Cisco estimates users generated only 0.4 GB of data traffic per month in 2015, is projected to grow faster than other major markets but not rapidly enough to catch up with other markets by 2020. These figures do not capture traffic carried over Wi-Fi networks nor smartphones used on Wi-Fi only, without a SIM card, which low-income groups may do.

Figure 7

## Mobile data growth

Data traffic per user (MB/month)



Source: Cisco



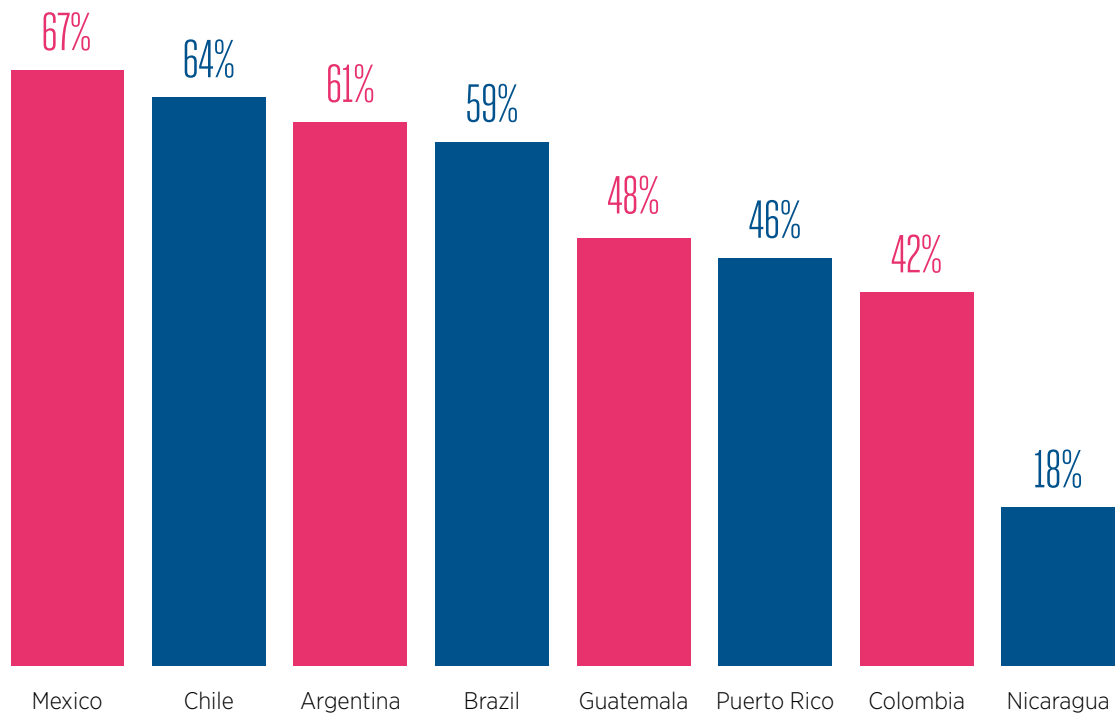
Over the past several years, use of IP messaging apps such as WhatsApp has become popular globally, and Latin America and the Caribbean is no exception. In our survey of 1,000 consumers in each of eight markets, mobile subscribers were asked if they used such apps at all and, if so, if they used them more than traditional SMS. In seven of the eight markets, a majority use messaging apps and in many, including Brazil and Mexico, respondents said they use the apps much more than SMS. Only

in Nicaragua did a minority report using these apps; this can be attributed to the smartphone adoption rate in the country of under one-third.

More so than in developed regions, the loss of messaging revenues is significant as a large majority – nearly 80% – of connections are on prepaid plans. Among the eight surveyed markets, only Puerto Rico has a minority on prepaid (28%); in the remaining seven, the percentage is at least 70%.

Figure 8

### Percentage of mobile subscribers who use IP messaging apps more than SMS



Source: GSMA Intelligence



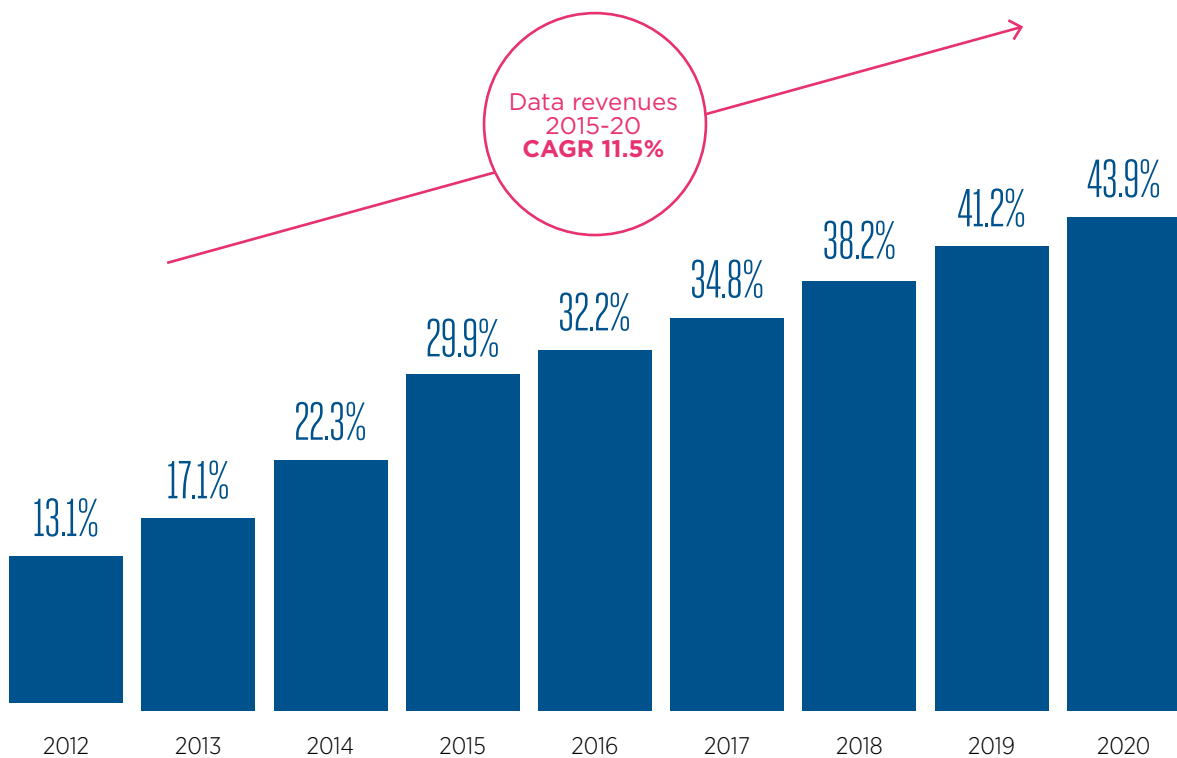
Declining traditional voice and messaging revenues highlight the need for operators to effectively monetise the growth in mobile data traffic. There are encouraging signs on this front. For example, Vivo in Brazil reported a 47% increase in data ARPU in 2015, as voice ARPU fell by 18%. This allowed the company to record an overall increase in ARPU for the year of 8%, despite the backdrop of a highly competitive mobile market and slowing economy. In the first quarter of 2016, Vivo reported that data volumes on its 4G network increased by 88%, well ahead of the

57% growth in the 4G connection base. Similarly, TIM in Brazil has reported that data traffic generated by 4G users was three times higher than that from 3G users, with the company expecting data to account for more than half of its total revenues by mid-2016.

For the region as a whole, data revenues are forecast to grow at an average annual rate of nearly 12% to 2020, with the proportion of service revenues generated by data increasing from 30% to nearly 45%.

Figure 9

### Data as a percentage of recurring revenues in Latin America and the Caribbean



Source: GSMA Intelligence

Operators in Latin America are experimenting with ways of cooperating and partnering to monetise the rise of IP messaging and social media apps as well as other online services such as Netflix and Spotify.

One option is zero rating, whereby subscribers are not charged nor is there any deduction from their data allowance for use of certain apps such as Wikipedia Zero or Facebook-backed Internet.org/Free Basics.<sup>2</sup> Zero rating gives new content providers an opportunity to compete with established content providers by bearing the costs of connectivity and leveraging the marketing, distribution and billing platform of the operators. Zero-rating is one commercial proposition among many in a competitive market and is generally aligned with the principles of the open internet. However, the commercial success of these practices is uncertain in a complex and competitive market.

An alternative strategy is to develop apps and a library of content organically. América Móvil provides an example here. By rolling out Rich Communication Services (RCS) across all its operators in the region, it will be able to better compete with WhatsApp and other messaging apps, while its Claro Video and Claro Música services position it to compete against the likes of Netflix, Spotify and Deezer for subscription and ad revenues.

A further option is to partner with the internet players, particularly in the areas of video and music content, where development of compelling alternatives requires significant investment and expertise. A recent example is Millicom’s partnership with Netflix, which will be rolled out across its seven Tigo operations in the region. The partnership utilises Millicom’s billing operations, importantly including prepaid subscribers, and the Netflix app will be pre-installed on any handsets bought through operator channels.

Figure 10

### Mobile operators’ commercial approaches to internet players



Source: Companies, GSMA

2. Free Basics has been launched in Barbados (Digicel), Bolivia (Viva), Colombia (Tigo), El Salvador (Digicel), Guatemala (Tigo), Jamaica (Digicel), Mexico (Telcel & Virgin), Panama (Digicel), Peru (Entel), Suriname (Digicel), and Trinidad and Tobago (Digicel).



The region is being buffeted by economic, regulatory and competitive pressures.

## 1.6 Revenue growth slowing due to economic, regulatory and competitive pressures

Having grown at an annual rate of 4.4% over the five years to 2015, driven mainly by rapidly rising subscriber penetration rates and a backdrop of strong economic growth, revenue growth in Latin America is now sharply slowing.

The recent slowdown in global economic growth (and particularly in China, which imports many commodities from Latin America) has had a negative impact on the region. This is causing a broad slowdown in economic growth and tipping some economies, including the largest, Brazil, into recession.

In several Latin American markets, regulators have imposed measures to reduce consumer costs, increase choice and create a more competitive market. Examples include the elimination of contract handset locks in Colombia and Mexico. In Mexico, Colombia and Ecuador, the dominance of América Móvil's national units has led to mechanisms to

reduce their power, such as asymmetric termination rates and, in Ecuador, a new tax based on market share of subscribers which ranges from 1% to 9% of revenues.

Meanwhile, many markets in Latin America are experiencing greater competitive pressures. Some markets have seen disruptive new entrants or revitalised/more competitive operators following a change of ownership; these include Wom in Chile, Bitel and Entel in Peru, Clarin in Argentina, Avantel and ETB in Colombia, and AT&T in Mexico. In the largest market, Brazil, competition remains intense following the failure of several consolidation attempts.



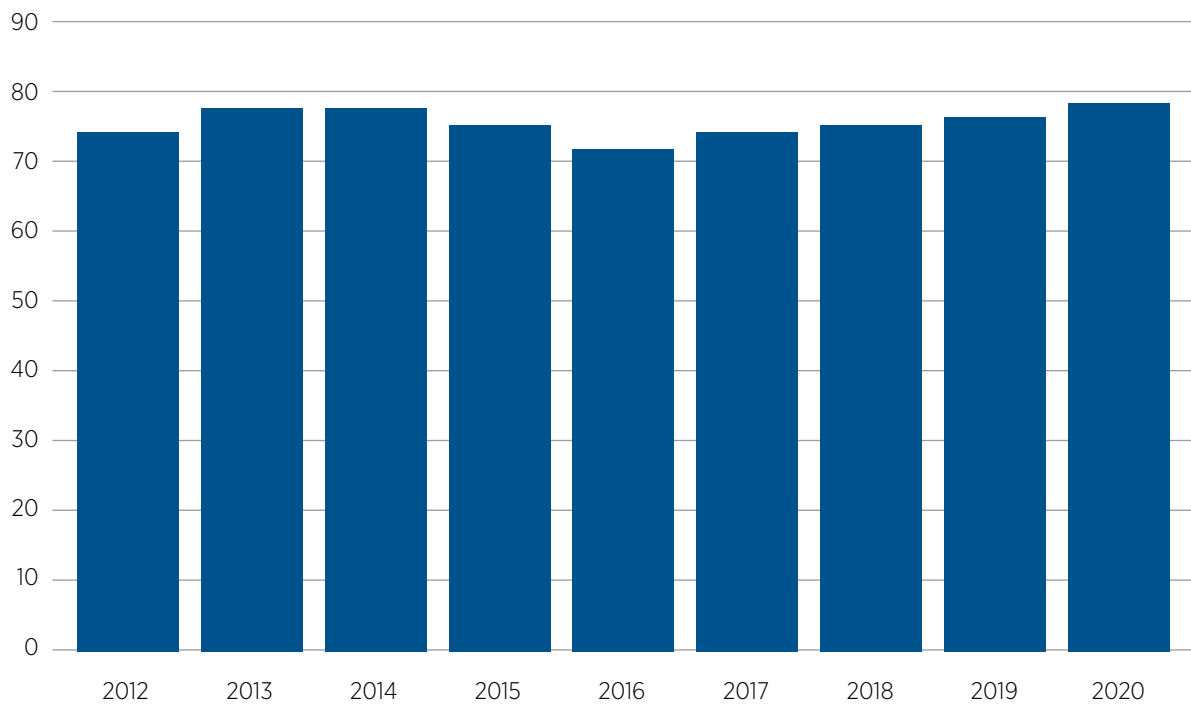
One measure of competition is the Herfindahl-Hirschman Index (HHI). An HHI of 10,000 indicates a monopoly, while a lower number indicates stronger competitive pressures. In all the major markets in Latin America, the index has fallen since 2010, often significantly – for example, by more than 20% in Colombia and Peru. HHI is projected to fall further in all the large markets between now and 2020, indicating greater competitive pressure. The one exception is Brazil, which will essentially remain unchanged for the rest of the decade but at the lowest (most competitive) HHI level of any major Latin American market.

The combination of slower economic growth, greater competitive pressures and increasing regulatory mandates focused mostly on traditional players has put ARPU levels under pressure. Across the region, ARPU declined by an average of 2.6% per year in dollar terms between 2010 and 2015. We forecast a further 2.8% annual decline over the period to 2020. With naturally slowing subscriber growth as markets mature, revenue growth will be slower in the coming years. Revenues (in US dollars) will grow by just under 1% per year to 2020, compared to more than 4% over the previous five years and global growth of nearly 2%.

Figure 11

## Revenue growth slowing in Latin America and the Caribbean

Mobile operator revenues, \$ billion



Source: GSMA Intelligence



## 1.7 Competition and economic slowdown take a bite out of margins

Economic and competitive pressures are also pulling down profitability. Across the region, operating (EBITDA) margins are projected to fall by more than three percentage points by 2020 from the 2015 level.

