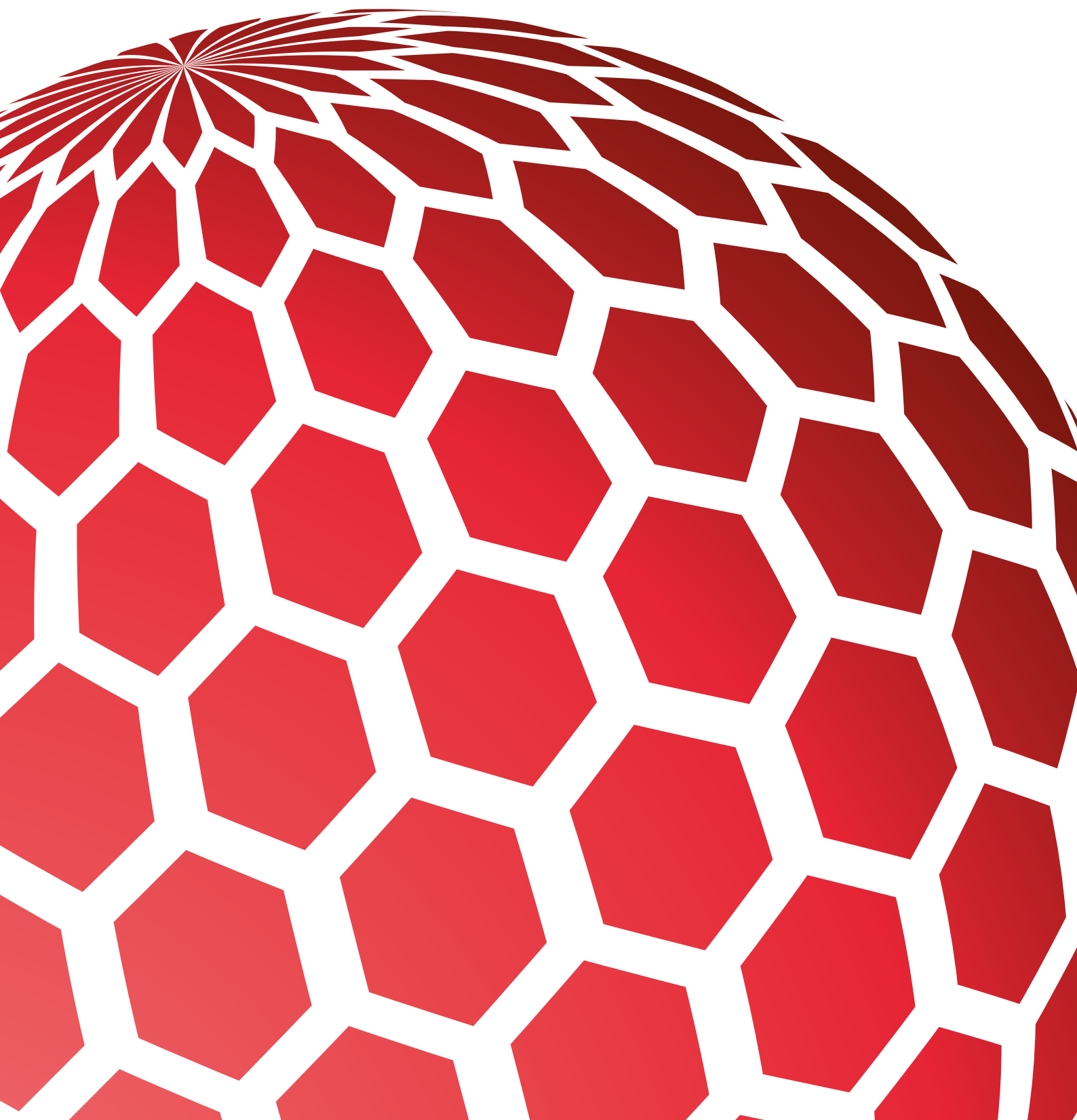




# The Mobile Economy 2014





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

For more information, please visit the GSMA corporate website at [www.gsma.com](http://www.gsma.com)

or Mobile World Live, the online portal for the mobile communications industry, at [www.mobileworldlive.com](http://www.mobileworldlive.com)



GSMA Intelligence

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

[www.gsmainelligence.com](http://www.gsmainelligence.com)

[info@gsmainelligence.com](mailto:info@gsmainelligence.com)

# Contents

<b>EXECUTIVE SUMMARY</b>	2
<b>1 GLOBAL MARKET OVERVIEW</b>	8
1.1 Mobile has scaled dramatically	9
1.2 Accelerating higher speed network deployments driving data growth	12
1.3 Revenue trends	21
1.4 Revenue mix and outlook	30
<b>2 AN INDUSTRY EMPOWERING PEOPLE AND SOCIETY</b>	36
2.1 Mobile is a cornerstone of the global economy	37
2.2 Mobile at the heart of communication today – empowering people and society	42
<b>3 ENSURING A HEALTHY AND PROSPEROUS DIGITAL FUTURE</b>	56
3.1 The Digital Future	57
3.2 The Personal Data opportunity	60
3.3 Connected Living – linking the physical and digital worlds	62
3.4 Digital Commerce – placing mobile at the heart of future commerce	66
3.5 Network 2020: a key pillar of the digital future	68
3.6 The importance of industry and ecosystem collaboration	70
<b>4 POLICY MEASURES TO DRIVE THE GROWING ECONOMIC AND SOCIAL BENEFITS OF MOBILE SERVICES</b>	74
4.1 Spectrum Measures for Mobile Evolution	75
4.2 The importance of best practice taxation	79
4.3 Sustaining effective competition and encouraging investment	80
4.4 Supporting innovation with a common position on Intellectual Property Rights	80
4.5 Avoiding unnecessary restrictions on network management	81

# Executive Summary

The mobile industry has scaled dramatically over the last decade. At the end of 2003, there were a little over one billion unique subscribers, meaning that just under one in six people had subscribed to a mobile service. By the end of 2013 this figure had increased to 3.4 billion unique subscribers: equivalent to just under half of the global population. Globally there were 6.9 billion SIM connections at the end of 2013, with an average of 1.8 active SIM cards per unique subscriber\*.

While subscriber and connections growth rates are now slowing in developed markets, significant untapped potential remains in developing markets. These are forecast to add 880 million unique subscribers by 2020. In developed markets, there is an accelerating technology shift underway in the global connection base, with an increasing proportion of connections now on higher speed 3G and 4G networks (globally this proportion is set rise from a third at the end of 2013 to two thirds by 2020). The number of commercially available LTE networks is forecast to increase to more than 500 in 128 countries across the world over the next four years, going from covering around a fifth of the global population today to around half by 2017.

The number of mobile broadband connections has grown tenfold from just over 200 million in 2008 to well over two billion by 2013. Growth should remain strong, driven by rising smartphone penetration, with almost 4 billion mobile broadband connections expected to be added globally in the period out to 2020.

Higher speed networks and more advanced devices are enabling the growth of data hungry applications such as video streaming, internet browsing and file downloads. At a global level, the rate of growth in data traffic is likely to far outstrip the growth in mobile connections.

The transformative effect of mobile has been made possible by significant capital investment by the mobile operators over recent years, totalling over US\$ 1 trillion in the last six years. Investment has been focused on both improving network coverage and to facilitate the growth in mobile broadband connections. Total investments by the operators are expected to increase going forward in order to accommodate the strong forecast growth in global data traffic, totalling US\$ 1.7 trillion out to 2020.

However, despite the success of the industry to date, revenue growth for the mobile operators is expected to slow (the GSMA forecasts revenue growth of 2.9% per annum out to 2020, against over 5% in the previous five years). Operators across the globe face an increasingly common set of challenges, in particular rising competitive pressures and increased regulatory intervention in many markets. This raises questions over the sustainability of the current business model for the mobile operators and their ability to continue to fund the required levels of network investment.

It is no surprise that mobile has become a cornerstone of the global economy, both as an industry in its own right and as an enabler of opportunities in other sectors. The mobile industry (both directly and indirectly) contributed around 3.6% of global gross domestic product (GDP) in 2013, equivalent to over US\$ 2.4 trillion. This figure is expected to increase to 5.1% of global GDP by 2020. In addition, there are 10.5 million jobs supported directly by the mobile ecosystem across the world, while the mobile ecosystem contributed over US\$ 336 billion in public funding in 2013, even before considering regulatory and spectrum fees.

The mobile industry has also played a crucial role in the global economy as an innovation platform for new services. Mobile networks provide unique opportunities to reach new customers and to monetise products and services. The industry has enabled the emergence of a number of “innovation hubs” across the world. These mobile innovation ecosystems contribute to the empowerment of individuals and societies not only through the opportunities they create, but also through the solutions and services they deliver.

Mobile connectivity has already transformed daily life across the globe, and mobile is playing a particularly strong role in socio-economic development in many

developing regions of the world. Mobile has brought voice services and Internet access to the previously unconnected, bridging the digital divide and empowering communities.

Mobile has also benefited some of the most disadvantaged communities through the provision of mobile money services. This brings financial services within the reach of previously unbanked and underbanked populations, driving economic growth and promoting financial inclusion. Empowering women through mobile Internet access also has more wide reaching benefits to broader societies.

The mobile industry is overcoming cost barriers and developing innovative new solutions to deploy networks in more remote and challenging environments, especially in developing regions. The industry is already competitive and significant price reductions over recent years have helped to drive strong subscriber growth across the world. However, the industry faces a number of challenges if it is to fulfil its growth potential, and regulators and policymakers must be careful not to hinder this with short-term policies that maximise near-term tax revenues over the medium-term potential for growth and development.

The mobile industry has the potential to deliver even greater benefits to society in the future: with the potential of connecting almost anything and anyone. The world of 2020 will offer a range of life-enhancing services powered by a vibrant mobile ecosystem that connects the physical and digital worlds. This convergence will unleash a new dimension of services that improve the quality of consumers' lives and the productivity of enterprises. The benefits of mobility will spread far beyond communications to provide dramatic improvements in sectors such as energy efficiency, security, health and education.

\*GSMA Intelligence estimates that the total number of active SIM connections at end 2013 was 6.3 billion.

The GSMA has identified four key growth areas that present both significant opportunities and benefits for consumers. These areas also provide clear opportunities for mobile operators to collaborate and, in doing so, play an active role in delivering them.



### Personal Data

Consumer access to a range of digital services could be authenticated by a mobile operator provided digital identity – linked to the phone number and secured via the SIM;



### Digital Commerce

Mobile devices will be at the heart of digital commerce ecosystem, with the potential to complete all types of purchases on connected devices using digital wallets;



### Connected Living

Intelligent networks connecting an ever greater range of devices have the potential to revolutionise the lives of customers and the productivity of many enterprises;



### Network 2020

Mobile networks will be at the heart of the all-IP mobile broadband era, connecting devices and acting as the key interface between the physical and digital worlds.