Although capital investments peaked in 2015, the need to expand and deepen mobile broadband coverage, particularly 4G, will keep capex relatively elevated at a level of about 20% of revenues. The depreciation of many currencies in the region is a further factor in keeping capex relatively high, as

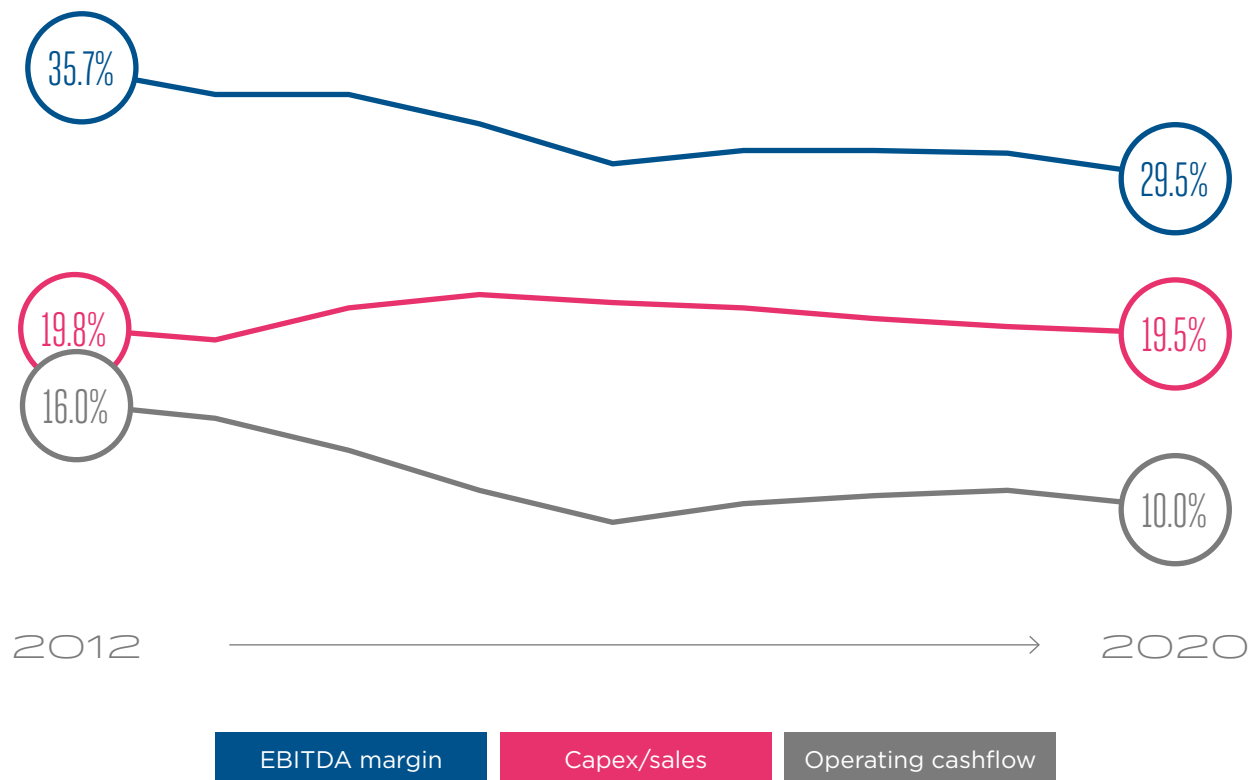
most telecoms equipment, such as smartphones, is imported.

Towards the end of the decade the level of investment will begin to fall, allowing operating cashflow (EBITDA minus capex) margins to stabilise and begin to rise slightly – though at a level of around 10% compared with 20% at the beginning of this decade.

Capex in the five years to 2020 will total more than \$76 billion, compared to \$74 billion in the five years to 2015.

Figure 12

### EBITDA and operating cashflow margins under pressure



Source: GSMA Intelligence

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# 2 Mobile as the platform for innovation across the region

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## 2.1 The mobile ecosystem is a significant contributor to economic growth

The mobile ecosystem consists of mobile network operators, infrastructure service providers, retailers and distributors of mobile products and services, handset manufacturers and mobile content, application and service providers. The direct economic contribution to GDP of these firms is estimated by measuring their value added to the economy, including employee compensation, business operating surplus and taxes.

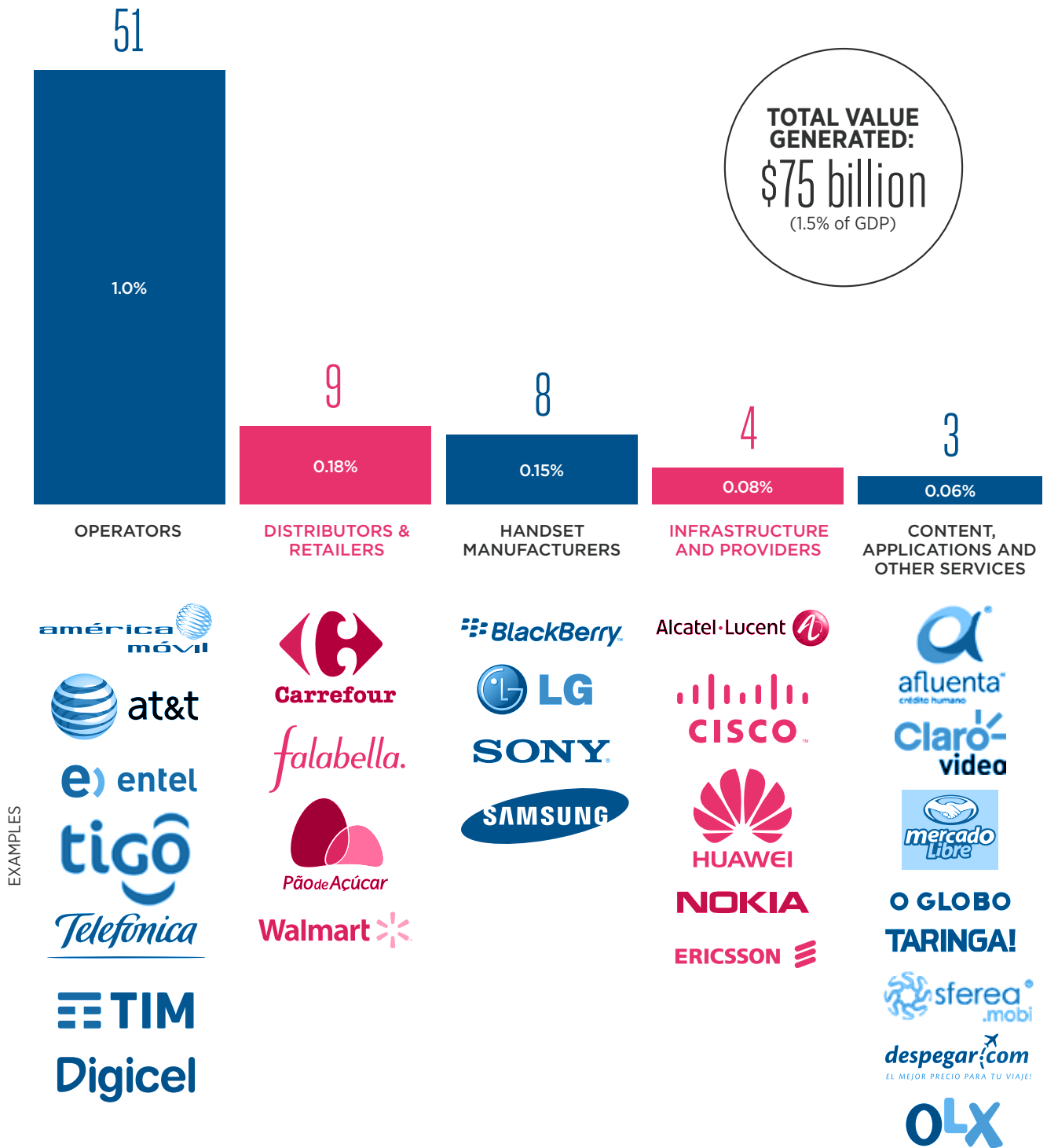
In 2015, the total value added generated by the mobile ecosystem was around \$75 billion (or 1.5% of GDP), with network operators accounting for two thirds of this.



Figure 13

## Direct GDP contribution of the mobile ecosystem

\$ billion, % 2015 GDP



Source: GSMA Intelligence

## 2.1.1 Indirect and productivity impacts of mobile technology

In addition to their direct economic contribution, firms in the mobile ecosystem purchase inputs from their providers in the supply chain. For example, handset manufacturers purchase inputs from microchip providers, and mobile content providers require services from the broader IT sector. Furthermore, some of the profits and earnings generated by the ecosystem are spent on other goods and services, stimulating economic activity in those sectors.

We estimate that in 2015, this additional economic activity generated a further \$21 billion in value add (or 0.4% of GDP) in the region.

The use of mobile technology also drives improvements in productivity and efficiency for workers and firms. There are three ways in which this takes effect:

- Use of basic mobile voice and text services, which allows workers and firms to communicate more efficiently and effectively (for example, by reducing unproductive travel time). Mobile subscriber penetration is currently around 70%.
- Use of 3G and 4G technology, which allows workers and firms to use mobile data and internet services. Access to information and services provides benefits in sectors such as agriculture, health, education and finance. The impact of mobile internet is particularly significant in Latin America, where fixed broadband penetration is relatively low. With mobile internet subscriber penetration ranging between 30% and 60% (with Central America and the Caribbean lagging behind), there is still a lot of room for productivity gains from mobile internet services.
- Adoption of the next generation of mobile services, in particular M2M and the Internet of Things. The impact of these is expected to be limited in Latin America over the next five years. In the longer term, however, these services are expected to drive significant benefits in the region by driving cost savings and efficiency gains in areas such as manufacturing, logistics and retail.

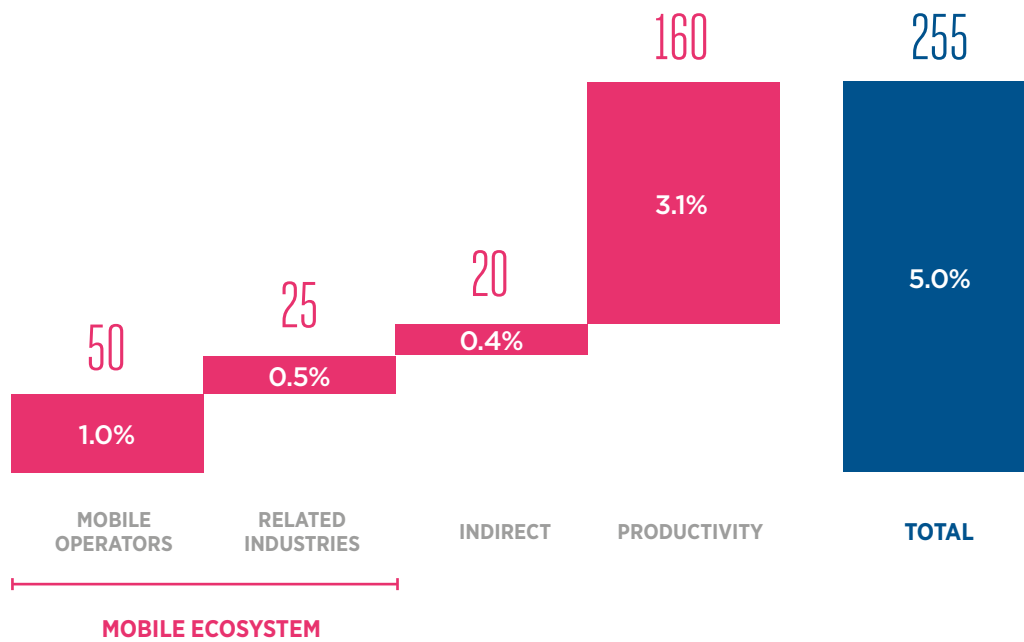
We estimate these productivity impacts generated around \$160 billion (or 3.1% of GDP) in 2015.

Overall, taking into account the direct, indirect and productivity impacts, in 2015 the mobile industry made a total contribution of approximately \$250 billion to Latin American economies in value-added terms, equivalent to 5% of the region's total GDP.

Figure 14

## Total (direct and indirect) contribution to GDP

\$ billion, 2015



Note: totals may not add up due to rounding  
Source: GSMA Intelligence

## 2.1.2 Employment provided by the mobile ecosystem across the region

In 2015 mobile operators and the ecosystem provided direct employment to more than 750,000 people in the region. In addition to this, economic activity in the ecosystem generates jobs in other sectors. Firms that provide goods and services as production inputs for the mobile ecosystem (for example microchips, transport services etc) will employ more individuals as a result of the demand generated by the mobile sector. Furthermore, the

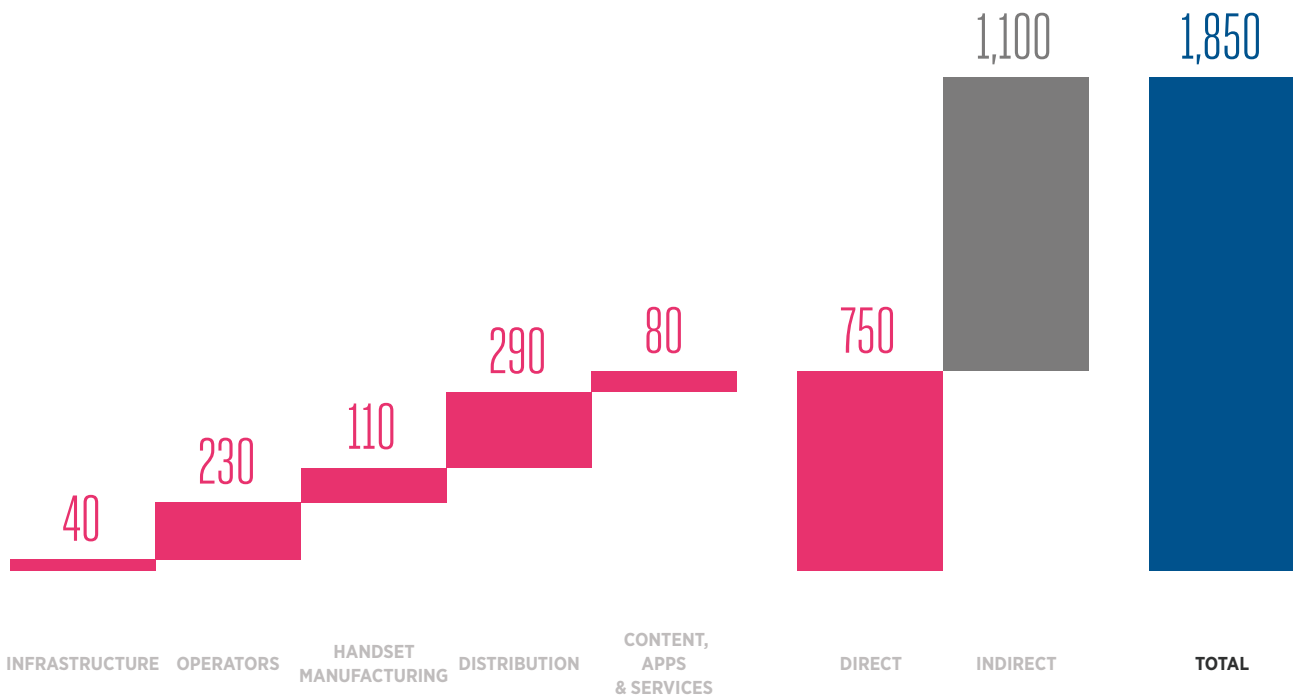
wages, public funding contributions and profits paid by the industry are spent in other sectors, which provide additional jobs.

We estimate that in 2015, around 1.1 million additional jobs were indirectly supported in this way, bringing the total impact (both direct and indirect) of the mobile industry to just under 1.9 million jobs.

Figure 15

### Employment impact

Jobs, thousands



Note: totals may not add up due to rounding  
 Source: GSMA Intelligence analysis

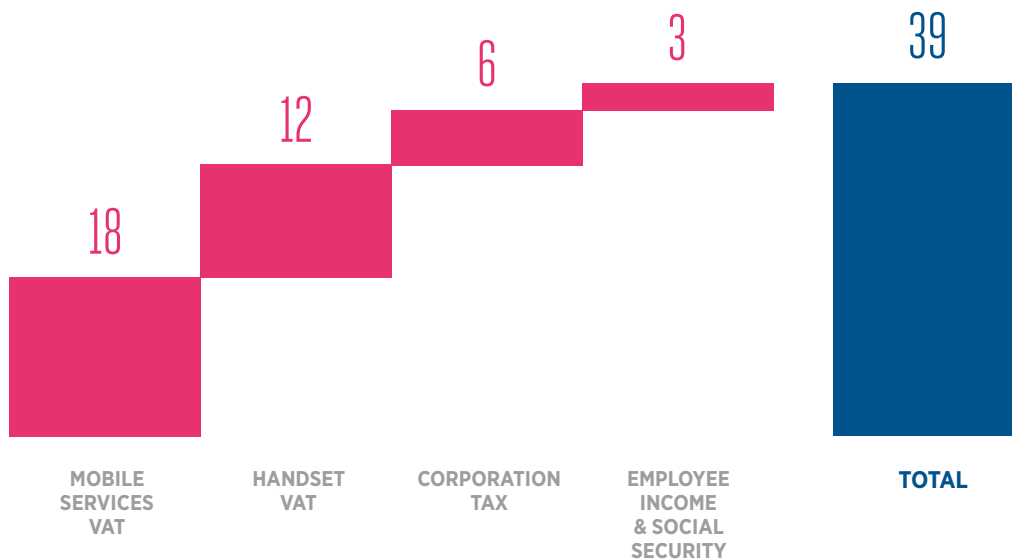
## 2.1.3 Public funding contribution

The mobile ecosystem also makes a significant contribution to the funding of public sector activity in the region through general taxation. For most countries, this includes value added tax, corporation tax, income tax and social security from the contributions of firms and employees. We estimate that the ecosystem made a tax contribution to the public finances of the region's governments of around \$40 billion in 2015.

Figure 16

### Contribution to public funding by the mobile industry

2015, \$ billion



Note: totals may not add up due to rounding  
Source: GSMA Intelligence

Mobile operators made further contributions to public finances through the payment of fees for the licences of spectrum bands, which are required for the deployment of mobile broadband services. In 2015, spectrum auctions in Ecuador, Brazil, Panama and Paraguay generated revenues of almost \$450 million. Mobile operators have spent \$12.8 billion on 4G spectrum since 2009.

## 2.1.4 Outlook and trends for the period 2015–2020

We forecast that the economic contribution of the mobile industry in Latin America will continue to increase in both relative and absolute terms. In value-added terms, we estimate that the ecosystem will generate \$315 billion by 2020 (5.5% of the region's GDP).

The majority of this increase will be driven by improved productivity, particularly from the

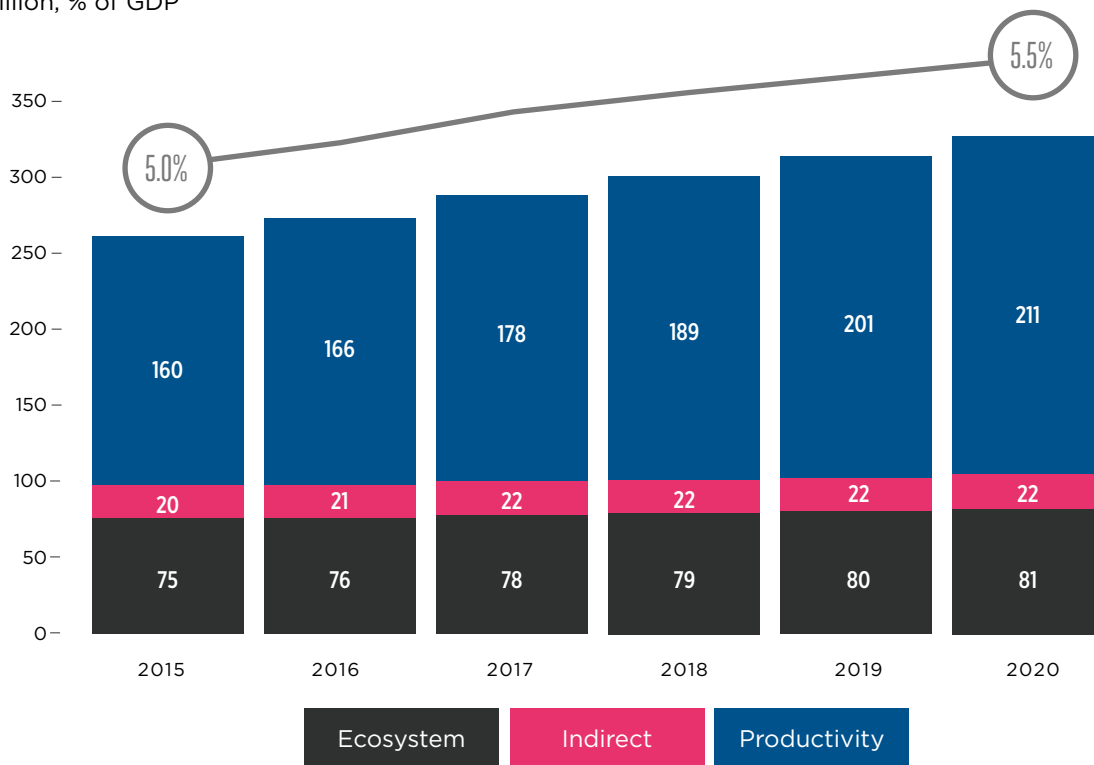
increasing adoption of mobile internet services. As mobile internet penetration expands throughout Latin America (especially in Central America and the Caribbean), its contribution to productivity will increase by more than \$50 billion.

Capital investments by operators in the five years to 2020 will total more than \$76 billion, compared to \$74 billion in the five years to 2015.

Figure 17

### Outlook to 2020

\$ billion, % of GDP



Source: GSMA Intelligence

The direct impact of the ecosystem will keep growing too, and the nature of its distribution will evolve. We expect Content and Services to claim a greater part of the total value added and total employment. This will occur as Latin American digital economies become more sophisticated due to improved mobile internet connectivity, labour skills and investment. Nevertheless, operators will continue to be the largest contributor.



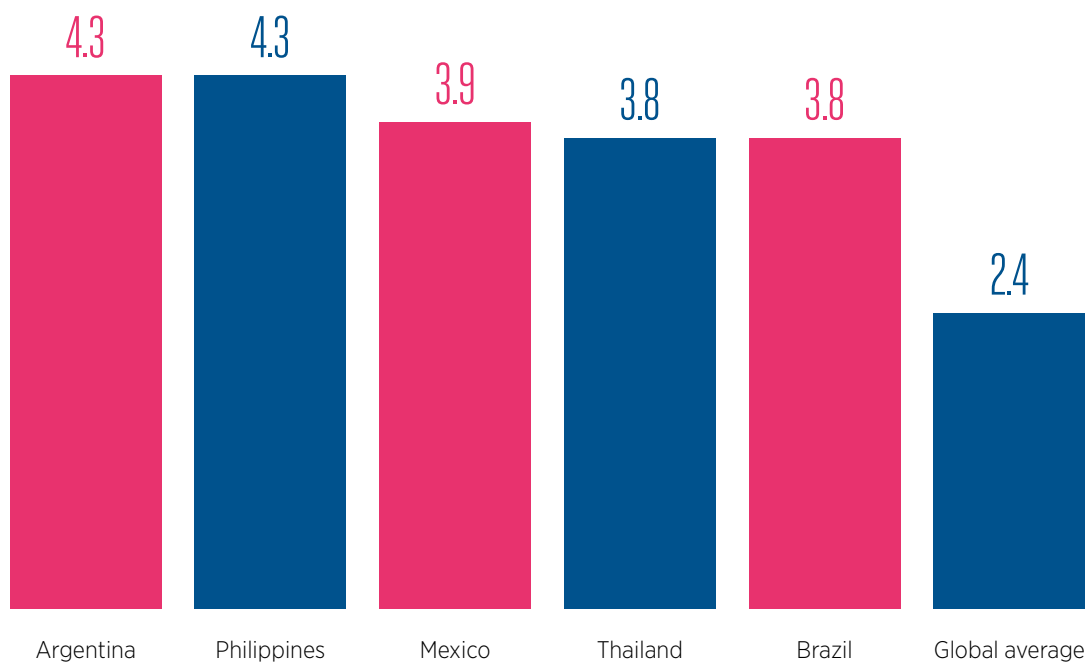
## 2.2 Growing digital ecosystem creates new growth opportunities

The rapid expansion of the mobile ecosystem in Latin America is creating new opportunities for growth and innovation. The region has some of the world's highest rates of social media usage, with the vast majority occurring over mobile networks. A recent survey of 30 countries around the world found that three of the top five markets for social media usage were in Latin America.

Figure 18

### Time spent on social media

Hours per day



Source: We Are Social

Latin America is also seeing the emergence of its own app economy, fuelled by the rise of smartphones and mobile internet access. Despite the presence of local developers and app stores, the region still struggles to compete with the dominant countries in North America, Europe and parts of Asia in what is a 'winner takes all' market. Data from App Annie shows that in 2014, Brazil ranked second globally for the number of downloads from Google Play. A study by Caribou Digital of local app developer markets found that Brazil was the highest ranked Latin American country in the survey but ranked 18th in the 37 countries studied.<sup>3</sup> This highlights the ongoing need for all ecosystem players to continue to collaborate and foster the growth of a vibrant local app economy.

As in other parts of the world, the shift of consumer engagement in Latin America to mobile devices is driving significant growth in areas such as mobile commerce and mobile advertising. Congestion and shortcomings in the offline service sector are further factors in the shift to online, given the high levels of urbanisation and strong population growth across the region. Total digital commerce in Latin America is forecast by eMarketer to double from its 2015 level to reach \$80 billion by 2020, with Brazil accounting for just under 40% of the total.

The growth in digital commerce is reflected in the emergence of regional players such as MercadoLibre, which operates in 12 countries in the region. It reported 43.7 million items sold through its platform in the second quarter of 2016 (up 45% year-on-year) and 31.9 million total payment transactions (up 76%). With the move to e-commerce, there is a clear shift to mobile, with the major online retailers improving their mobile platforms to improve the consumer experience and drive further growth in mobile commerce.

A recent report by GSMA Intelligence highlighted how mobile banking and payments are becoming increasingly common in Mexico.<sup>4</sup> Around half of all Mexican retail firms already sell online, while mobile accounts for 18% of total e-commerce sales (which are expected to grow at an annual rate of almost 25% over the next four years). Mobile is the

preferred method of banking and shopping for a greater proportion of people in Mexico (55%) than in any other country in Latin America, with forecasts from IE Market Research suggesting mobile payment transaction volumes in Mexico reached \$10.3 billion in 2015.

New mobile payment services are being launched in a number of markets:

- **Ourocard-e**, a partnership between mobile operator Oi, Visa and Bank of Brazil, enables users to make payments with an NFC phone at any of the 1.4 million contactless point-of sale (PoS) terminals in the country.
- **Samsung Pay** has recently been launched in Brazil in preparation for the Olympic Games, with the service then expected to be launched in other countries across Latin America. Samsung Pay can be used with existing PoS equipment, as well as contactless terminals.
- In February 2016, **PayPal** announced a partnership with **América Móvil** which will see PayPal's capabilities integrated into Telcel's mobile wallet services.
- **Transfer**, a joint venture between Telcel and Banamex and Inbursa banks launched in Mexico in 2011, offers deposits, cardless withdrawals from ATMs, person-to-person (P2P) transfers, prepaid top-ups and an optional companion card. By early 2016, there were around 5 million active Transfer accounts in Mexico, representing around 5% of the adult population.<sup>5</sup>

## Contactless point of sale



3. "App economy research shows how poorer countries are losing again", IDG Connect, March 2016

4. Country overview: Mexico, GSMA Intelligence, June 2016

5. Source: América Móvil

## 2.2.1 Growth of start-ups and venture-capital funding

Over recent years, the outlook for start-ups has improved significantly in Latin America. The policy mix is evolving to a range of more targeted tools (including direct government funding) and applied to a range of new players from across the digital ecosystem. Addressing the financing gap in the early stages of a start-up's development has been a particular focus. This has helped a number of innovation and tech hubs to develop across the region, supported by governments, universities and the private sector.