Delivering the digital future will require a more collaborative approach between the mobile operators themselves: a new focus on collaborative action will bring greater scale to operator activities in the global race to meet the needs of the customer in the future. With revenue growth in the broader mobile ecosystem expected to far outstrip that of the operators (particularly in the area of content, applications and services), there are significant opportunities for mobile operators to generate additional revenues and so lift growth rates beyond current expectations.

At the same time, new entrants to the mobile ecosystem should recognise the need to collaborate with other players, particularly the network operators. Online service providers are dependent on mobile broadband networks that are deployed and maintained by the mobile operators, which in turn requires a sustainable financial model for the operators that generate sufficient cash flows to meet these ongoing investment needs.

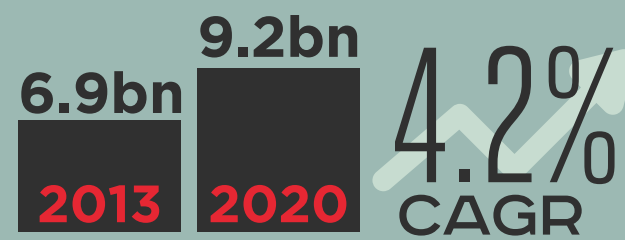
Policymakers should ensure that the right conditions are in place for the full transformational potential of mobile services to be realised. As the mobile Internet gathers momentum, policy change is required to ensure that adequate investment and innovation comes from all ecosystem players. Operators and investors need stability and clarity in order to fund the significant investment needed over the coming years both to extend coverage to more remote areas and to meet the growing demand for higher speed connectivity.

The growth of internet access over mobile broadband networks is dramatically increasing spectrum demand and poses a significant, disruptive, threat to the industry. Securing additional long term harmonised spectrum is critical to realising the potential of the digital future.

In summary, the mobile industry can only realise this positive vision of the digital future through collaboration between all players: between mobile operators and the broader mobile ecosystem, including new entrants such as online service providers; as well as through collaboration with governments, regulators and other industry stakeholders.

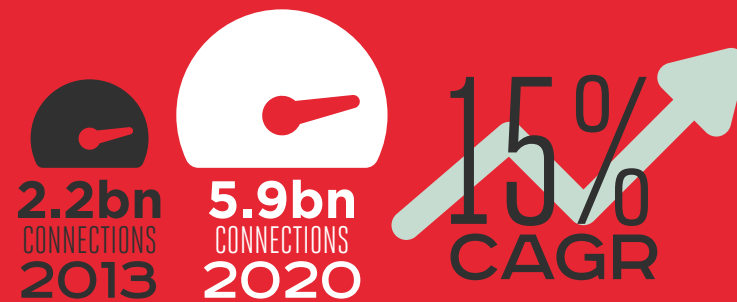
# GLOBAL MARKET

## Global SIM Connections

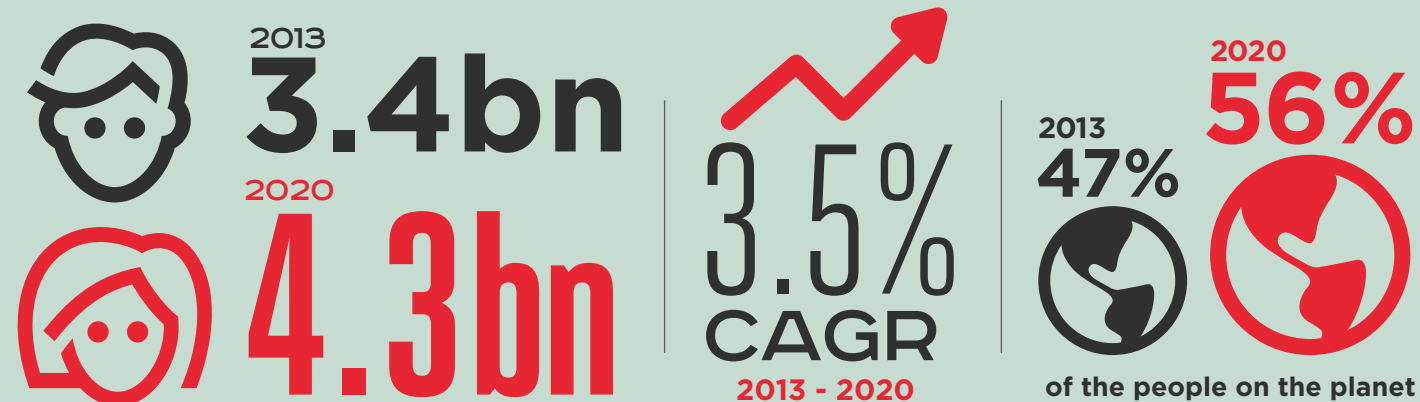


Note: excludes M2M

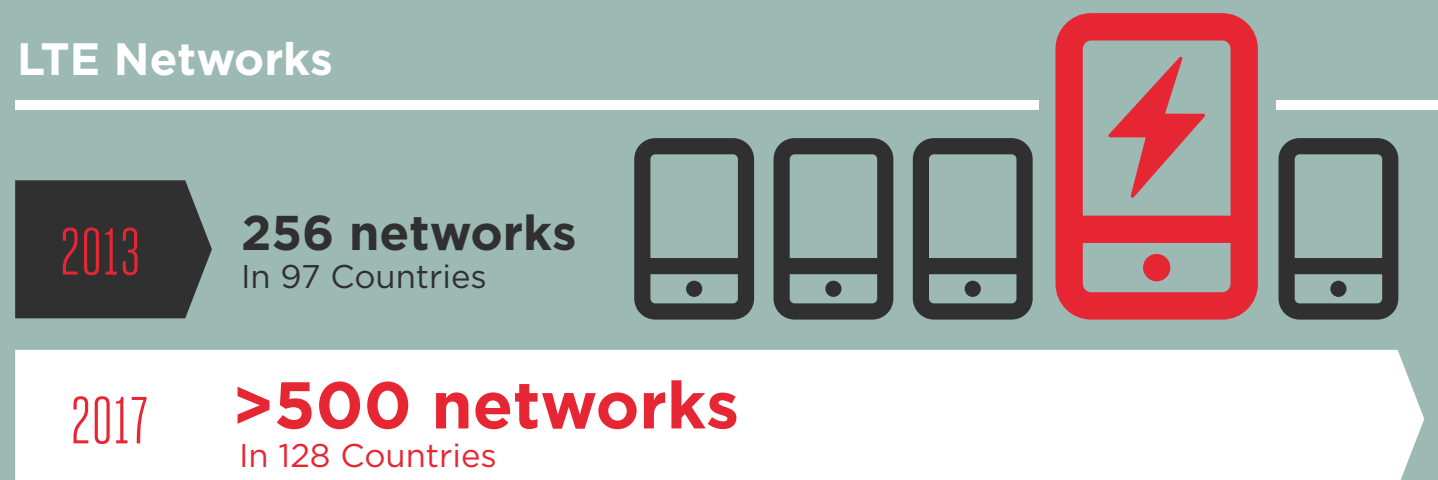
## Mobile Broadband Growth



## Unique Subscribers



## LTE Networks



## Connection Type

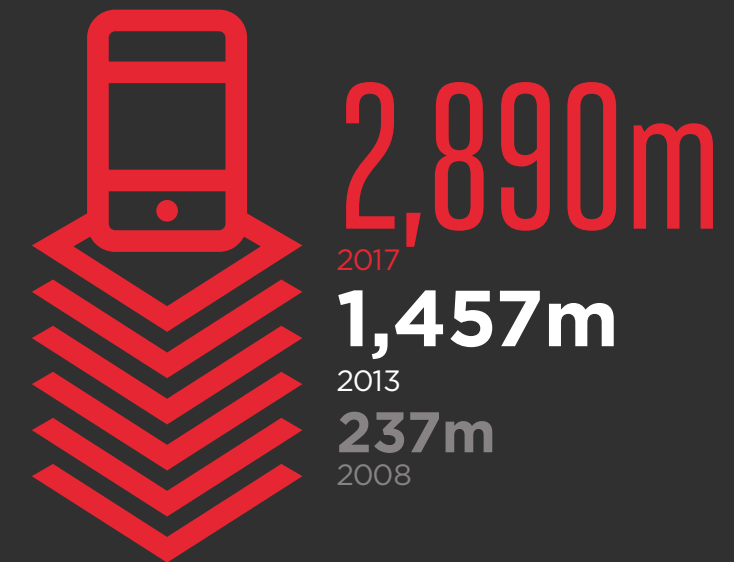
2G  
2008 3622m | 2020 3,163m

3G  
2008 416m | 2020 3,732m

4G  
2008 1m | 2020 2,284m

Note: excludes M2M

## Smartphones Installed Base

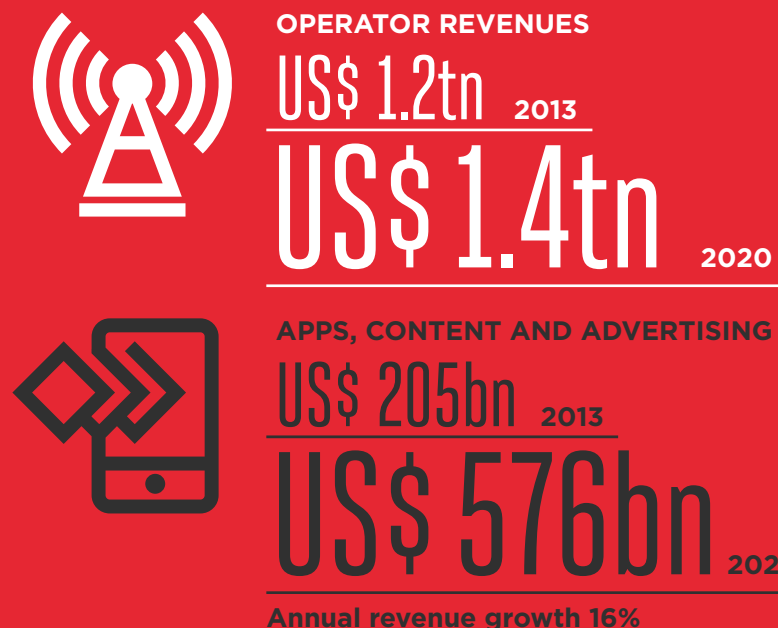


(Source Strategy Analytics)

## Global Connection Speed



## Revenues





# 1 Global market overview

The mobile industry is continuing to see rapid growth in connections, subscribers and data traffic, and is playing a pivotal role in unlocking socio-economic progress across the world. Many industry sectors are increasingly digitising and mobilising their products and services, reducing costs and providing compelling new experiences for consumers.

More advanced devices (such as smartphones and tablets) operating on increasingly ubiquitous mobile broadband networks are allowing users to adopt an ever growing range of new services and applications, which in turn is driving an explosion in mobile data traffic. These transformations and new services have been made possible thanks to the significant investments that mobile operators have been making to deliver the sustained growth and ubiquity of mobile broadband connectivity.

However, despite the success of the industry to date, revenue growth for the mobile operators is expected to slow over the coming years. Operators across the globe face an increasingly common set of challenges, in particular rising competitive pressures and increased regulatory intervention in many markets. This raises questions over the sustainability of the current business model for the mobile operators and their ability to continue to fund the required levels of network investment.