Venture-capital (VC) funding flows into Latin America have increased sharply over recent years,

even if overall funding for the region is still dwarfed by that into North America, Europe and Asia Pacific. Brazil is the most significant market in the region, attracting just under half of total investment. Local start-up association ABStartups reports there are currently nearly 5,000 start-ups in Brazil, a figure that has increased by 30% in just the past year. A separate study by innovator association Anprotec and think-tank Fundação Getúlio Vargas found that incubators' start-ups generate BRL15 billion (\$4.6 billion) in combined revenues, and employ more than 53,000 people directly, with a further 370,000 indirectly.<sup>6</sup>

Table 2

### Venture-capital funding into key markets in Latin America, 2014–2015

	VC funding (\$m)	Deal volume	Average deal size (\$m)	Share of regional VC investment	Share of regional mobile subscribers
<b>Brazil</b>	2,231	156	14	45%	35%
<b>Mexico</b>	1,722	47	37	34%	21%
<b>Colombia</b>	457	16	29	9%	8%
<b>Chile</b>	128	15	9	3%	4%
<b>Argentina</b>	380	31	12	8%	9%

Source: CB Insights, GSMA Intelligence

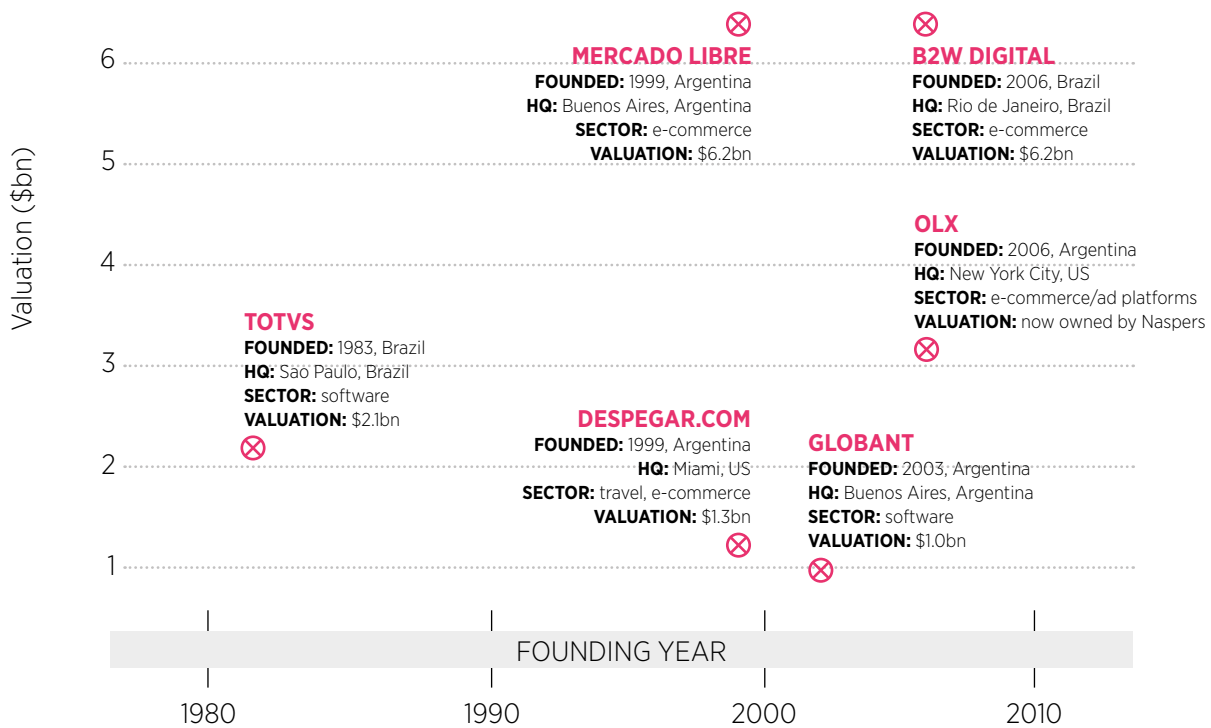
6. "Spotlight: Brazil's incubator scene", BNamericas, July 2016

A majority of the VC funding into the region has gone into the internet and mobile sectors, as the digital start-up space in the region begins to scale on the back of a growing and more varied digital ecosystem. Rising levels of mobile broadband coverage and smartphone adoption, with the increasingly ubiquitous adoption of social media, are creating a fertile environment for digital entrepreneurs.

Latin America cannot compete with the US or Asia Pacific in terms of number of unicorns (CB Insights lists 160 unicorns according to their latest valuations, of which almost 100 are in the US). However, six unicorns have emerged over recent years, four of which originated in Argentina. These companies operate in a range of sectors including online marketplaces, classified marketplaces, software and online travel services.

Figure 19

## Unicorns in Latin America - the Argentina effect



Source: NXT Labs, company websites



Rising levels of mobile broadband coverage and smartphone adoption, with the increasingly ubiquitous adoption of social media, are creating a fertile environment for digital entrepreneurs.

There is a larger group of rapidly growing companies in Latin America with valuations below the \$1 billion threshold, with a report claiming around 17 pure internet/software companies with valuations above \$250 million<sup>7</sup>, suggesting a clear increase in the pace of innovation and the rate at which start-ups scale. In addition, numerous companies have received significant investments over recent months, including the following:

- 
- Movable, a Brazil-based mobile commerce platform, raised \$40 million in June 2016 from Naspers. Over the last three years, Movable has invested more than \$100 million in building a range of mobile commerce apps and services across the delivery, logistics and streaming media markets.
  - Kueski, an online short-term micro-loan service based in Guadalajara, attracted VC funding of more than \$35 million in 2016, the largest capital funding for a fintech start-up in Mexico to date.

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7. "Producing Unicorns In The Land Of Fútbol, Samba And El Dorado", TechCrunch, June 2015

## The role of governments

Governments have launched several initiatives to support start-ups and entrepreneurs in the region. Chile was the first country to launch a formal accelerator programme, and was followed by Brazil, Mexico and Colombia. Such programmes aim to attract international entrepreneurs to the home country, offering equity funding, visas and practical support. Governments have also taken steps to promote more entrepreneurial cultures and to simplify the legal framework for start-ups.

**Start-up Chile** is a government-funded start-up accelerator that provides funding and other forms of support for new companies. One hundred start-ups from around the world are chosen each round for a six-month programme. Over 12,000 start-ups have graduated from the programme. To encourage companies to stay in Chile, a follow-up fund (SCALE) was created and awards \$100,000 to selected start-ups on the basis that they incorporate in Chile and assume operations there. Start-up Chile has been recognised as the leading accelerator in Latin America in terms of total cash invested.<sup>8</sup>

The Buenos Aires City government launched **Programa Aceleradoras Buenos Aires Emprende** in 2014, investing ARS28 million (\$3.5 million) in its first year to support entrepreneurs. Of this, ARS18 million (\$2.3 million) went to local accelerators for direct investment in 13 start-up projects in Buenos Aires.<sup>9</sup>

The Mexican government created the **Instituto Nacional del Emprendedor (INADEM)** in 2013 with the goal of organising all the public funding for start-ups and small and medium-sized businesses. In 2014, around \$658 million was distributed to an estimated 620,000 entrepreneurs, micro, small, and medium sized businesses, leading to the creation of 6,000 new companies and 73,000 new jobs. INADEM supports various accelerators and incubators throughout Mexico, primarily in three locations: Mexico City (the capital and largest city), Guadalajara (the second largest city and a major tech hub home to offices of major global companies such as General Electric, IBM, Intel and Oracle) and Monterrey (an important commercial centre given its proximity to the US border).

However, despite the progress to date, there are clearly still challenges to be addressed if the potential of mobile as a platform for innovation is to be fully realised. Issues include a funding gap when it comes to securing larger funds to allow companies to grow, in large part a reflection of the relative

immaturity and modest size of the VC funds in the region. The involvement of the entire mobile value chain is key to allowing further tech innovation and enabling Latin America to realise the full potential of the digital economy.

8. Latam Accelerator Report 2015, Gust, 2015

9. Argentina: The Road to the App Economy, Progressive Policy Institute, May 2016

## 2.3 Building digital societies: smart cities and the Internet of Things

The Internet of Things (IoT)/machine-to-machine (M2M) space in Latin America is at a nascent stage of development, and Latin America is one of the smallest regions globally for IoT, representing only about 4% of global revenues. However, there are encouraging signs of development.

Guadalajara, the second largest city in Mexico, was selected by the IEEE in 2013 to become the first city in the country to become a smart city, with rollout in March 2014. City and national government leaders are keen that Guadalajara, home to the University of Guadalajara with 100,000 undergraduates, becomes a testing ground for new technologies to develop both best practices for national use and technological brainpower. In addition to the usual focus areas for a smart city (water, energy, transport, etc.), Guadalajara has created the Ciudad Creativa Digital (CCD), or Creative Digital City, initiative with the goal of becoming a regional and global centre for digital media.

A smart city initiative is now planned for Mexico City, a massive undertaking for the largest urban area in the region and the whole of the Americas. The electric utility CFE in Mexico, which is state owned, is also planning to replace 9 million meters with an M2M solution.

Elsewhere, in Brazil, Huawei and Pontifical Catholic University of Rio Grande do Sul (PUCRS) have recently inaugurated the Smart City Innovation Center in the southern city of Porto Alegre. The centre will test and prove concepts that help stakeholders create solutions for the areas of public management, health and education as well as the development of an operating system for smart cities and their applications.

Among operators, Telefónica is the most active in the IoT/M2M space in the region. In early 2014, Telefónica launched Smart M2M, a connectivity management platform, developed in-house, in Argentina, Chile and Mexico. A year later, it extended its M2M Global Partner Programme to Latin America. Launched first in Peru and Mexico, this programme aims to create an IoT ecosystem by encouraging partnerships between all players in the IoT value chain.

Telefónica's Brazilian subsidiary, Vivo, was selected by public utility Eletrobras to provide M2M connectivity for a smart grid and metering project in Brazil in 2015. It also launched an IoT platform (Vivo M2M Control Center Platform) in partnership with Jasper for global corporate clients in Brazil.

In late 2016, Telefónica, in partnership with Huawei, will launch the first smart home solution in the region, using Huawei's cloud-based platform and offering a jointly designed user experience.

IoT startup Sigfox and WND, launched to extend Sigfox's network across Latin America, have announced they have begun deploying Sigfox's dedicated IoT network throughout Brazil, starting with Rio de Janeiro and São Paulo, to be followed by Mexico City. However, Sigfox lacks certain characteristics that low power wide area (LPWA) networks have – namely, 3GPP standards, global coverage, security and scalability.

Figure 20

## Selected data on potential socioeconomic benefits in Latin America

**\$8.4 billion**

IoT will reduce healthcare costs in Mexico by \$8.4 billion

PWC

Brazil

**28.4 million**

Mexico

**15.5 million**

Healthcare services could reach an additional 28.4 million people in Brazil and 15.5 million people in Mexico in 2017

PWC

**19%**

The implementation of an integrated security hub as part of a smart city initiative in the city of São Jose dos Campos helped reduce the local murder rate by 19% over a three-year period

In Compliance

**\$860 billion**

\$860 billion value at stake in the private and public sectors in Latin America over the next decade

Cisco

**25%**

IoT will reduce the time to respond to traffic accidents by 25%

Rio de Janeiro municipality

**20%**

Smart meters will reduce losses due to energy theft by 20%

AMPLA

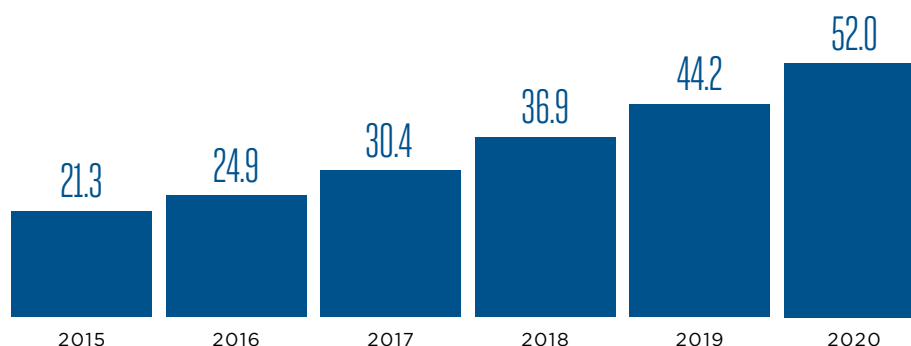
Source: PwC, In Compliance, Cisco, Municipality of Rio de Janeiro, AMPLA



Figure 21

## Cellular M2M connections in Latin America and the Caribbean

Millions



Source: GSMA Intelligence

## 2.4 Operators' role in advanced network deployments

Operators in the region are increasingly deploying advanced network services as their 4G networks achieve critical mass in terms of coverage and they look to fight back against asymmetric competition such as from WhatsApp.

Voice over LTE (VoLTE) offers many benefits for both subscribers and operators. For subscribers, benefits include a more reliable service, an extremely clear calling experience with rapid connection time, and an extension of battery life by 40% compared to VoIP. For operators, benefits include more efficient use of spectrum and elimination of the need to have voice on one network and data on another. The largest regional operators, América Móvil and Telefónica, have deployed VoLTE in many of their countries; América Móvil in Brazil, Colombia, Mexico and Peru, and Telefónica in Argentina, Chile, Colombia and Peru, with further deployments by both expected in the coming years. Other operators that have deployed VoLTE include TIM Brasil, Avantel in Colombia, VNT in Ecuador and Digitel in Venezuela. However, presently only Peru has a commercially launched VoLTE network.

Telefónica's efforts in Peru are worth highlighting. Working with Chinese vendor ZTE, it is constructing the region's first unified fixed-mobile convergent

IMS VoLTE network. Telefónica began with a fixed IMS network construction in 2015, and, following its success, decided to launch the converged version to give it an advantage in mobile internet. Telefónica says the biggest challenge was to implement a landline network IMS deployment capable of integrating with legacy characteristics, such as TDM switches, PSTN/ISDN services and POTS. Therefore, it opted to create an all-new HD voice network that ensures compatibility with interactive calling services such as VPN, call collect or voicemail.

Rich Communications Services (RCS) is an IP-based service that allows subscribers to take fuller advantage of the capabilities of smartphones and advanced networks. This includes instant messaging and chat, live video and sharing files across devices on any network. América Móvil has deployed RCS in all of its subsidiaries in the region, and most have been commercially launched, which may help to ameliorate the loss of voice and SMS revenues to internet players. Moreover, Google, whose Android operating system is used by the vast majority of smartphones in the region, is collaborating with operators on RCS-based messaging known as Jibe Mobile.



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## Mobile Connect

Mobile Connect is the global, mobile industry-led, single log-in solution that delivers secure consumer access to websites and apps. It uses the consumer's unique mobile number to verify and grant online access anywhere the user sees the Mobile Connect logo. Mobile Connect can play a significant role in driving growth within digital economies, and is experiencing early traction in highly populated developing regions, including in Latin America.

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Mobile Connect provides clear advantages to consumers, such as eliminating the ever-increasing number of passwords needed to securely maintain online identities, and giving consumers control over their data, helping them interact online with confidence. Mobile Connect can reduce the risk of fraud for service providers when users access their services, and can reduce the number of abandoned online transactions. Issues such as identity theft are a particular challenge in Latin America, with losses from cyber-crime in countries such as Brazil and Argentina entailing billions of dollars of losses.

The Mobile Connect solution is already available to more than 2.8 billion consumers globally, including all the major markets in Latin America. Although initially focused on secure and convenient log-in to digital services, Mobile Connect is evolving to deliver secure authorisation of digital transactions and

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to add context and attributes about the user and the transaction to increase convenience, trust and security for users and online service providers, while respecting users' privacy.

Regional mobile operators such as Telefónica and América Móvil are leading the way with enabling Mobile Connect across their footprints, with the service already enabled in markets such as Argentina, Mexico and Peru. Other countries such as Colombia will come next, expanding Mobile Connect availability in Latin America and positioning this region as one of the pioneers in the world. Telefónica in Argentina, Mexico and Peru as well as América Móvil in Mexico are already using Mobile Connect to allow users to verify their identities to access customer services through the companies' self-care portals.

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# 3 Mobile's role in addressing social challenges in Latin America and the Caribbean

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## 3.1 Mobile boosting digital inclusion for the previously unconnected

Latin America has seen rapid growth in the number of mobile internet subscribers over recent years, with a total of over 300 million, an increase from less than 200 million at the start of 2012. Of these subscribers, more than two-thirds connect to the internet via high-speed mobile broadband (3G or 4G) networks. As the importance of digital access and engagement increases, so this figure will continue to grow strongly, to reach close to 450 million by 2020.



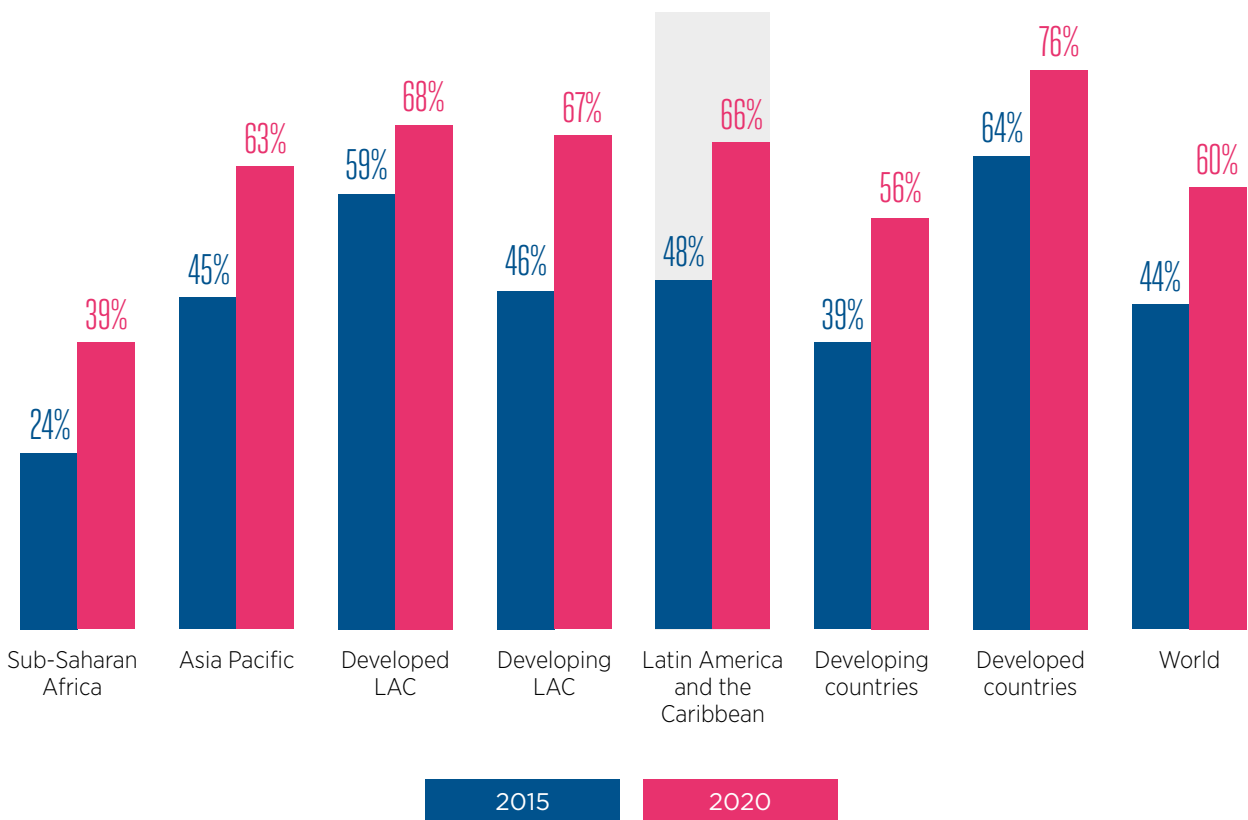
Despite the growth to date, only around half of the population currently have a mobile internet subscription, well below the developed market average of around 60%, although some lower-income groups may connect using Wi-Fi only. As a result, more than 300 million people are digitally excluded and unable to enjoy the socioeconomic benefits that mobile internet can bring. By 2020, two-thirds of the population will be connected, still well behind the developed market average. More than 200 million people across the region will still be digitally excluded. There remain significant barriers to adoption, particularly for underserved population groups (rural, women, low income and youth).

Mobile internet penetration also varies significantly across the region. Chile has the highest penetration as at the end of 2015, with two-thirds of the

country’s population having a mobile internet subscription, and a number of other countries are in the 60% range. In contrast, a number of smaller Caribbean Islands, as well as countries such as Guyana and Guatemala, have mobile internet penetration rates of 20–30% (Cuba has among the lowest levels of mobile internet penetration globally, at 2% of the population). In a similar way to overall unique subscriber penetration and other metrics highlighted earlier, there is not as large a difference between developed countries (in Latin America and the Caribbean, the World Bank classifies these as Argentina, Chile, Puerto Rico, Uruguay and Venezuela as well as many small Caribbean markets) and developing countries as one might expect. Brazil, for example, is classed as developing but has an internet penetration rate only slightly below the regional developed average.

Figure 22

### Mobile internet subscriber penetration



Source: GSMA Intelligence

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**Digital inclusion** – defined here as the expansion of global connectivity and mobile internet adoption – can extend various economic and social benefits to previously unconnected populations, fuelling a virtuous circle that reduces poverty, improves infrastructure and services, and further increases internet access and usage. By extension, unconnected and underserved communities risk falling further behind, widening the digital divide, if the barriers to digital inclusion remain unaddressed.

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



**Network coverage:** expanding the commercially sustainable coverage of mobile broadband networks to underserved population groups (typically in rural or remote communities) by promoting infrastructure sharing, regulatory best practice and technical innovation.



**Affordability:** addressing key issues such as mobile-specific taxation to help make internet access more affordable, especially for citizens at the bottom of the pyramid.



**Digital skills and awareness:** providing the Mobile Internet Skills Training Toolkit (MISTT) for practitioners to use with their audiences, so people understand the benefits and opportunities of being online and have the skills to use the mobile internet.<sup>10</sup>



**Locally relevant content:** encouraging and promoting the development of content and services that are relevant to underserved population groups. Particularly for lower income users, the priority should be that content proves its relevance by improving productivity and well-being as opposed to focusing primarily on entertainment or social media.

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10. See Mobile Internet Skills Training Toolkit, GSMA



### 3.1.1 Highlighting the key barriers to digital inclusion in Latin America

A recent report by GSMA Intelligence<sup>11</sup> highlighted the fact that more than 360 million people across Latin America could subscribe to mobile broadband services as they had coverage but currently do not do so. Over 90% of the population in the region is covered by 3G networks, well ahead of the global average. To further understand why the uptake of mobile internet services in the region lags their availability, the report analysed the results of the GSMA Intelligence Consumer Survey 2015. This survey covered 54 countries from across the globe, including eight countries in Latin America. Among the key findings in the survey from the 8,000 respondents in Latin America were the following:

- Around 30% of respondents had never used the internet on any device.
- The two biggest barriers identified by non-users were a lack of relevant local content and lack of digital skills.
- Affordability was also a significant barrier in several markets, partly a reflection of the high levels of income inequality in the region.
- In contrast, the coverage gap in the region is relatively small, with only 10% of the population in the region living outside of a mobile broadband network. (In Africa, the figure is closer to 40%.)

11. Digital inclusion in Latin America and the Caribbean, GSMA Intelligence, February 2016

Table 3

### Lack of relevant, local content and digital literacy & skills among top reasons for non-users

Barrier	Lack of locally relevant content	Lack of digital literacy and skills	Affordability barrier	Lack of network coverage	Security and trust barrier	Other
Argentina	72%	19%	18%	2%	4%	11%
Brazil	47%	41%	37%	2%	10%	19%
Chile	37%	47%	18%	1%	4%	9%
Colombia	49%	46%	49%	19%	19%	25%
Mexico	51%	33%	43%	9%	7%	6%
Guatemala	57%	38%	14%	3%	5%	6%
Nicaragua	31%	58%	23%	6%	3%	7%
Puerto Rico	68%	18%	33%	2%	6%	10%



Note: Survey conducted in 54 countries. The sample for Latin America and the Caribbean covered eight countries and 8,000 respondents  
 Source: GSMA Intelligence Consumer Survey 2015

Addressing these barriers and the issue of digital inclusion in Latin America will require collaboration and action from players across the mobile ecosystem, with mobile operators and governments playing important roles. Mobile is already the primary technology for accessing the internet in the region, highlighting the central role of mobile networks in improving internet access.

Mobile operators can provide local talent with opportunities to incubate and scale start-ups and innovations, opening up their APIs to developers or investing directly in local companies. Operators can also leverage their distribution networks to partner with governments and other developmental organisations to increase digital literacy and awareness among non-users.



## Governments and mobile operators have a role to play



### Governments

Providing funding and support to promote ICT usage and learning in schools

Promoting local tech innovations and start-ups

Providing locally relevant content via e-government services

Lowering mobile-specific taxation



### Mobile operators

Collaborating with government and other organisations to promote digital literacy and awareness

Offering flexible pricing plans to make them affordable for those at the bottom of the pyramid

Providing opportunities to startups and innovators by helping them incubate and scale

### 3.1.2 Locally relevant content

Content is more relevant when it is created in local languages, rather than simply translated. The lack of locally relevant content in Latin America is surprising, given that the region is less linguistically fragmented than other parts of the world. The region is dominated by two languages, Spanish (67%, around 400 million) and Portuguese (33%, over 200 million in Brazil). Despite this, research in 2013 by Raúl Katz found that less than 30% of content accessed in Latin America is hosted locally and in the local language, the lowest proportion of any regional globally.<sup>12</sup>

Content also needs to be relevant to people's daily lives. Relevance can mean different things to different people, of course. For some users, entertainment-related apps may be the preference.

However, and particularly for lower income users, content should prove its relevance by improving their productivity and well-being. The GSMA Intelligence report *Digital Inclusion in Latin America and the Caribbean* included a review of around 35 mobile operators' websites for relevant content. The review found that most of the offerings fall into the entertainment category, with relatively few services that focus on productivity areas such as mAgri, mEducation and employment.

Additionally, while there is a large and well developed local media market in Latin America, content has been relatively slow to migrate to mobile channels and away from traditional media such as TV, print and radio.

12. Desarraigo Cultural En Contenidos De Internet: Un Análisis Para América Latina, Katz et al, The Columbia Institute for Tele-Information, 2014

### 3.1.3 Digital literacy and skills

Digital literacy was identified by the GSMA Intelligence Consumer Survey as a significant barrier to internet usage. Few countries in the region formally evaluate digital literacy, but school curricula in the majority of countries in the region include specific objectives or subjects on basic computer skills. However, none include mobile-specific instruction, which would be helpful given that this is how the vast majority access the internet in the region. There are several countries with a general lack of ICT education, including Paraguay, Guatemala and Chile. The report *Digital Inclusion in Latin America and the Caribbean*<sup>13</sup> identified a significant gap in the supply of ICT infrastructure and teaching support in most countries, and in particular a low percentage of ICT-qualified teachers in the region.

Governments have a clear role to play in areas such as digital literacy programmes and ICT supply. The government of Uruguay has promoted ICT studies through its Digital Agenda 2011-15 programme. The benefits of this initiative can be seen in the widespread availability of ICT infrastructure in schools in the country and the relatively high proportion of teachers with ICT education.

Mobile operators and other ecosystem players also have an important role to play. Many operators across the region have initiatives to improve digital literacy – for example, Millicom with its Digital Lifestyle programme. A number of companies have now signed up to the 2030 ICT Alliance for the Americas, including Telefónica, América Móvil, Millicom and Cisco. The project is aligned with the UN Sustainable Development Goals, and among several commitments includes the goal of ensuring that all schools across the Americas are connected to the internet by 2030.

Another example is América Móvil's education platform Aprende.org, a free online educational platform aimed at expanding opportunities to anyone with a smartphone and an internet connection. Aprende ("learn" in Spanish) is a platform with educational, cultural and job training content aimed at improving people's job opportunities by earning diplomas free of charge. As part of this effort, América Móvil announced a programme to encourage donations of electronic devices to schools and universities. Customers who donate phones they no longer use will receive MXN500 (around \$26) for each handset, which is donated to public schools and universities. Aprende's content is being developed by the Khan Academy, a non-profit educational website founded by Salman Khan, and is being managed by 150 staff in Mexico.