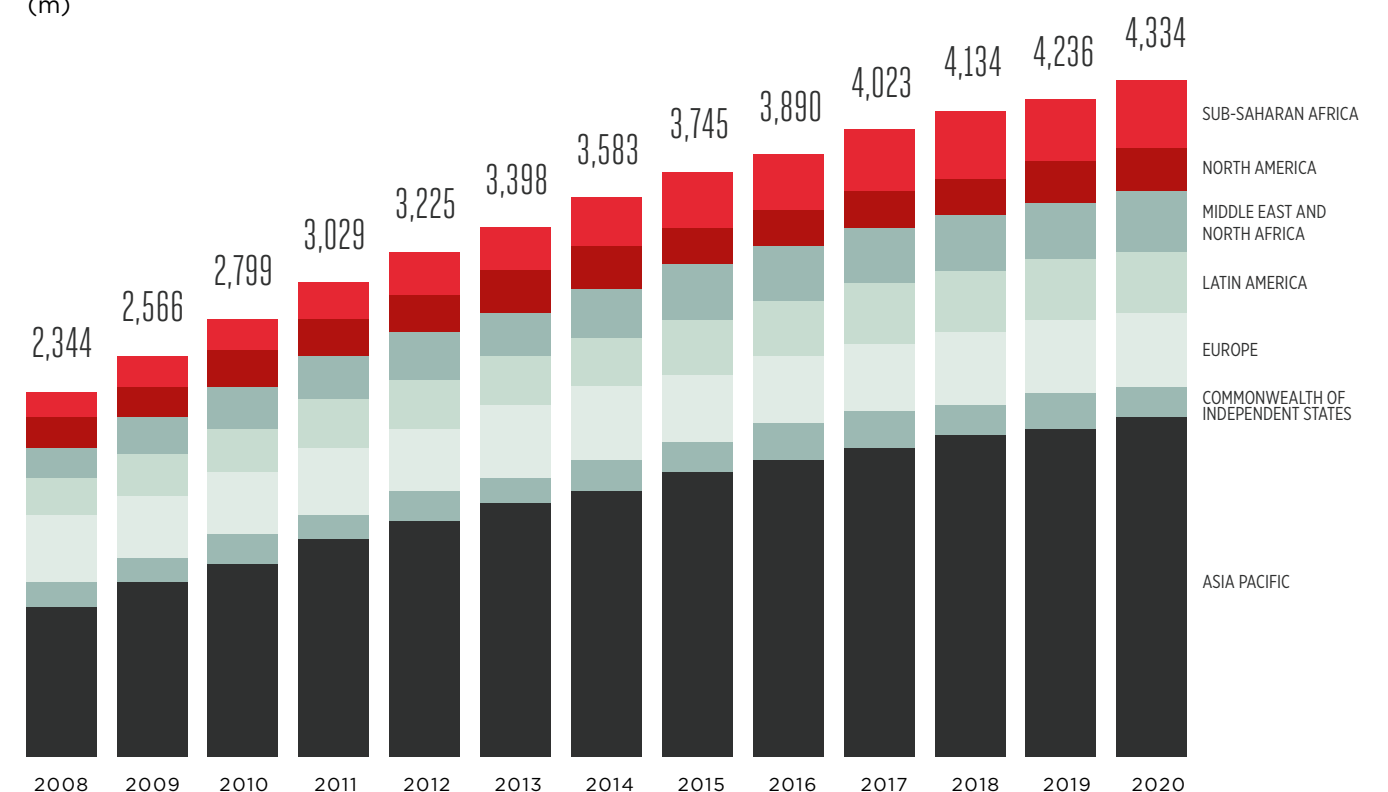
## 1.1 Mobile has scaled dramatically

The mobile industry has scaled dramatically over the last decade. At the end of 2003, there were a little over one billion unique subscribers globally, equivalent to just under one in six people. By the end of 2013 this figure had increased more than threefold to 3.4 billion, equivalent to a unique subscriber penetration rate of 47%. By 2020, the majority of the world's population (56%) is expected to have their own mobile subscription. Multi-SIM ownership means that at the end of 2013 there was a total of 6.9 billion SIM connections<sup>1</sup>, with an average of 1.8 active SIM cards per unique subscriber.

Source: GSMA Intelligence

### Unique Mobile Subscribers

(m)



7.7%

CAGR 2008-2013

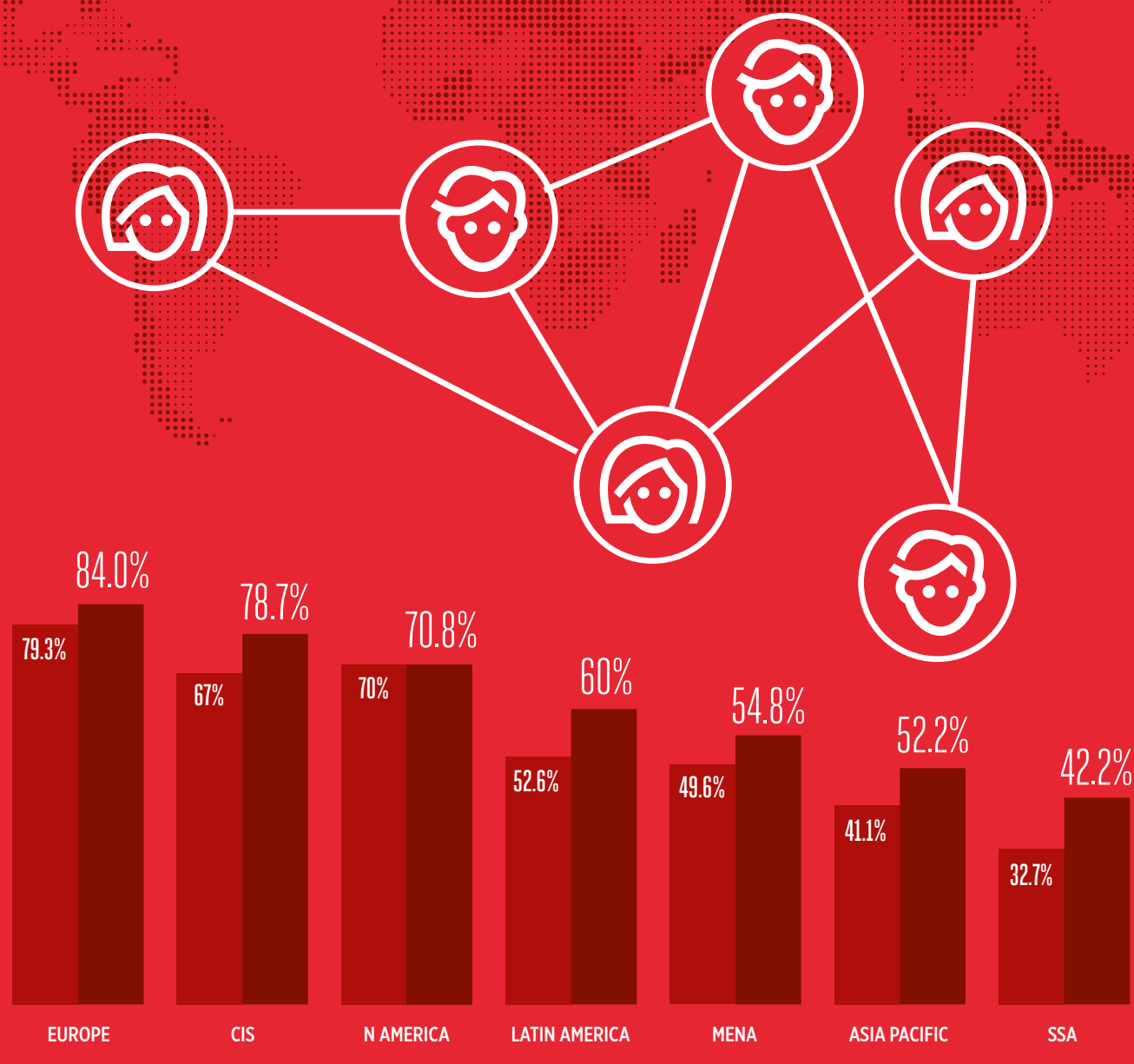
3.5%

CAGR 2013-2020

1. GSMA Intelligence estimates that the total number of active SIM connections at end 2013 was 6.3 billion

Source: GSMA Intelligence

## Unique subscriber penetration by region



The global unique subscriber base has been growing at a rate of 7.3% per annum: growth is forecast to continue, but at a slower rate of 3.5% out to 2020. However, this growth is far from uniform across the regions of the world. Growth is now largely coming from developing markets, which are forecast to add nearly 880 million subscribers over the next seven years, compared to only 56 million new additions in developed markets over the same period.

Unique subscriber penetration rates vary significantly across regions. Europe has the highest penetration rates, followed by North America and then the Commonwealth of Independent States ("CIS"). Sub-Saharan Africa had the lowest penetration rate at the end of 2013 (at just under a third of the population), despite having seen the fastest subscriber growth of any region over recent years.

The developed market average unique subscriber penetration figure is now 79%, which is around the "demographic ceiling" at which subscriber growth tends to stall (with many developed countries already above this level). In contrast, unique subscriber penetration on average in developing markets is only 41%. This highlights the growth potential for mobile services in developing regions, with only four out of ten people in these countries having subscribed to mobile services. However, there are also challenges in many of these developing markets, with incremental subscribers typically generating low average revenues per user ("ARPU") and coming increasingly from rural or remote areas, raising issues for operators about how to bring services to these lower income populations on a cost effective basis.

Multiple SIM ownership is a feature of many markets across the world, in both developed and developing regions, driving a substantial differential between

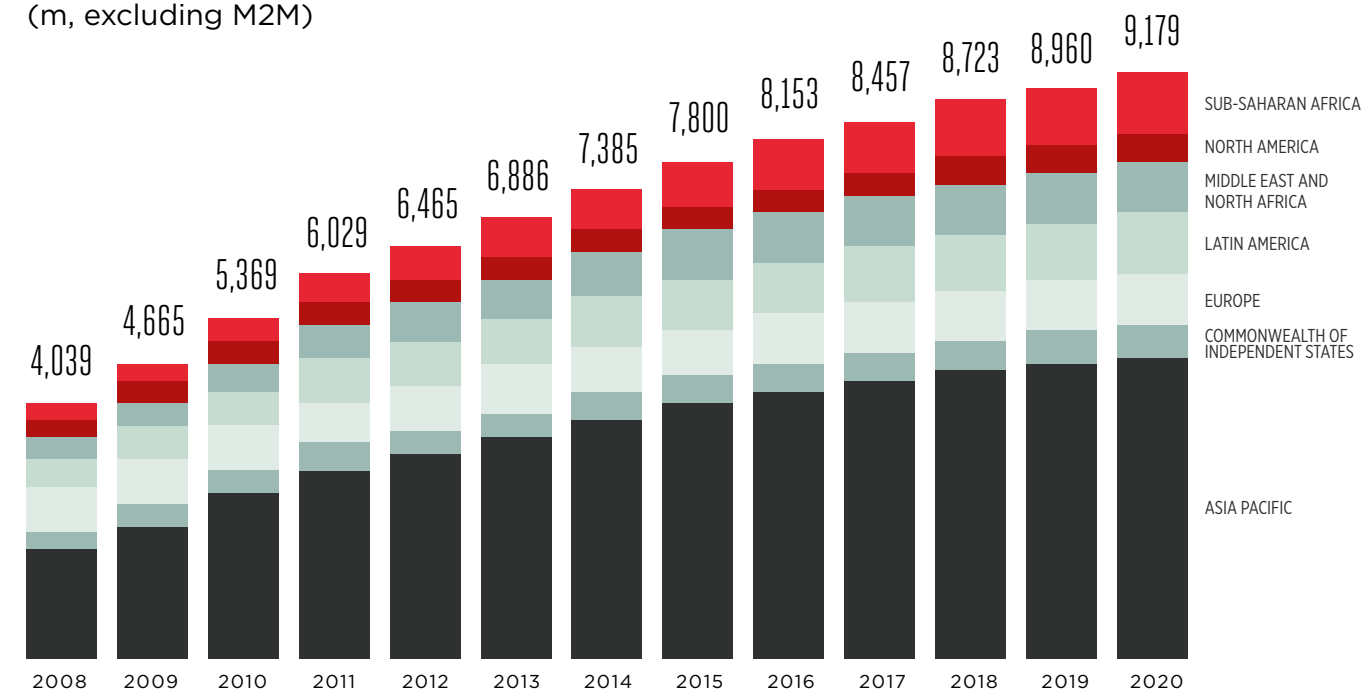
unique subscribers and SIM connections in many markets. Global SIM penetration now stands at 95%, and the figure is already over 124% on average in developed markets. We are now seeing a slowdown in the growth rate of connections across all regions of the globe, linked to slower subscriber penetration growth described previously.

SIM connections have grown globally at a Compound Annual Growth Rate (CAGR) of 11.3% p.a. in the five years since 2008, but are now forecast to grow at a rate of 4.2% per annum for the period out to 2020, less than half of the previous growth rate. This will take the global penetration rate by 2020 to 119%, with connection penetration passing through the 100% level before the end of 2014. The total number of connections will grow by almost another 2.3 billion by 2020: much of this growth in new connections will come from developing markets; adding 2.1 billion connections over the next seven years.

Source: GSMA Intelligence

## Global Mobile Connections

(m, excluding M2M)



11.3% → 4.2%

CAGR 2008-2013 → CAGR 2013-2017

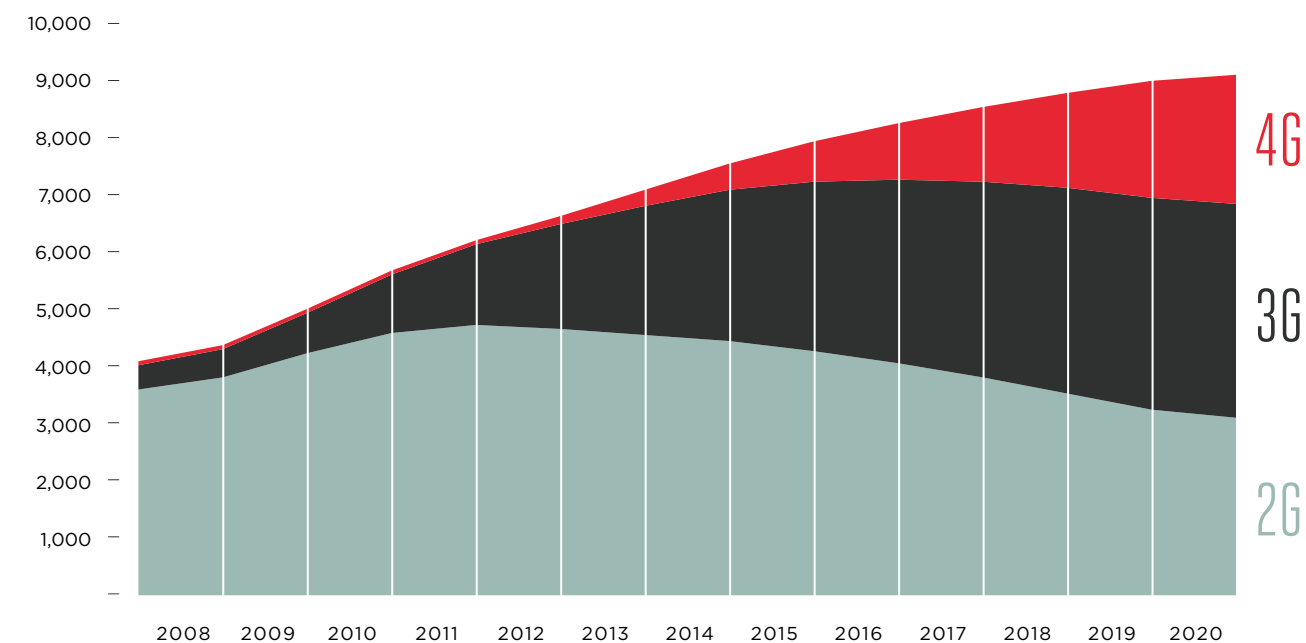
## 1.2 Accelerating higher speed network deployments driving data growth

There is an ongoing technology shift in the global connection base, driven by improving coverage of higher speed networks and the increased affordability of more advanced handsets and devices. While 2G remains the dominant technology in terms of the number of connections, the proportion has fallen from 90% of total connections in 2008 to 67% by the end of 2013. The absolute number of 2G connections fell for the first time in 2013, and this decline is likely to accelerate going forward. By 2020, 2G connections will account for only a third of the total connection base, with 3.2 billion 2G connections by that date excluding machine-to-machine ("M2M").

Source: GSMA Intelligence

### Global connections by technology

(m, ex-M2M)



2G will remain the dominant technology in many lower income countries for a number of years to come, in contrast with the technology shift underway in the developed region.

The developing region is now home to four in every five connections worldwide, and just under 80% of those mobile connections are 2G-only. In contrast, the proportion of 2G-only connections in the developed world had already declined to 30% by the end of 2013.

While in part this reflects the relatively more limited deployment of higher speed networks in developing economies, it is also due to factors around the affordability of more advanced handsets. Cost-conscious consumers in the developing world are looking for the most affordable mobile tariffs and devices, which is likely to extend the life cycle of

2G networks in these markets. The combination of socio-economic and infrastructure challenges mean that 2G connections will still account of the majority of connections in developing markets until 2018.

The number of 3G connections globally has increased dramatically in recent years, growing from just over 600 million in 2009 to over two billion by 2013, accounting for a little under a third of the total global connection base. The 3G base will continue to grow in the future with another 1.7 billion 3G connections forecast to be added by 2020.

We are also seeing an accelerating uptake of 4G connections: these are set to increase from 3% of the global total in 2013 to a quarter by 2020, by which date there will be 2.3 billion 4G connections.



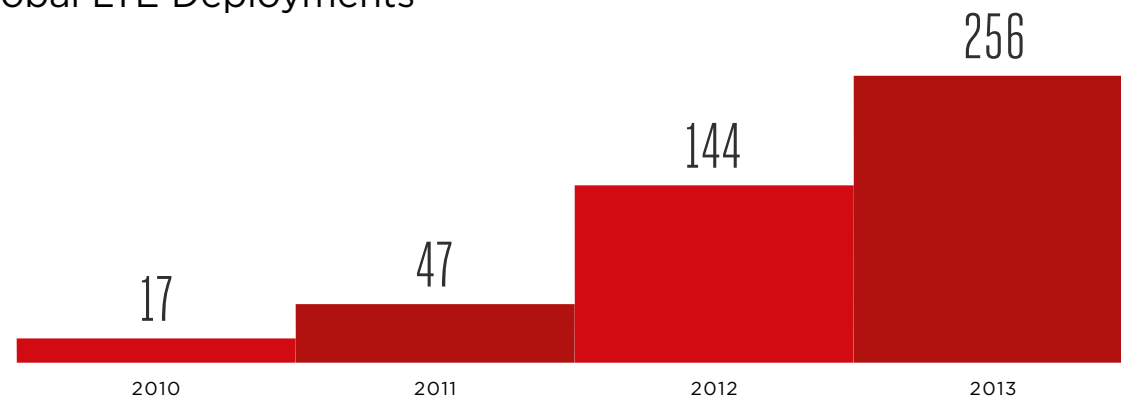
## 1.2.1 LTE network build out gaining pace

The increase in 4G connections reflects the acceleration in LTE deployments in many countries across the world. By the end of 2013 there were 256 LTE networks commercially available across almost 100 countries across the globe. This is forecast to increase to more than 500 networks in 128 countries across the world by 2017, covering half of the global population by that date against only one in five today.

At a country level, the US, Japan and South Korea account in aggregate for 80% of all global LTE connections as of 2013. Going forward the focus will shift increasingly towards Asia, with the region set to account for almost half of all LTE connections by 2017, with growth being led by China.

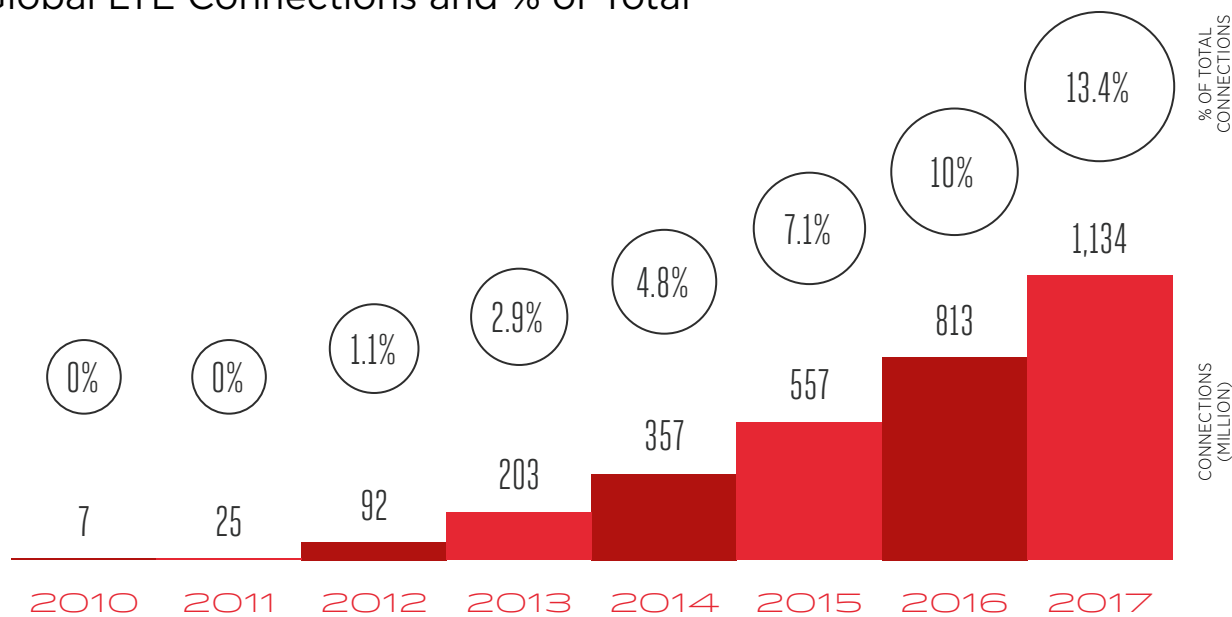
Source: GSMA Intelligence

Global LTE Deployments



Source: GSMA Intelligence

Global LTE Connections and % of Total



# LTE

The increase in 4G connections reflects the acceleration in LTE deployments in many countries across the world.