13. Digital inclusion in Latin America and the Caribbean, GSMA Intelligence, February 2016

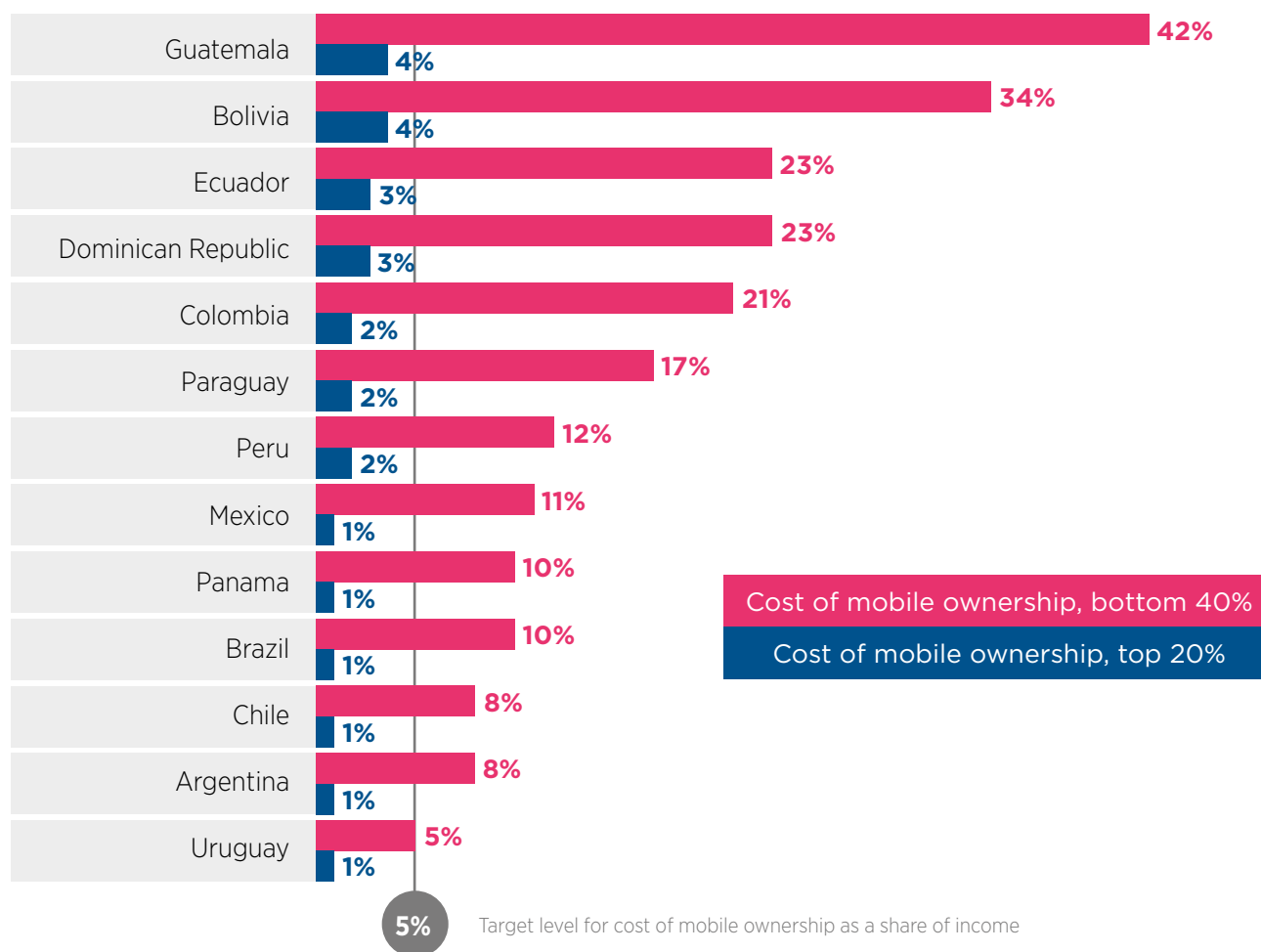
## 3.1.4 Affordability

Income inequality is a particular challenge in Latin America and lies at the core of the barriers to digital inclusion in the region. Compared to countries with similar GDP per capita levels, countries in Latin America have higher scores in the GNI index, indicating higher levels of income inequality. On average, the per-capita income of the top 20% of the population is eight times the income of the bottom 40%. There are four key elements that affect the ability of people to pay for mobile services and the retail price they face: income (and how this is allocated), cost of data and airtime, device cost, and cost of charging the device.

This translates to particular challenges around the affordability of mobile services for those at the bottom of the pyramid. The cost of mobile ownership for the poorest 40% of the population is on average 17% of income, compared to 2% for the top 20% of the population. To address this challenge, governments across the region have launched 'social broadband tariffs', and a number of mobile operators now offer innovative and flexible tariff plans. Operators will need to continue to work to ensure that mobile services (and particularly data packages) are affordable to lower income groups.

Figure 23

### Mobile ownership is unaffordable for the bottom 40% of the population in Latin America and the Caribbean



Note: Mobile broadband is based on a 500 MB prepaid plan. Handset cost is based on entry-level smartphone (Nokia 215).  
Source: GSMA Intelligence, World Bank, ITU



Challenges around the affordability of mobile services are often compounded by taxation of mobile services. Mobile-specific taxes can include both consumer taxes and operator taxes, which serve to reduce returns on investment for mobile operators, and raise the final price of services for users. The result is lower incentives to invest in network rollout and upgrades in uneconomic rural areas, and lower affordability for consumers.

Examples of these mobile-specific taxes across the region include:

- Jamaican mobile operators pay a 20% import duty on network equipment, a special telephone call tax of JMD0.4 (\$0.004) per minute of call and a universal service contribution.
- Several sector-specific fees are levied on mobile operators in Brazil. An inspection fee, FISTEL, is levied on the inspection of mobile phones and network equipment, and mobile operators pay fees for two telecommunication funds, FUNTEL and FUST, at 0.5% and 1% of revenues respectively.
- In Mexico, mobile consumers pay the Impuesto Especial sobre Producción y Servicios (IEPS) tax on mobile airtime and SMS. This tax adds to the cost of service consumption and the overall cost of owning and using a mobile phone. When all taxes on devices and services are taken into consideration, taxes accounted for nearly 19% of the total cost of mobile ownership in Mexico in 2014. Meanwhile, the share of Mexican operators' revenues spent on regulatory fees is the third highest of the 26 countries for which data is available.

The GSMA has commissioned a number of recent reports highlighting the range of taxes that the mobile sector is subject to in several countries across the region.<sup>14</sup> The reports find that reductions in mobile-specific taxation have the potential to increase mobile penetration and usage, and through the positive externalities of mobile, bring about greater economic growth and generate more tax revenues.

### Transitioning to a non-discriminatory tax system in Honduras

- **Eliminating the international incoming call fee.** Between 2016 and 2020, increased demand for mobile services has the potential to add a cumulative 159,000 connections, of which 115,000 are 3G. Through the direct efforts of the mobile operators and the broader mobile ecosystem, increased mobile usage could lead to additional GDP growth of \$126 million, with an additional \$9 million in tax revenues in 2020 alone.
- **Eliminating the mobile security tax.** Increased demand for mobile services has the potential to add more than 26,800 extra connections between 2016 and 2020, of which 19,400 are expected to be 3G. This could support an additional \$21 million in GDP, enabling up to \$1 million in additional tax revenues to be collected through broader based taxation in 2020.
- **Eliminating the FITT contribution.** Between 2016 and 2020, increased demand for mobile services has the potential to add a cumulative 21,000 connections, of which 15,000 are expected to be 3G. Increased mobile usage could lead to additional GDP growth of \$16.5 million, with up to \$0.8 million in additional tax revenues in 2020.

### Transitioning to a non-discriminatory tax system in Brazil

- **The abolition of sector-specific FUST and FUNTEL fees.** Under this scenario connections penetration is estimated to increase by 0.8% to 2020, relative to the base case scenario of no tax change. Annual GDP growth over the period 2016–2020 could rise from 2.40% to 2.46%, a 2.5% increase<sup>15</sup> In addition, the model estimates that the policy reform could reach tax neutrality within one year of implementation.<sup>16</sup>
- **The abolition of the sector-specific FISTEL installation fee.** It is estimated that this reform could add up to BRL29 billion to GDP in 2020. Positive externalities, brought about by an additional 12.5 million connections, and lower taxation could incentivise additional economy-wide investment of up to BRL5.2 billion in 2020.

14. See GSMA Public Policy: Tax Research and Resources

15. This is a compound annual growth rate over the period, 2016–2020, based on an IMF forecast

16. The scenario analysis suggests tax neutrality could be achieved from the second year after the change is implemented, and this assumes an immediate change in price and consumer behaviour. In practice, there are reasons to caution that this may take longer as consumers adjust their behaviour

## 3.1.5 Coverage

Overall mobile broadband coverage levels in Latin America compare favourably to other regions and are well ahead of the developing world average. However, the developed market average is closer to 99%, and the coverage gap in Latin America equates to an unconnected population of more than 60 million people. Many of these are residing in sparsely populated areas in Uruguay, Bolivia and Brazil, often in relatively challenging terrain such as mountain ranges, rainforests and islands.

This presents significant commercial challenges for mobile operators considering rolling out networks in these areas. Moreover, due to low take-up in areas that are already covered, the commercial incentives are not as clear for further operator investment as in other regions. A public funding model might therefore be necessary to bridge the remaining coverage gap.

It is also important to ensure that services provided in the covered areas are reliable and of a high quality. Unreliable and patchy network coverage disincentivises users from using mobile broadband, which could be an underlying reason behind the latent demand gap in the region. This in turn increases the cost pressure on mobile operators due to lack of service usage.

These challenges highlight the need for a coordinated approach to addressing the coverage gap in the region, involving collaboration between key stakeholders – mobile operators, government, development organisations and players from the wider ecosystem. To ensure a positive regulatory environment, governments can help bridge the last-mile gap by providing financial support, reducing municipal red tape and encouraging infrastructure sharing. For more details on such strategies, see *Closing the coverage gap: Digital inclusion in Latin America*.



## 3.2 Delivering financial inclusion across the region

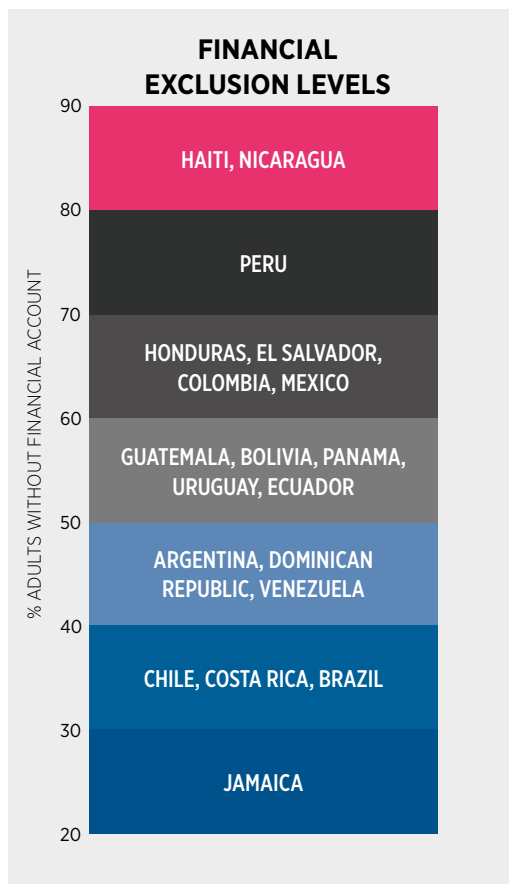
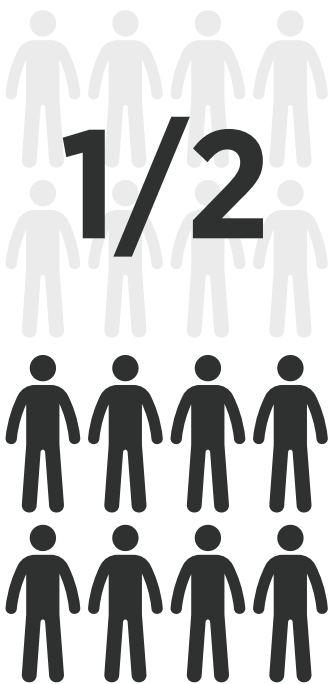
There has been considerable progress in recent years in delivering financial inclusion in Latin America, with the most recent World Bank Global Findex statistics indicating that the number of adults with bank accounts increased from 39% in 2011 to 51% in 2014.<sup>17</sup> The mobile industry has contributed to

this development through mobile financial service offerings. Growing adoption of smartphones in the region will help to expand the use of mobile financial services and so shrink the financially underserved population. However, almost half of the population in the region remain unbanked.<sup>18</sup>

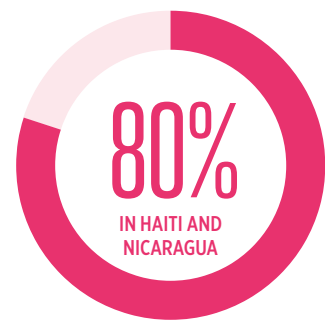
Figure 24

### Financial inclusion in Latin America and the Caribbean

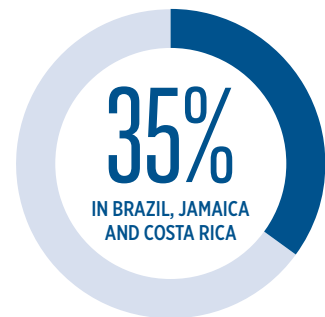
**HALF OF ADULTS ARE UNDERSERVED BY FORMAL FINANCIAL SERVICES**



**RANGING FROM OVER**



**TO LESS THAN**



Source: World Bank, GSMA Mobile Money Programme Infographic: Mobile Money in Latin America & the Caribbean

17. Global Financial Inclusion Database (Global Findex) 2014, World Bank  
18. Global Financial Inclusion Database (Global Findex) 2014, World Bank

Mobile money services – which allow the unbanked to use basic mobile phones to make and receive payments, and which rely on a network of transactional points outside of bank branches – are a powerful tool to deepen financial access in developing markets. Mobile money services can be offered by a range of providers, including mobile operators, financial institutions and third parties, all of which play a critical role in building a healthy digital financial ecosystem.

At the end of 2015, there were 37 live deployments across 17 markets in Latin America and the Caribbean, of which around half are led by mobile operators and the rest by banks and other financial services providers. The majority of countries now have two or more live services, while several markets now have three live mobile money services.

Figure 25

## Live mobile money services for the unbanked by country



Source: GSMA Mobile Money Deployment Tracker



Mobile money is gaining traction with users in some key markets. Three mobile money deployments in Latin America have crossed the 1 million active customer milestone, and there are now 17.3 million registered mobile money accounts across the region (of 411 million globally). Honduras, Paraguay and El Salvador are among the top 20 markets globally for mobile money account penetration. In December 2015 alone, 40 million mobile money transactions were made across Latin America (including cash-in and cash-out).

Although far from the levels of uptake and usage we have seen in Sub-Saharan Africa, Latin America and the Caribbean is notable for more diverse business models, a high degree of integration with the formal financial system, and a strong focus on building a mobile financial ecosystem from the start.

At one end of the spectrum are business models akin to those in East Africa, where a mobile operator assumes most of the functions in the value chain (e.g. Tigo in Central and South America, Digicel in the Caribbean). At the other end of the spectrum, banks drive mobile money schemes and, in some cases, even acquire mobile virtual network operators (MVNOs) to one day offer mobile financial services independently of mobile operators (e.g. Bancolombia). Finally, new entities dedicated to mobile payments, including joint ventures between mobile operators and financial institutions or payment processing companies, are an alternative approach to mobile money in the region (e.g. Transfer, a joint venture between América Móvil and Citibank's Banamex subsidiary in Mexico; and MFS, a joint venture between Telefónica and MasterCard in Brazil).<sup>19</sup>

### The importance of user experience and security

Latin America is taking a lead in creating user-friendly and secure apps. Features such as barcode scanning (using the smartphone camera) make paying bills a straightforward experience. This feature has been launched by Telcel Mexico's Transfer mobile money service. Meanwhile, a recent study on mobile money and banking apps<sup>20</sup> recognised the Brazilian mobile money service 'Zuum' app for its ability to preserve the integrity of customer transactions, demonstrating high security standards.

Source: Mobile money smartphone apps: Trends from Latin America, GSMA, January 2016

## 3.2.1 Regulation increasingly supportive

Policymakers and regulators in the region continue to recognise the valuable role of mobile operators in enhancing financial inclusion, and are gradually moving to frameworks that allow different business models to compete. Regulation is already enabling mobile money services in 7 of 19 markets in the region.<sup>21</sup> El Salvador, Honduras and Colombia could soon join the list, as they are currently implementing recently issued regulations that level the playing field for non-banks to offer mobile money services.