## 500 NETWORKS IN 128 COUNTRIES

LTE networks are forecast to increase to more than 500 networks in 128 countries across the world by 2017.

## 1.2.2 Mobile broadband and smartphone uptake accelerating

Investment by operators in deploying higher speed networks has driven strong growth in the number of mobile broadband ("MBB") connections over recent years, from just over 200 million in 2008 to well over two billion by 2013 (excluding M2M connections). Mobile broadband is device agnostic and covers a range of technologies including CDMA 2000; EV-DO; WCDMA HSPA; TD SCDMA; WiMAX and LTE.

Growth should remain strong in the future, with almost 4 billion MBB connections forecast to be added in the period out to 2020. HSPA allows operators to offer download speeds of over 14Mbps, and HSPA+ offers significantly higher speeds. Attractively priced propositions (and device subsidies) in many countries mean that mobile broadband offers consumers a viable substitute for a fixed broadband connection, especially in those markets where fixed broadband penetration is relatively low or where

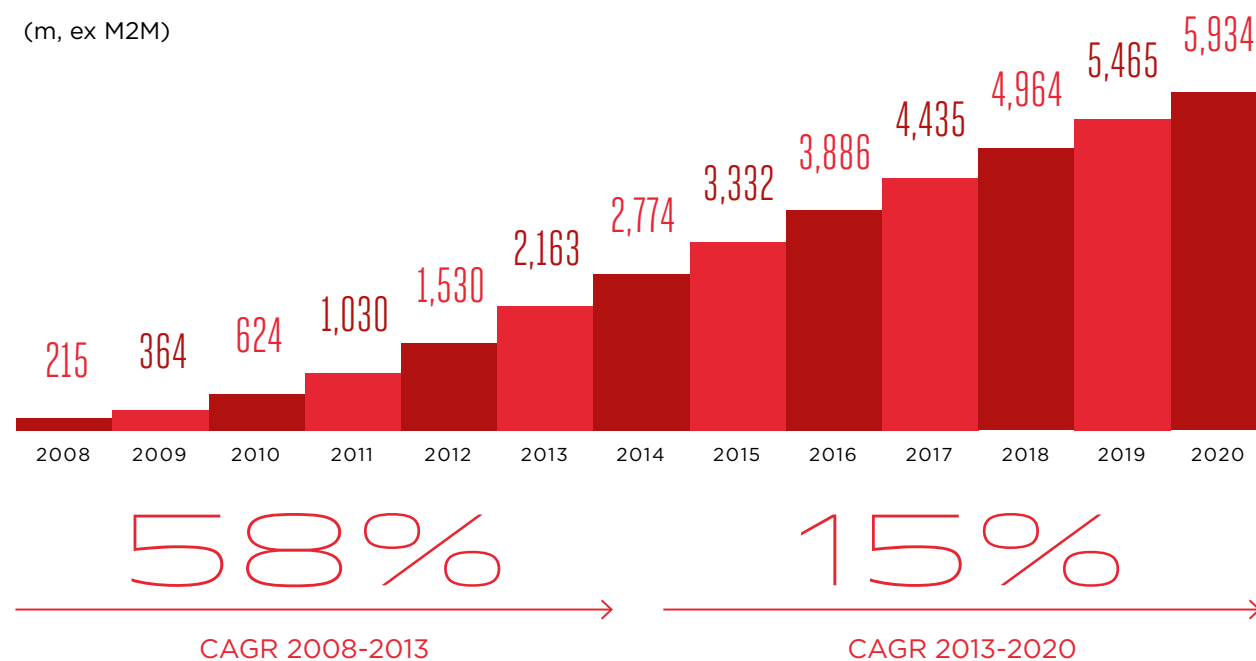
fixed broadband networks have not been fully upgraded to offer higher data speeds. Operators have also encouraged adoption at the lower end of the market for price-conscious consumers, by offering tailored data plans that trend towards prepaid tariff structures.

The growth in mobile broadband connections in many regions of the globe is being driven by rising smartphone penetration. According to data from Ericsson, around 55% of all mobile phones sold in the second quarter of 2013 were smartphones, compared to 50% in the first quarter and only 30% in 2012 as a whole. By the end of 2013, there were just under 1.5 billion smartphones in use, of which almost half were in Asia Pacific. Going forward, new smartphone connections will largely come from the Asia-Pacific region, with just under 900 million new smartphones expected in the region in the period out to 2017.

Source: GSMA Intelligence

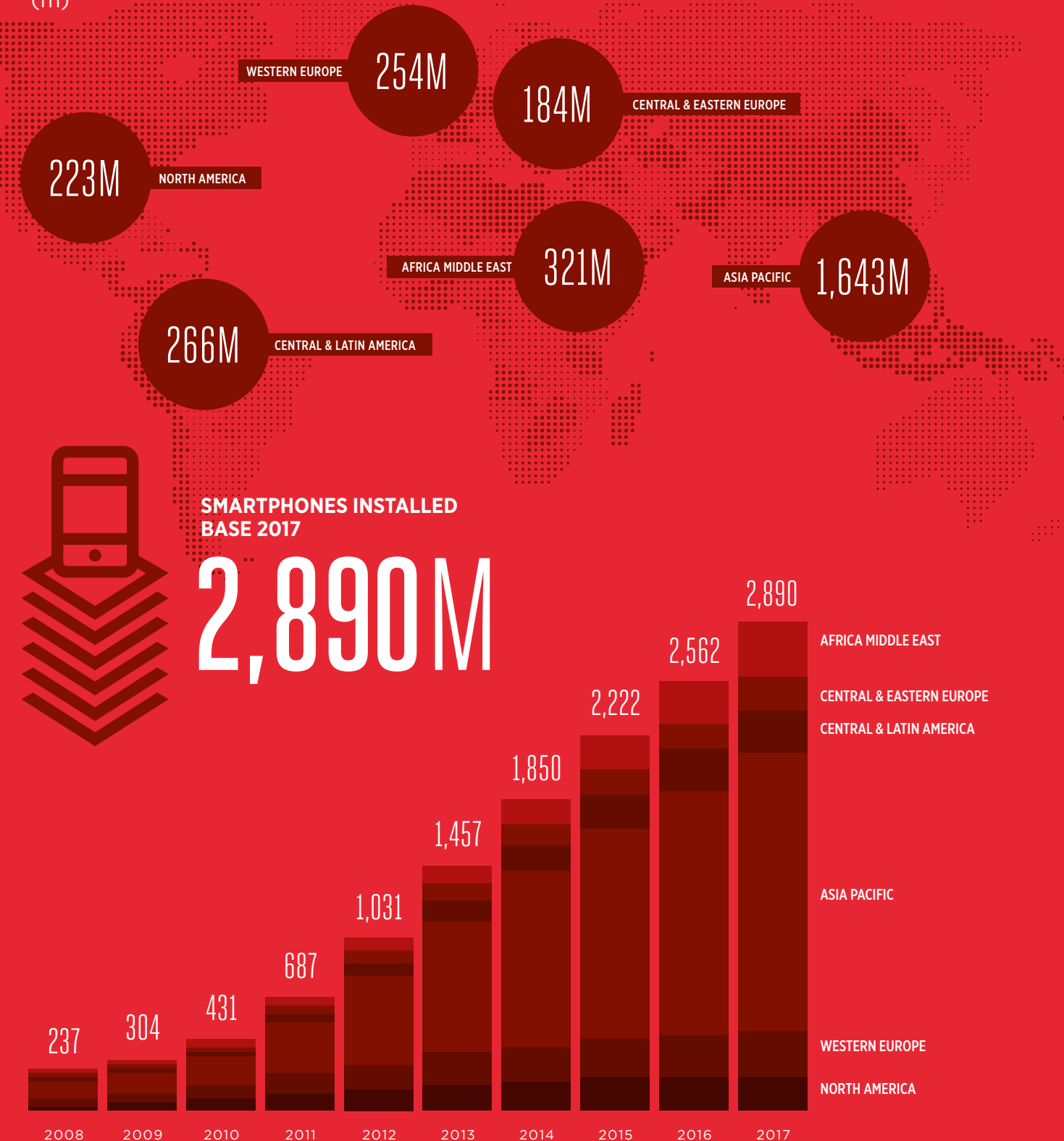
### MBB connections

(m, ex M2M)



Source: Strategy Analytics

### Smartphones installed base (m)



## 1.2.3 Data growth accelerating

More advanced devices (such as smartphones and tablets) operating on increasingly ubiquitous higher speed networks (both 3G and 4G) are allowing users to adopt an ever growing range of new services and applications. These new services are driving an explosion in data traffic across the world. LTE users tend to consume almost twice the amount of data than non-LTE users; 1.5GB per user per month has

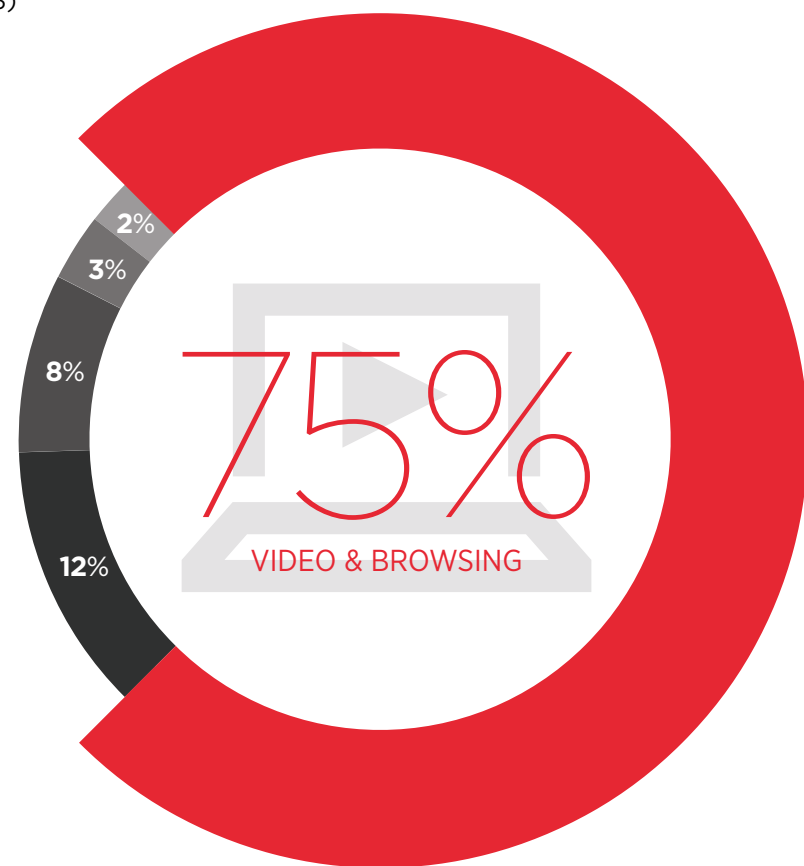
been recorded on average across selected operators in developed markets<sup>2</sup>.

Higher speed networks are enabling the growth of data hungry applications such as video streaming, internet browsing and file downloads. Recent data from Vodafone showed that in the quarter to September 2013, 75% of the company's data traffic in Europe was already video and browsing.

Source: Vodafone

### 75% of data traffic is video and browsing

(% Europe Sep 2013)



- VOICE CALLING OVER INTERNET
- SHARING CONTENT (FILES) BETWEEN TWO DEVICES
- OTHER (VPN, GAMING, IP MESSAGING, ETC.)
- DOWNLOADING FILES (EG. APPS/MUSIC)

2. <https://gsmintelligence.com/analysis/2013/11/global-lte-network-forecasts-and-assumptions-201317/408/>

This combination of factors points to ongoing strong growth in data traffic volumes. At a global level, the rate of growth in data traffic is likely to comfortably outstrip the growth in mobile connections. Ericsson stated that there was an 80% increase in global data traffic between the third quarter of 2012 and the third quarter of 2013<sup>3</sup>.

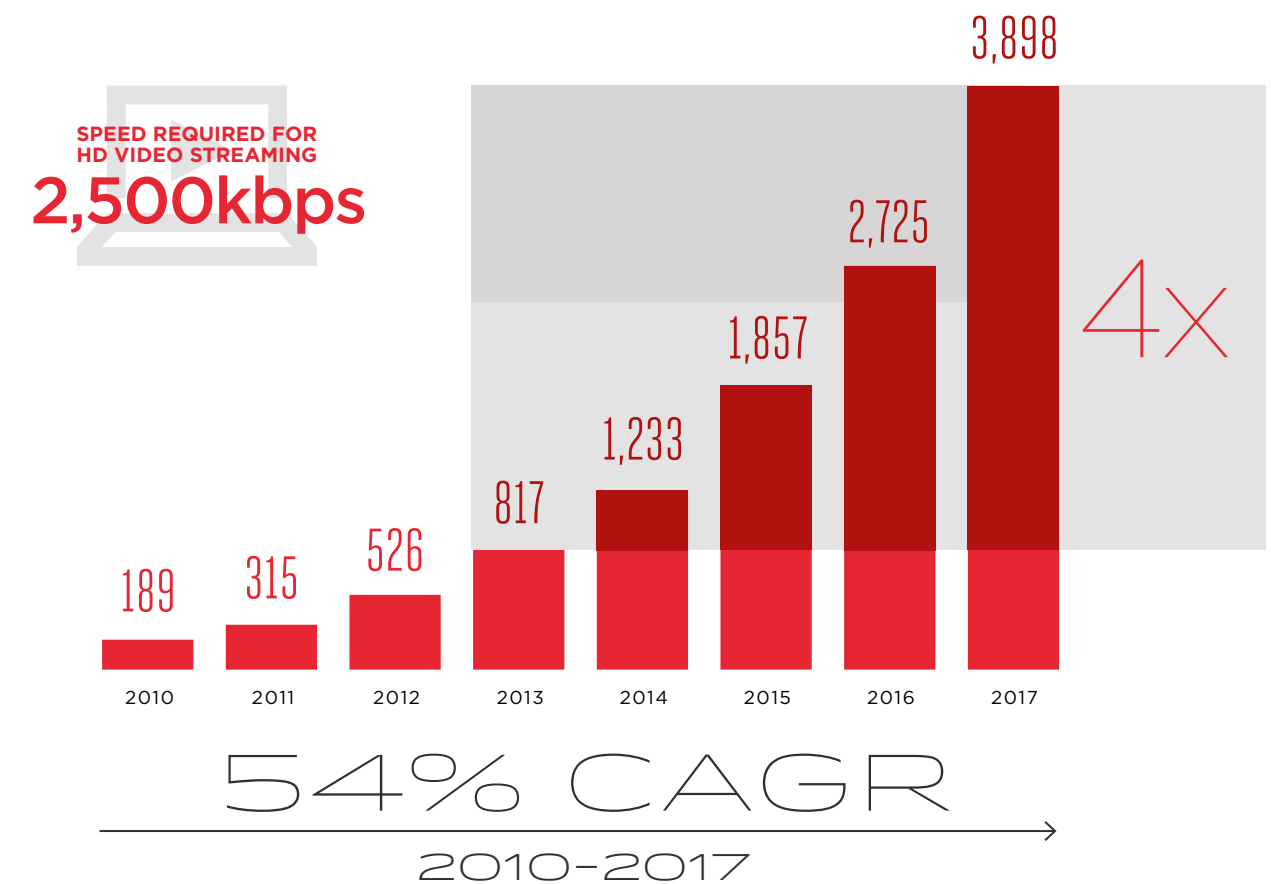
Data growth will also be fuelled by the increasing number of devices connected to mobile networks, including M2M connections, which includes a range of devices and objects including cars, medical appliances and freight packages. M2M data traffic is forecast to grow strongly as a result of the growth in connections, driven by a wide range of applications from smart utility meters to in-car telematics services.

Global network speeds are increasing steadily with the build out of 3G and more recently 4G networks. Cisco estimate that the average global network connection speed was 512kbps in 2012. Cisco also forecast that the average connection speed will increase at a compound annual growth rate of almost 50% by 2017, taking the average speed to over 3.9 Mbps. At a regional level, the more developed regions such as Europe and North America will continue to have the highest connection speeds, though the more significant increase in speeds will come from more developing regions where historic connection speeds are lowest. The extent of 4G (LTE) network deployments is a key differentiator, one of the key reasons that North America is expected to continue to see the highest connection speeds throughout the forecast period.

Source: Cisco VNI 2013

### Average global connection speed

(Kbps)



3. <http://www.ericsson.com/res/docs/2013/ericsson-mobility-report-november-2013.pdf>



## 1.2.4 Mobile operators investing to sustain data growth

Mobile operators have invested more than US\$ 1 trillion over the last six years across the globe. Investment has been driven by a range of factors: to improve network coverage; to increase network capacity to deal with both the growth in connections and the even greater growth in data traffic; and to deploy higher speed mobile broadband networks (both 3G and more recently 4G).

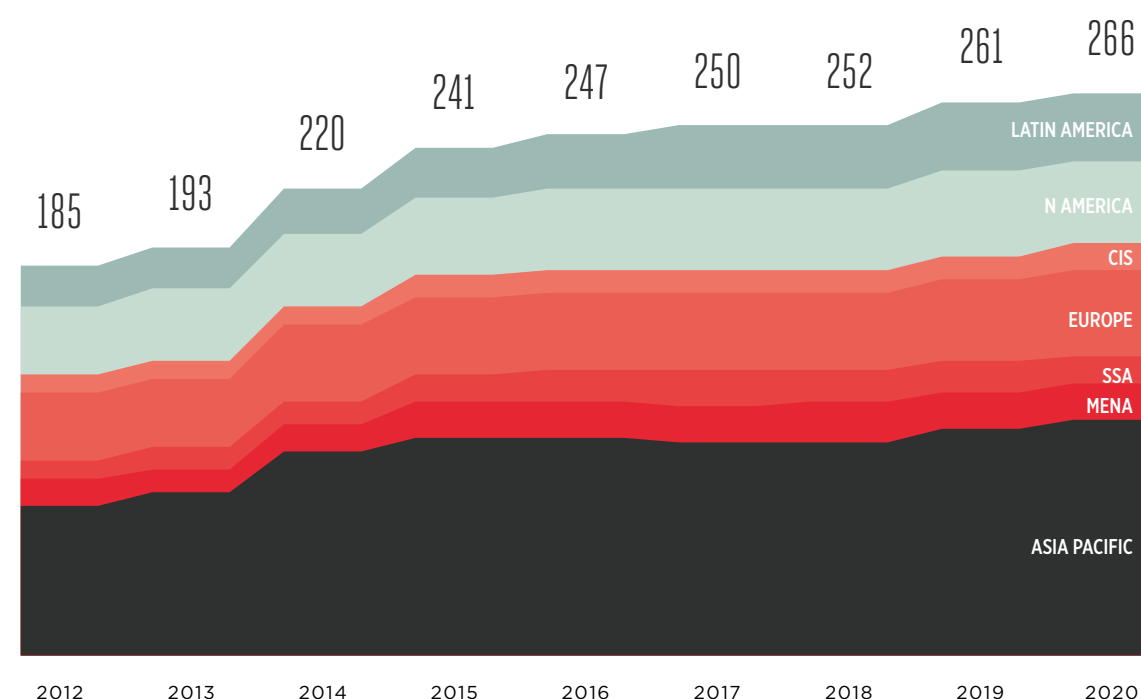
While total capital expenditure ("capex") levels for the mobile operators waivered slightly in recent years due to the impact of the global economic crisis, investment levels have already recovered. Indeed, total investment by the operators is

expected to increase going forward, driven especially by the need to cope with the ongoing explosive growth in global data traffic. For the period out to 2020 operator capex is forecast to exceed US\$ 1.7 trillion, with capex forecast to grow at a compound annual growth rate of 4.7% per annum over the period.

Asia Pacific tends to dominate the capex forecasts given both the sheer number of connections and the expectation for strong data traffic growth in the region. All regions of the world are forecast to see capex growth over the period, reflecting ongoing data traffic growth.

Source: GSMA Intelligence

Total Operator Capex  
(US\$ Bn)



4.7% CAGR  
2013-2020

## 1.3 Revenue Trends

However, and despite this backdrop of high investment levels and the strong growth in data traffic, revenue growth has been slowing for operators across the globe. Growth over the last five years has been at a still healthy rate of over 5% per annum, though this is under half the rate in the preceding six years from the year 2002. This is largely due to slowing subscriber and connection growth already discussed, though revenues have also been impacted by the recent global economic slowdown. While revenue growth has recovered to some degree since the financial crisis, it remains well below historic levels.

Intensifying competition has been a factor impacting global revenue growth in recent years. This is shown by the reduction in the average of the Herfindahl-Hirschman Index ("HHI")<sup>4</sup> globally, which has fallen by around 6 percentage points in the four years to 2012<sup>5</sup>. Whilst increased competition in part reflects a reaction by operators to slowing growth, in many countries it reflects increased regulatory intervention. This includes a range of measures such as the entry of new mobile operators as well as other regulatory measures to increase competition such as the introduction of mobile virtual network operators (MVNOs) and number portability.