What makes a market truly 'enabling' for mobile money to flourish lies not just in the issuance of an enabling regulatory framework, but in the technical details of its implementation by the central bank. New regulations were recently launched in both Honduras and El Salvador (top 20 markets globally for mobile money account penetration); the respective central banks now have a responsibility to implement the regulation in a manner that ensures the market is truly 'enabling' for mobile money services to flourish, and thus ensures financial inclusion.

19. Mobile financial services in Latin America & the Caribbean: State of play, commercial models, and regulatory approaches, GSMA, May 2015

20. Mo(bile) Money, Mo(bile) Problems: Analysis of Branchless Banking Applications in the Developing World, USENIX, August 2015

21. Bolivia, Brazil, Guyana, Nicaragua, Paraguay, Peru and Uruguay

### 3.3 Working together to the benefit of users: the 'We Care' campaign



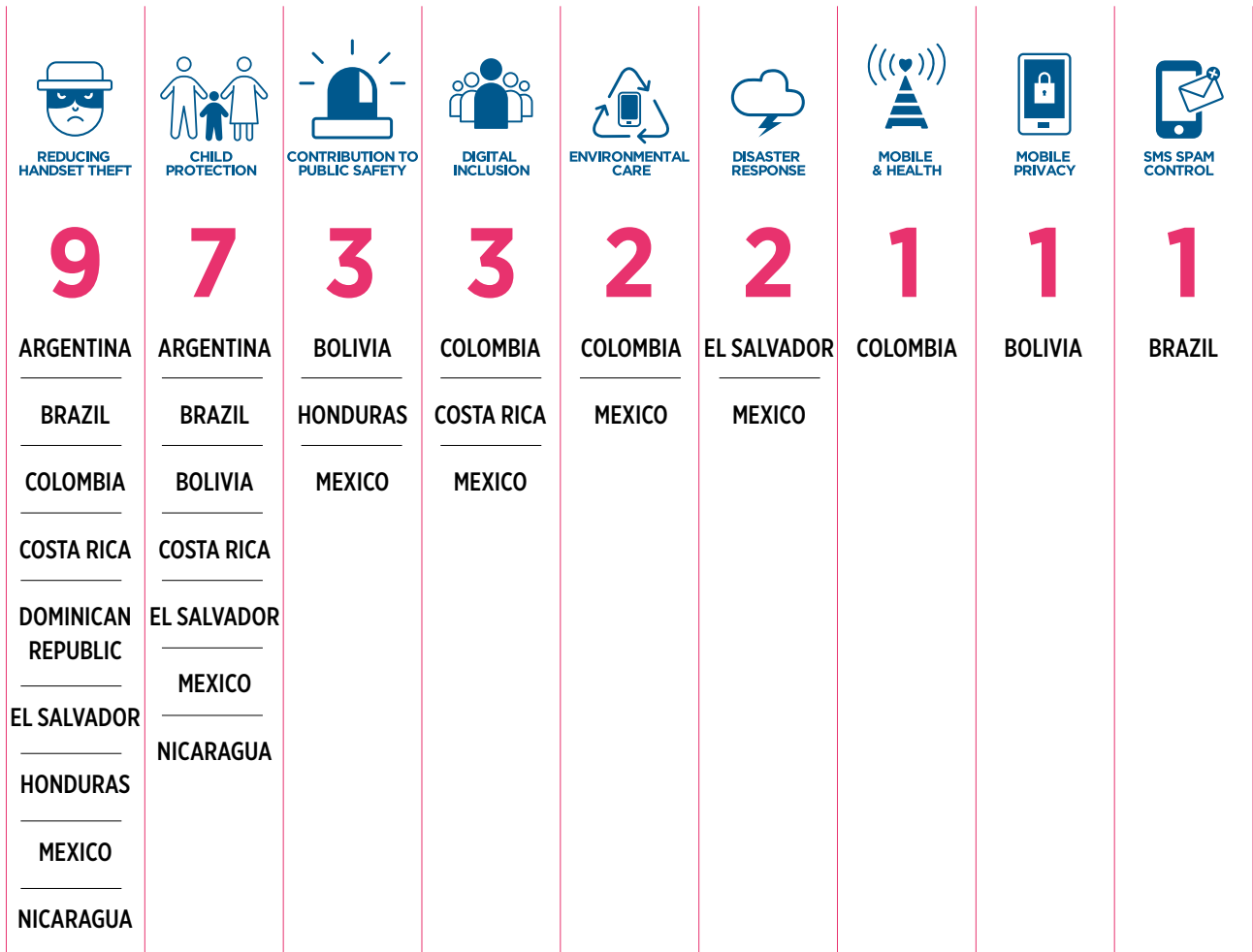
The goal of **We Care** is to promote active and voluntary collaboration in the mobile operator community in Latin American countries, working with local authorities to enable all citizens to enjoy the enormous benefits of mobile in a protected and trusted environment. The campaign helps governments achieve their social objectives through mobile technology.

The campaign started in 2013 in Brazil and has already reached 10 countries in Latin America. It is a unique example of self-regulation from mobile operators willing to set aside competition to launch joint initiatives to tackle handset theft, protect children, contribute to public safety, promote the recycling of electronic waste and develop preparedness for natural disasters. The **We Care** campaign initiatives are a vehicle for the regional mobile industry to launch actions that enable them to contribute to the **UN Sustainable Development Goals**.



Figure 26

## Theft reduction and child protection most widely adopted We Care programmes



Source: Companies, GSMA

## 3.4 Supporting the UN Sustainable Development Goals

In September 2015, the United Nations introduced its Sustainable Development Goals (SDGs) to the world — a 17-point plan to end poverty, combat climate change and fight injustice and inequality by 2030.

Mobile connectivity is essential to the achievement of the SDGs: globally, the industry has already connected 4.7 billion people, enabling greater inclusion in vast cities and remote villages, transforming communities, delivering healthcare in ways never imagined, opening doors to education, employment and income opportunities, creating smarter cities, empowering people with the tools they need to thrive, and driving a more sustainable planet.

The GSMA and mobile operators are united in support for helping achieve the SDGs in Latin America and the Caribbean, leveraging the power of mobile networks to accelerate this journey in a way that no other technology can. Across the region, mobile is already playing a key role in tackling various social and economic challenges around poverty eradication, agriculture, health, education, gender equality, water resource management and sanitation, affordable energy access, employment, infrastructure, inequality reduction, safer cities and climate change.

### CASE STUDIES

#### 1 NO POVERTY



#### POVERTY

End poverty in all its forms everywhere.

We can use connectivity to bridge the human divides and create socioeconomic opportunity. Expanding mobile access to the internet will accelerate economic growth and create new opportunities for every community. We are leading the mobile revolution to create banking solutions for the unbanked with mobile money services to help move people out of poverty.

Since 2013, Millicom has been promoting both digital and financial inclusion through its mobile financial services. Using its Tigo Money platform to disburse state salaries or monetary aid on behalf of NGOs such as the World Food Program in Honduras or Habitat for Humanity in El Salvador gives many beneficiaries a powerful first experience of technology. Many of its customers have learnt how to receive money (locally and internationally), but also how to pay bills, pay for digital and physical goods, access insurance products, and apply for credit through partnerships with financial institutions.

América Móvil's Transfer venture with Banamex (a Citibank subsidiary) and Inbursa allows mobile payments, transfers between mobiles, balance inquiries and withdrawals at ATMs without a card. It also takes advantage of Telcel's 185,000 outlets in the country and the infrastructure and support of two of its largest banking institutions.

"Pescando con Redes Móviles" (Fishing with Mobile Networks) provides an example of how technology can be used to achieve greater social inclusion, in this case for fishermen in Colombia. Launched in 2013, the project founded by the Telefónica Foundation, Qualcomm, Cintel and USAID has 200 participants. In the two years since launch it has produced an average increase in income of 15% through opening up of new business opportunities and a reduction in overfishing.

## 2 ZERO HUNGER



### AGRICULTURE/HUNGER

End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Agriculture is the main contributor to GDP in emerging markets and the largest employer. Mobile operators provide nutritional information to improve the health of people in emerging markets. They are also leading delivery of critical information to improve the crop yields and incomes of smallholder farmers.

#### CASE STUDIES

Brazilian farmers are to use drones to boost agriculture and support environmental sustainability. Data produced in real time by a drone flying over the agricultural fields will be delivered to the farmer in an easy-to-read format via an LTE-connected smartphone or tablet. This will inform farmers which precise measures are needed to avoid the overuse of agrochemicals or over-fertilisation, and will allow for selected irrigation of dry fields to reduce environmental impact and increase crop yields.

Esoko provides daily prices for corvina drum fish from the world's second largest fish market in Mexico City. This initiative provides market information for 300 corvina drum fishermen in the Gulf of California who supply landlocked Mexico City with the saltwater fish.

Adisagua is a smallholder agricultural initiative in Guatemala with 1,350 farmers enrolled in the scheme. It provides a tool to help them overcome challenges to more effective grower management.

## 3 GOOD HEALTH AND WELL-BEING



### HEALTH

Ensure healthy lives and promote wellbeing for all at all ages.

More than 1,200 mobile health initiatives have been deployed to date globally; mobile is having a profound impact on the healthcare industry. Mobile networks enable the delivery of mobile health to people and places previously unreachable, providing healthcare to those who need it most.

#### CASE STUDIES

The Enlace Hispano Americano de Salud (Latin American Health Link) improves healthcare services in isolated, rural areas of Latin America using ICT. Technology is used to connect caregivers with patients so they can discuss their issues, send and receive epidemiological information or coordinate the transfer of patients needing urgent care.

América Móvil's ClikiSalud offers apps and calculators for various health issues and conditions, including cardiovascular, epilepsy, postnatal health, caloric intake and body mass.

Flowminder, in partnership with Digicel Haiti, used mobile phone data to predict the spatial spread of cholera following the Haiti earthquake in 2010.

**4** QUALITY EDUCATION**EDUCATION**

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

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

**CASE STUDIES**

Aprende (Learning) is a mobile platform with educational and training tools. All customers of América Móvil's Mexican operator, Telcel, can study and learn for free, from wherever they are. The platform provides educational, cultural and job training content aimed at improving people's job opportunities by earning diplomas free of charge. An agreement with Mexico's Department of Education is in place to validate the diplomas in Mexico's education system. Free courses are offered in the fields of mathematics, history, science and culture. Aprende's content is developed by the Khan Academy, a non-profit educational website.

Mobile operators in Honduras will work with the IT heads of Conatel and the Department of Education to develop and implement a Digital Educational Content platform accessible to pupils in the Honduran public education system. The project will boost digital inclusion among children in public schools by giving them access to structured virtual content in line with the approved curriculum in Honduras.

**5** GENDER EQUALITY**FEMALE EMPOWERMENT**

Achieve gender equality and empower all women and girls.

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

**CASE STUDIES**

AT&T Mexico is reducing the gender gap in corporate positions and across the organisation with its "Mujeres en Acción" (Women in Action) initiative to empower women. The proportion of women in leadership positions in the company has increased from 10% to 34% since the start of the initiative and has grown to 38% company-wide, with a goal to reach 43% in 2016.

## 6 CLEAN WATER AND SANITATION



### WATER

Ensure availability and sustainable management of water and sanitation for all.

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

### CASE STUDIES

SOIL is working to open a third way between unsustainable, foreign-funded humanitarian projects on the one hand, and expensive, exclusive and environmentally hazardous businesses on the other. The social business initiative has the potential to vastly expand global sanitation access in an affordable, sustainable way, while creating new jobs and livelihoods. SOIL provides an end-to-end sanitation solution to Haitian urban slum dwellers of Cap-Haitien and Port-au-Prince using a sanitation-as-a-service model and by experimenting with mobile tracking technology to monitor performance of waste collectors.

In Lima, the second driest capital in the world, there are more than 2 million people who do not have access to proper sanitation and to the sewage system due to water scarcity and lack of public investment. X-Runner in Peru is an end-to-end sanitation solution (design, sales, waste collection and treatment) utilising mobile CRM platforms and mobile logistical solutions. For example, each bucket it delivers and collects is equipped with an NFC tag with a customer's code; all information is registered and progressed by combining the use of Salesforce.com and Open Data Kit on mobile phones, enabling access to information and guaranteeing a high level of efficiency. To pay for this service, customers use a payment system that involves banking agents (kiosks and small shops that are connected to banks), thereby also introducing users into the banking system.

## 7 AFFORDABLE AND CLEAN ENERGY



### ENERGY

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

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

### CASE STUDIES

Brazil faces high non-technical losses from the electric distribution network of up to 20%, mainly due to theft, vandalism and inefficient billing. To tackle this, in 2014, Eletrobras contracted a consortium aimed at upgrading the network. Telefónica Vivo was selected to provide M2M cellular connectivity as well as the operation and maintenance management platform for Eletrobras' smart grid rollout.

Ericsson worked with Cable & Wireless Panama to reduce its network's energy consumption. By modernising the network and reducing its footprint (for example, reducing the number of radio controller nodes from seven to three), energy consumption was reduced by 50%, while still increasing capacity.

**10** REDUCED INEQUALITIES**INEQUALITY**

Reduce inequality within and among countries.

Around 4 billion people are not connected to the internet, excluding them from social and economic opportunities. Globally, 2 billion people remain unbanked. Proof of identity is a prerequisite to socioeconomic development and essential to accessing basic services.

The mobile industry is creating a platform for information, social improvement, jobs, businesses and growth. Through the power of mobile we are creating a ubiquitous mobile money ecosystem, increasing financial inclusion and enabling digital identity.

**CASE STUDIES**

Millicom's Tigo Foundation and ALAS Foundation are supporting investment in early childhood development programmes to improve the economies of Central America. This includes programmes and policies that ensure comprehensive quality care for children under the age of 6, who are the most vulnerable age group in the region. The alliance will start with the construction of Early Childhood Development Centers in Guatemala, through investment of up to \$1.6 million.

**12** RESPONSIBLE CONSUMPTION AND PRODUCTION**RESPONSIBLE CONSUMPTION AND PRODUCTION**

Ensure sustainable consumption and production patterns

As a result of increased electrical and electronic equipment production and use, the amount of discarded e-waste is also growing worldwide, reaching more than 40,000 kilotonnes (kt) of electronic products discarded in 2014, nearly 4,000 kt of which occurred in Latin America. By 2030, the electronics industry has to substantially reduce waste generation through prevention, reduction, recycling and reuse.

Given the growing issue of e-waste in Latin America, mobile operators in the region are developing programmes, campaigns and projects to treat e-waste, such as mobile phones, batteries and accessories, in compliance with local and international environmental legislation.

**CASE STUDIES**

Given the growing issue of e-waste in Latin America, mobile operators in the region are developing programmes, campaigns and projects to treat e-waste, such as mobile phones, batteries and accessories, in compliance with local and international environmental legislation.