The impact of some of these regulatory actions are discussed in more detail in the final section of this report.

The GSMA segments all mobile markets across the world based upon their technological maturity (using smartphone and 3G penetration rates as the basis for classification), with four segments identified. The following section looks in more detail at the factors that have impacted revenue growth and market developments in each of the four segments.

4. HHI can be used to measure levels of competition in national mobile markets; the lower the index figure, the more competitive the market  
5. <https://gsmaintelligence.com/files/analysis-subscription/?file=131031-revenue-trends.pdf>

# Segment Trends

## 1.3.1 Discoverer

The Discoverer segment includes markets mainly in Africa and Southern Asia, where unique subscriber penetration still stands on average at only a third of the population. Unique subscriber growth in recent years has been very strong, with this segment showing the highest growth rate of any segment at 15% over the last five years. However, with only one in three people having subscribed to a mobile service, there is clearly significant growth to come.

These markets are predominantly prepaid (contract market share remains in the single digits) and low ARPU, with approximately 90% of connections still utilising 2G networks. Smartphones contribute less than 10% of total connections, while non-voice ARPU is less than 10% of total ARPU.

Mobile revenue growth among the Discoverer segment is stabilising after an explosive growth rate of 54% during the period 2002- 2006, with growth slowing to 10% over the last five years. Increasing penetration among some of the world's poorest countries will inevitably lead to declining ARPU, and put pressure on revenue growth. However, competition, intense price wars and mobile market policies have also had a significant impact on recent revenue growth and operator profitability in these countries.

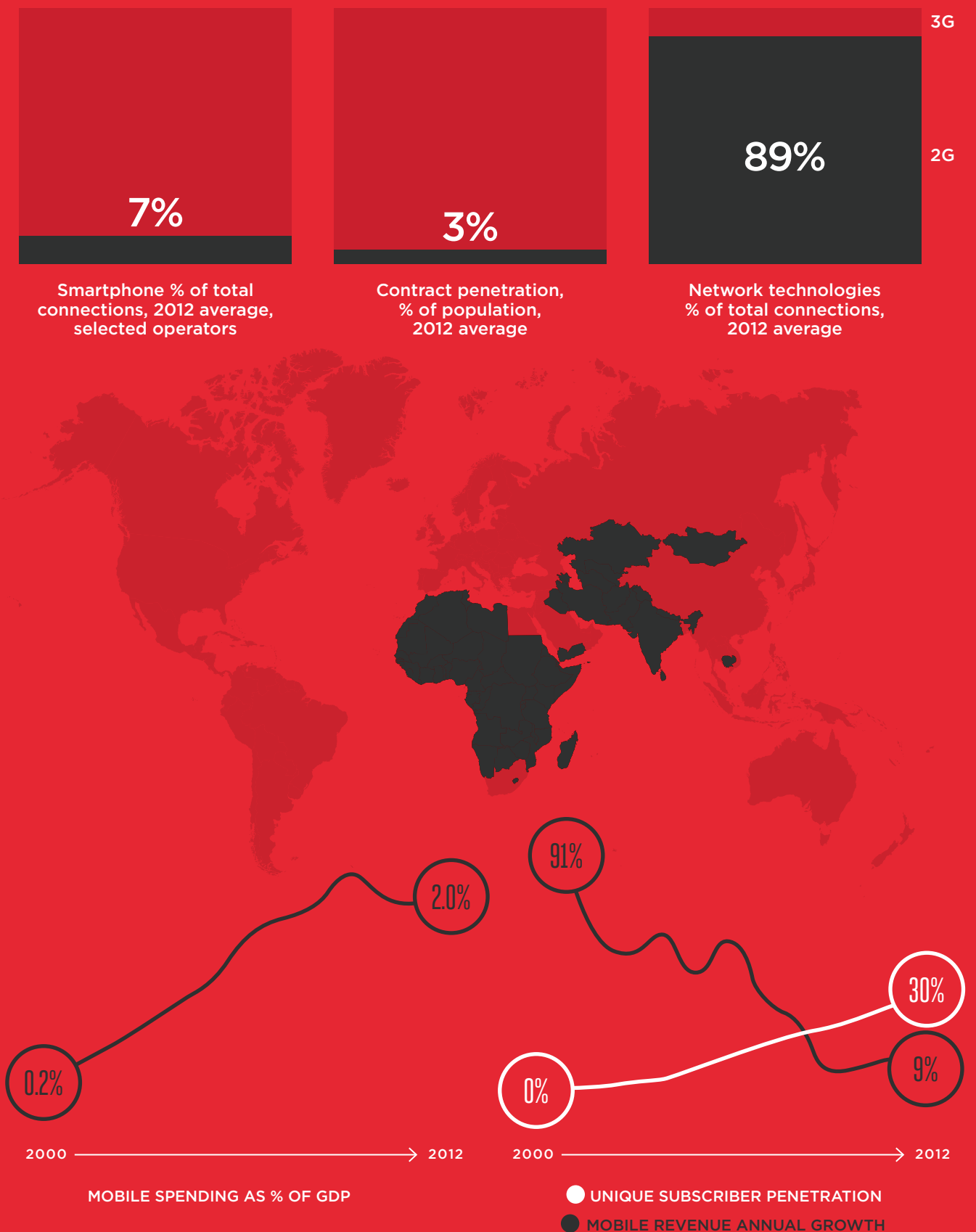
In markets where operator profitability is under threat, device affordability, prepaid voice and data plans and lower taxes are some of the key factors that can help stimulate demand, while ensuring operators do not pay over the odds for mobile

spectrum will allow them to support lower price points. As has been previously noted in other markets—from Europe to India—mobile retail prices will climb in the face of unrealistically high spectrum prices and high taxation, slowing the pace of mobile adoption<sup>6</sup>. This is particularly true when it comes to mobile broadband services, where the cost of deployment for operators and of devices/usage for users is generally higher than for more basic services.

While unique subscriber penetration rates are relatively low and show the long term growth potential for markets in this segment, there are also challenges for operators. Operators need to extend network coverage into more rural and remote areas in a cost effective manner, into areas where supporting infrastructure (such as electricity) is often limited or absent. With new subscribers in these areas generating relatively modest ARPUs, there is a particular challenge for operators to ensure that network deployments generate adequate returns on investment.

6. <https://gsmintelligence.com/analysis/2013/07/bangladesh-asias-untapped-mobile-broadband-opportunity/394/>

Source: GSMA Intelligence





## 1.3.2 Fast Growers

The Fast Grower segment includes the major emerging markets of China, Brazil, Russia and South Africa (markets that together already accounted for a quarter of the world's total subscribers at the end of 2013), as well as a number of other Eastern European, Latin American and Asian countries. Unique subscriber penetration growth among this segment has advanced at a steady pace over the last 10 years, reaching half of the population in 2013.

These markets are witnessing strong growth in 3G adoption with around 30% of total connections on 3G and a quarter of connections being smartphones. While non-voice ARPU and contract penetration are still relatively low, on average Fast Grower markets have seen these metrics break into double digits (as a percentage of the total).

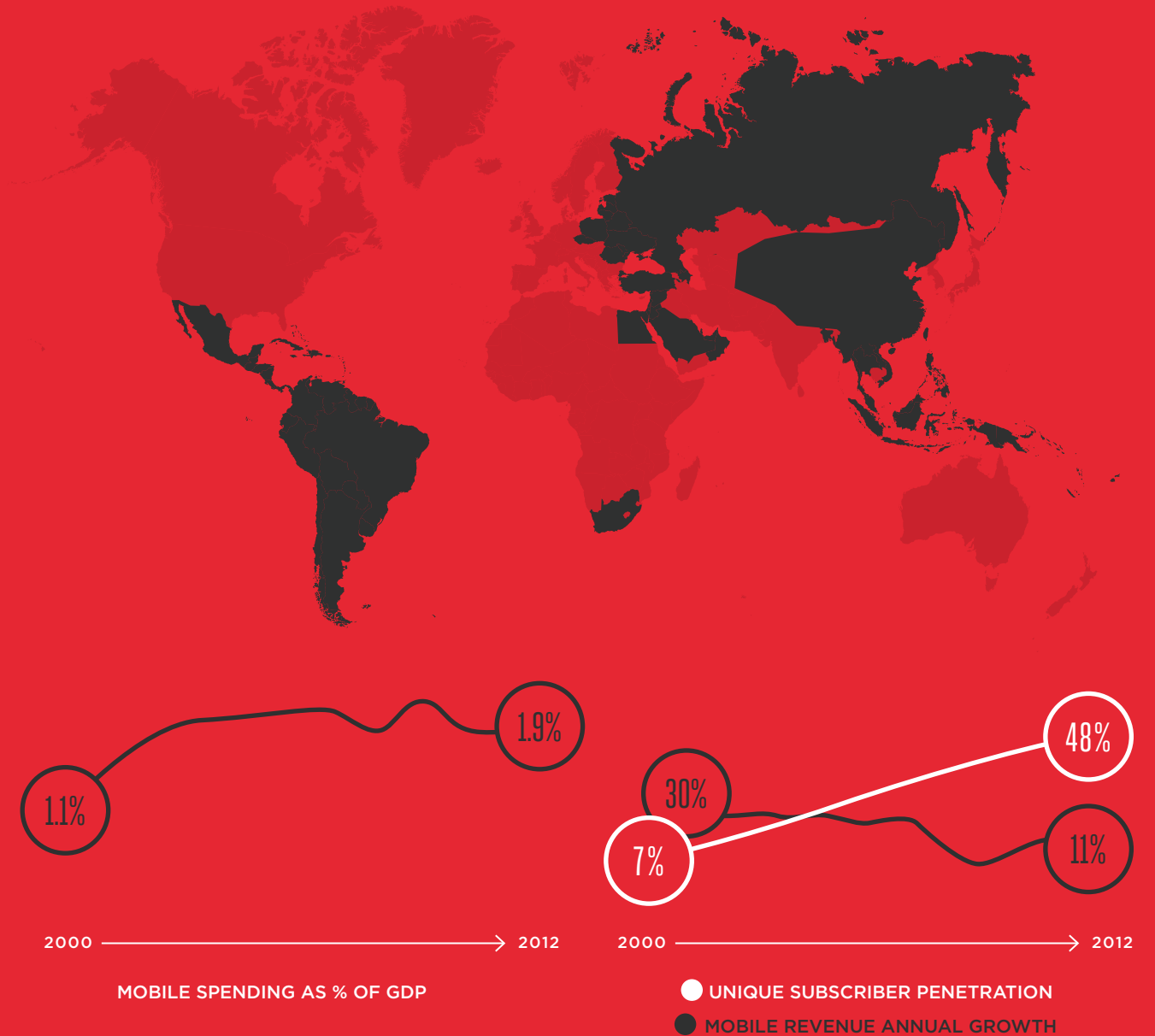
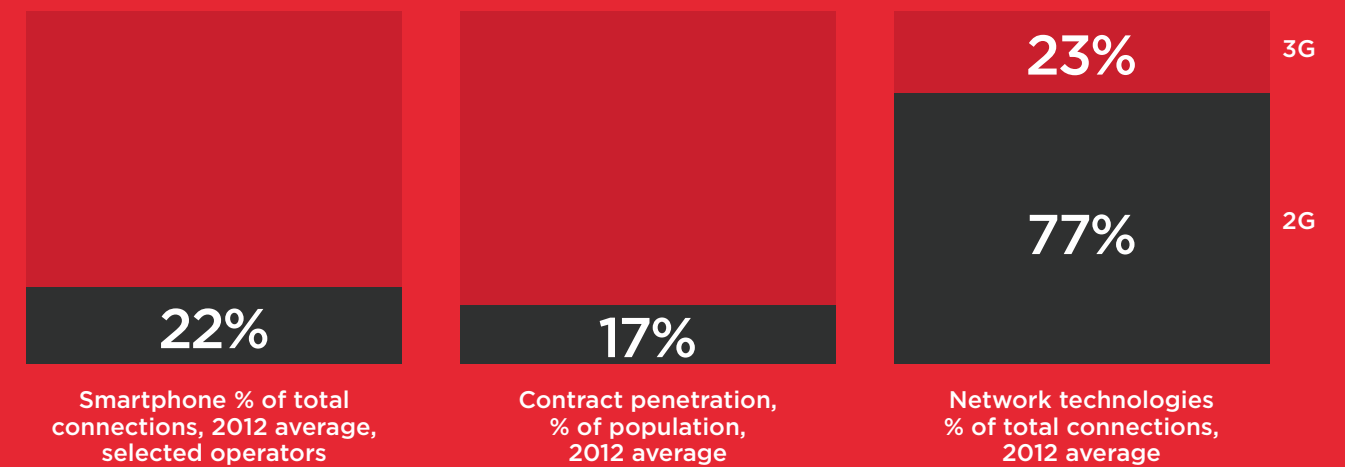
There is a common theme across many Fast Grower segment countries of increased regulatory intervention and rising competitive pressures. A number of the major countries in the segment have seen new entrants enter the market, with revenue growth falling as a result of increased competition over recent years.