Between 2013 and 2015, the Green Programme (part of the We Care campaign) and the 'Give Your Old Cell Phone a New Purpose' campaign in Mexico recycled more than 1.8 million mobile handsets and 558 tonnes of accessories, such as batteries and chargers. To continue such efforts, the first free mobile app will be launched to enable users to locate the 479 collection boxes made available throughout the country by Mexico's mobile operators and equipment manufacturers.

In 2013, Telefónica Movistar Ecuador processed 112,321 obsolete mobile phones from its users.

In Brazil, Oi is investing BRL10 million in five recycling plants owned by Descarte Certo. Descarte Certo collected 43,782 mobile devices, batteries and chargers from Oi customers in 2012. Oi, Telefónica, TIM and Vivo collected 90.6 tonnes of e-Waste in Brazil in 2012.

In Peru, Claro installed 203 collection sites across the country and gathered more than 58,000 items between 2010 and 2013.





# 4 Removing barriers through new policies and deregulation

The mobile market and regulatory environments are changing in Latin America. 5G, virtual and augmented reality, ubiquitous computing, big data, and network integration are some of the opportunities that lie ahead. These emerging trends will change the ways people interact with each other and disrupt existing industries.

Meanwhile, operational efficiency gains (made possible by more advanced technology, improved processes and economies of scale and scope) have failed to offset the downward pressure on operator margins. As a result, ubiquitous connectivity is both a considerable challenge and an opportunity for companies operating in this market.

Users are consuming increasing amounts of mobile data in every market across the region; what varies is how regulators are responding to these new market dynamics and emerging technologies and business models.

Although this digital convergence is benefitting consumers, it also creates regulatory challenges. Rapid innovation, in terms of technology and business models, together with the growing importance of economies of scale and scope, is blurring the boundaries between once-distinct markets and regulatory regimes. The net result is a

complex and dynamic digital ecosystem in which both consumers and businesses face regulatory uncertainty.

Sustaining growth in the digital ecosystem will depend on the right regulatory environment. Policymakers cannot currently keep up with the speed of innovation and technological change, quickly making prescriptive policies outdated. A principles-based, ex-post and technology-neutral framework to regulate the ecosystem is critical to enable investment, innovation and regulatory certainty.

Table 4

## Comparison of legacy regulation and new framework

Type of Regulation	Legacy Status Quo	New Framework
<b>Access Regulation</b>	Regulated access to termination and roaming; mandated resale of voice and wireless under telecom specific standards	Access regulation reassessed under generic standards applicable to all digital ecosystem players
<b>Barriers to Entry and Exit</b>	Limits on entry and exit; approval required before new technologies or business models can be deployed	“Permissionless innovation;” subject to general consumer protection and antitrust regulation
<b>Privacy and Data Protection</b>	Industry-specific restrictions; regulatory uncertainty on application to digital services	Symmetric regulation focused on preventing consumer harm
<b>Merger Review</b>	Static analysis and stricter standards for telecom operators than for other ecosystem firms; industry-specific procedures	Dynamic analysis with same criteria and procedures across the digital ecosystem
<b>Spectrum Management</b>	Technology-specific licences; variety of regulatory obligations embedded in spectrum licences	Flexible spectrum rights; symmetric regulatory obligations through general regulation
<b>Universal Availability and Affordability</b>	Financial, price and coverage obligations only on network operators	Holistic policy that enhances availability and affordability across the whole ecosystem

Source: A new regulatory framework for the digital ecosystem, NERA, 2016



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To enable sustainable growth in this converged digital ecosystem, a new approach to policy and regulation is necessary. While digital markets are essentially dynamic and forward-looking, policies are often static and reflect the present and recent past. Moreover, with increased competition, the need for regulation decreases – but regulation often remains. Where there is evidence that markets have changed so as to demand deregulation to be able to move forward, competition and regulatory authorities should not hesitate to revise the existing framework, taking into account the effects of policy on the many different parts of the digital ecosystem.

We are starting to see some positive moves towards new regulatory frameworks in Latin America. Argentina, for example, has a committee whose main objective is to revise current telecommunications and media regulation to produce new, updated and future-proof regulation that is consistent with converged ICT services. Other examples can also be seen in Peru, Colombia and Mexico, where new regulations to harmonise infrastructure deployment in their respective countries are being put in place.

- Mexico and Argentina are moving forward in permitting mobile operators to deploy antennas in public buildings enabling them to roll out their network and improve quality in a more efficient way.
- Chile is showing the region that the spectrum licensing process can be focused more on fast deployment and greater coverage than money raising.
- Colombia introduced new regulations for the upcoming spectrum auctions that allow mobile operators to discount from the spectrum price the cost of certain social projects that have been previously agreed with Ministry of ICT.

## 4.1 Consumer protection in the convergent digital ecosystem

The digital ecosystem and the many new services associated with it pose a series of complex challenges for policymakers in terms of consumer protection. The combination of data-heavy services and next-generation networks that offer higher speeds has led to an increased sensitivity from consumers on issues of quality of service. Regulators have often translated this added pressure from consumers into excessively technical obligations that rarely result in a better end-user experience.

Similarly, user concerns about online privacy have risen significantly in recent years. Reports of data breaches and abusive use of personal information have already started to influence consumer behaviour. However, consumers can also benefit from more targeted and personalised offers and services made possible through the use of consumer data. In response, privacy laws are emerging where little or none previously existed, and some countries such as Argentina are taking positive steps to modernise their data protection frameworks.

Finally, with the surge in personal devices and machines connected to mobile networks, the perceived security risk associated with mobile

technology has grown over time. In turn, policymakers in Latin America have increasingly favoured regulatory intervention.

From both end-user protection and public safety perspectives, consumer protection rules, such as emergency services, legal interception, interoperability, portability and data protection, should apply to all equivalent services. This guarantees a consistent level of consumer protection and promotes trust in the digital ecosystem. The digital ecosystem will grow even if trust is minimal, but it will generate much more value if there is a significant level of trust.

## 4.1.1 A consistent approach to quality of service

Many factors can affect the experience of the end user – from weather and the time of day to the number of users in each cell and the amount of spectrum available. Some of these factors lie beyond the control of the operators. Regulation can also play a major role in quality of service, but should be applied carefully. In some cases, it can create further restrictions, which can affect the cost of the service, its quality and even competition.

For instance, in many Latin American countries, the deployment of antennas requires authorisation from municipalities. In El Salvador, this could mean up to 263 municipal laws; in Brazil, up to 5,570 municipal laws; and sometimes local laws are not necessarily aligned with the national laws and regulations that govern the telecommunications industry.

The amount of spectrum allocated to each operator largely determines its capacity to provide a faster data transfer speed, better levels of coverage, improved call quality and a lower dropped-call rate, among other variables. The amount needed in each national market will vary depending on the level of demand for data and the priorities of each country. According to the ITU-R report M.2290, there is a gap between the current licensed spectrum for mobile services and estimated needs for 2020.

Quality of service does not depend solely on the number of antennas installed. Unlike fixed networks, several factors affect network performance. Mobile networks, by design, do not have dedicated channels, and the total quality end-to-end depends on aspects beyond the control of mobile operators.

Regulations that affect the prices of goods and services are regressive public policies, as they affect the ability to offer a wider range of services to meet demand and do not allow improvements in the quality of life for the less fortunate. Fee-based quality requirements benefit those who already have access, at the expense of delaying entry for those with no access – or simply locking them out.

Ideally, the market and operators should be allowed to improve the quality of service offered, supported by an enabling regulatory regime that, for example, ensures the availability of appropriate spectrum and removes barriers to network deployments (such as issues over installation permits or concerns over interference).

To modernise quality-of-service regulation, policymakers should consider the following:

- Whether there is still a need for the policy, given the current level of competition in the market – after all, quality of service is a differentiator for operators in a competitive market.
- How a new regulatory framework could promote transparency on quality of service using technical measurements of network quality to empower consumers to make informed decisions about the services available, rather than using such measurements to punish businesses.
- How public policies can create the right incentives for investment that will help eliminate barriers to infrastructure deployment.

## FACTORS AFFECTING QUALITY



The number of users varies from cell to cell



People move about, traffic varies, accidents happen, congestion occurs, protests take place, groups gather, events are held, etc.



In a single cell the number of users varies depending on the time of day



The consumption pattern in each cell varies significantly throughout the day



Weather, especially rain



Obstacles between terminals and antenna, whether fixed (buildings) or moving (vehicles)

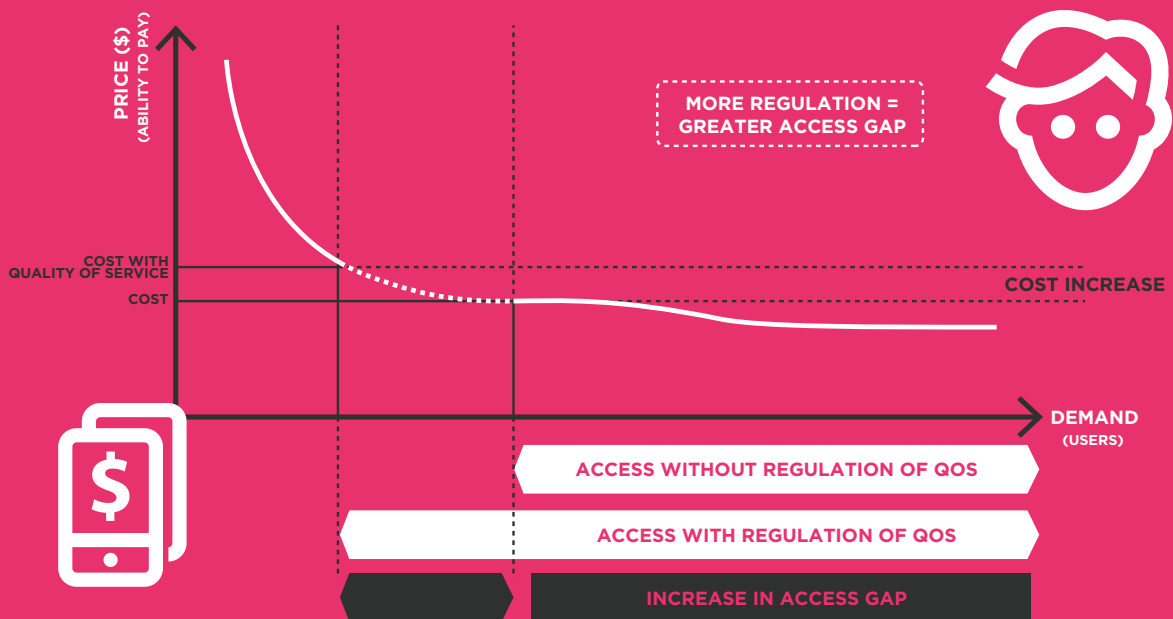


The distance between the terminal and the antenna varies when users are in motion



Indiscriminate use of jammers and amplifiers

## RELATION BETWEEN QUALITY OF SERVICE (QOS) REGULATION AND NUMBER OF USERS



## 4.1.2 The privacy dilemma

Online privacy means users are able to choose and control what digital information they want to share with others, including businesses and the government. The right to privacy is legitimate, but so too can be the use of personal data for business purposes. Regulators face a difficult dilemma of how to strike a balance between consumer demand for perfect privacy but also personal, data-based services.

In Latin America, privacy laws have a tendency to rely excessively on explicit consent. Although this gives an impression of additional user protection, it creates additional burdens for the industry, can lead to a 'tick box' consent culture and even create privacy fatigue among users, thus translating into lost business opportunities. An alternative is to require explicit consent for sensitive categories of data, and, where data is not sensitive, to allow for consent to be implied from the context in which a service is being used.

The mobile industry is subject to a range of laws and/or licence conditions that require operators to support law enforcement and security activities in countries where they operate. These requirements vary from country to country and have an impact on the privacy of customers. Such laws typically require customer data retention, but also require the ability to legally intercept customer communications. Failure to cooperate with the judicial system can often result in escalating fines or even the suspension of the service.

Recently, to avoid issues of legal interception where companies based abroad refuse to hand over the

data of their users, many countries are turning to localisation laws, which mandate that companies must have datacenters based within national borders to be able to operate within that country. In many cases, this could dramatically increase the cost of offering the service for that particular country, and may even lead to the company exiting the market.

Due to network effects, the ongoing collection, storage and processing of data by a few companies may in some cases lead to barriers to entry for potential new rivals. Although this should not be the focus of privacy laws per se, competition frameworks should take it into account when measuring market power.

To move forward, policymakers in Latin America must consider the negative impact that a patchwork of privacy and data protection laws can cause in the digital ecosystem. A harmonised approach would help promote trust and the development of a regional digital market.



## 4.1.3 Towards a more secure digital environment in Latin America

Concerns over security have increased 360% over the last 20 years in Latin America.<sup>22</sup> The GSMA and its members are committed to building a more secure environment through a number of regional and global actions.

**Handset theft.**<sup>23</sup> There is no single measure that can effectively address the problem of handset theft. A collaborative approach among the main stakeholders is key:

- **Operators** can connect to the GSMA's IMEI Database (the most complete and official database containing IMEIs of lost and stolen mobile devices around the world). A total of 53 operators from 17 Latin American countries are currently connected and exchanging information on stolen devices, strengthening the blacklist each day.
- **Users** can report stolen devices
- **Governments** can help by penalising IMEI reprogramming.
- **Manufacturers** can help by designing safer terminals.

Governments must also recognise that this is not a problem that can be addressed by a single country or even region; it is a global problem that requires a globally coordinated solution that builds and improves on existing tools and efforts.

The GSMA offers telecoms regulators the **IMEI Device Check Tool**. It enables users, recyclers, mobile network operators and law enforcement agencies to identify suspect devices, minimise loss and combat crime. This tool has been successfully implemented in Mexico, Argentina, Costa Rica and Brazil.<sup>24</sup>

**Device identity.** It is vital to strengthen the role of the IMEI – on which the majority of industry and government solutions are based – and recognise voluntary industry solutions such as blacklist integration and information exchange. Attempts to build parallel national, regional or international handset identifier databases from scratch would result in a splintering of handset information, which would ultimately undermine the effectiveness of all approaches.

**Spam.** The GSMA and its members support the combatting of mobile spam and voluntary multi-stakeholder collaboration to develop effective filtering mechanisms. Defining approaches to combat spam should not restrict the options available for the industry to innovate in the security market. Prescriptive approaches could also become outdated quickly, as technological advances are being made by both firms and spammers.

22. According to Latinobarometro, period: 1995-2015

23. For more information on handset theft please visit <http://www.gsma.com/latinamerica/handset-theft-imei-database>

24. Through an agreement with ABR Telecom.



To download the full report please visit  
the GSMA website at [www.gsma.com](http://www.gsma.com)

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