Mobile operators in Fast Grower markets are facing a dual challenge of having to introduce more affordable products and services to meet price-

sensitive demand in rural areas, while fighting high churn rate in mature urban areas. These markets still tend to be dominated by prepaid subscribers. Both smartphone and mobile broadband uptake in these markets is accelerating, while LTE deployments are also gaining scale leading to increasing data growth.

For most markets in this segment, the key to unlocking greater revenue growth lies in encouraging subscribers to adopt smartphones and mobile data services, as voice-only growth models will not be sustainable over the medium-term. A number of operators in the region have notably turned to handset subsidies to stimulate data demand growth.

Source: GSMA Intelligence



### 1.3.3 Connected Players

This segment includes many markets in the throes of recession, or with very minimal GDP growth, such as those found in Europe. Mobile revenues for this segment have continued to decline over the last four years, with revenue declines forecast to continue albeit at a more modest rate. Unique subscriber penetration levels for the Connected Player segment are among the highest in the world, reaching 80% in 2009, with very limited growth since then.

A number of factors influence mobile revenue trends within the Connected Player segment. As outlined previously, unique subscriber penetration tends to stall once it passes the 80% demographic ceiling, a situation which is very evident in the Connected Player segment. However, there are also a number of other factors negatively impacting revenue growth.

One of the most often cited reasons for revenue decline among the Connected Player segment has been regulator-driven reductions in mobile termination rates ("MTRs"). This is particularly true across Europe, with many operators continuing to highlight their performance excluding the impact of MTR reductions. The average MTR across Europe more than halved between 2010 and 2013. Roaming price caps are estimated by the European Commission to have reduced revenues by €15 billion by the end of 2012<sup>7</sup>, a major challenge to industry profitability at a time when operators are seeing overall revenues decline.

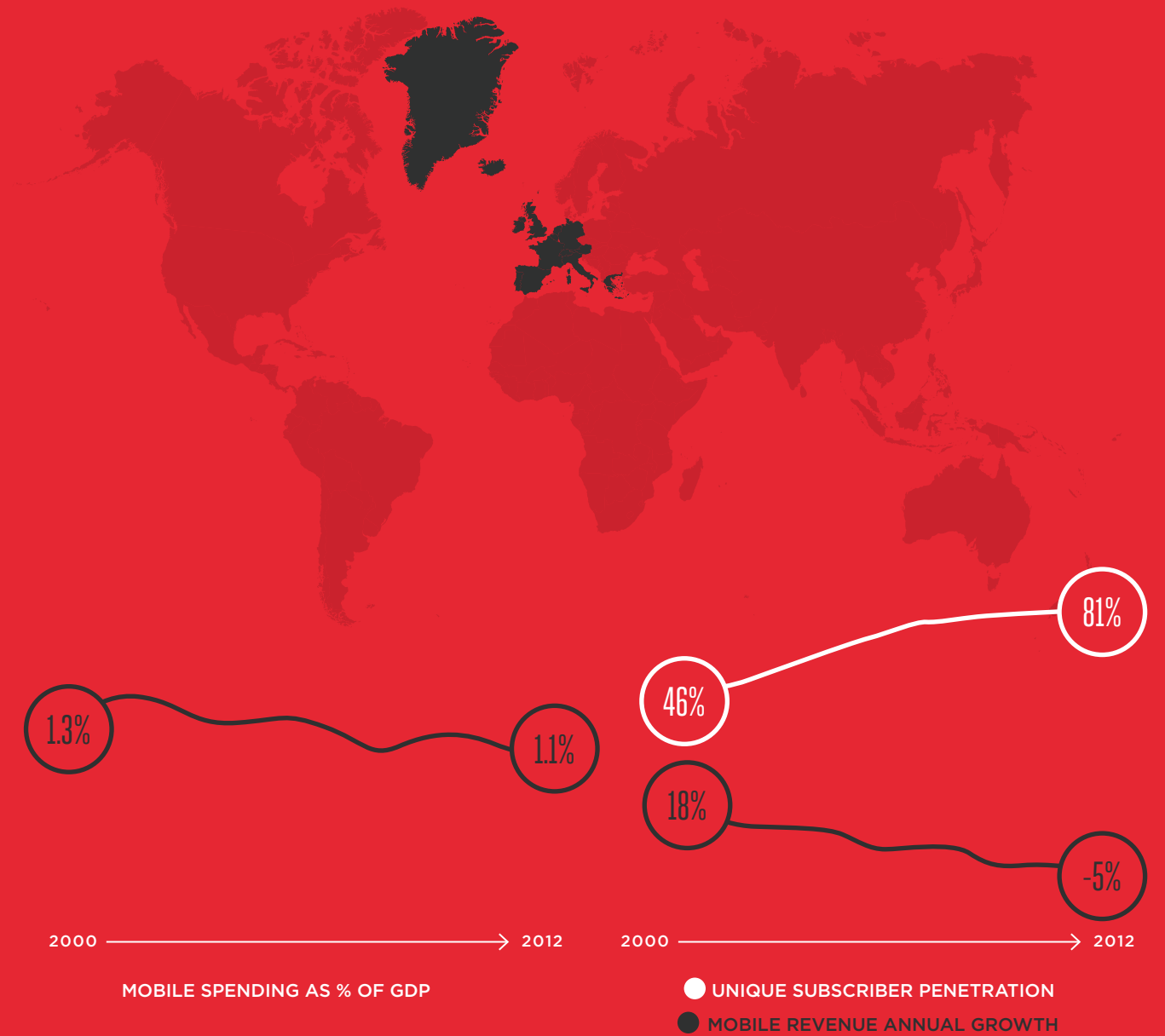
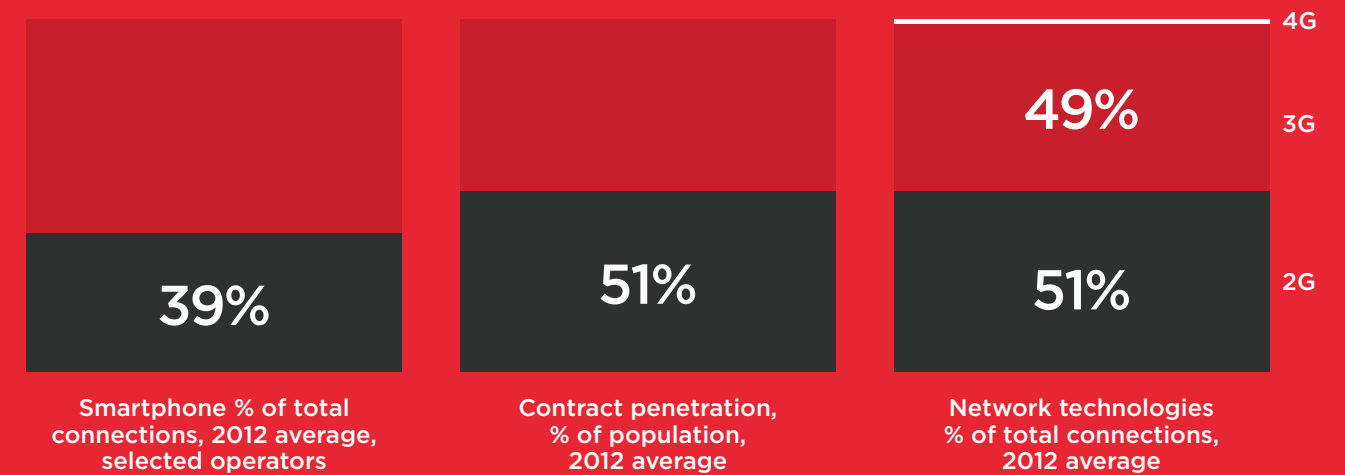
The adverse macroeconomic environment has also played a part in dragging top-line performance downwards. Figures for Europe as a whole also mask the significant variation in growth rates across the region, with for example Greece seeing a 6.4% decline in GDP in 2012 and Italy a 2.4% decline. It is these southern European markets that have seen the greatest macro pressures, which are also seeing the most significant declines in mobile service revenues.

Across Europe, slow-to-negative GDP growth has exacerbated the negative impact of rising competitive pressure on top line revenues. From 2008 to 2012, the average HHI across Europe fell by 6.8% indicating an increase in competition and a decline in the market power of dominant operators.

With rising smartphone penetration in Europe, online messaging services such as Viber and WhatsApp have seen exponential growth in Europe over the last couple of years. However, the growth of these new services, which has gone hand in hand with this rising smartphone penetration, has created a dilemma for the industry. The enormous growth in third party applications is one of the key drivers of increasing demand for mobile data services, and messaging services are just one facet of this growth in the broader mobile ecosystem.

The key challenge for operators in this segment is to diversify the revenue base, given the ongoing decline in traditional voice and data revenues. Operators in a number of countries in Europe have been relatively slow to launch LTE services, due to delays in allocating lower frequency spectrum but also due to financial pressures and falling profitability as a result of ongoing revenue declines. This has hampered the ability of operators to monetise data growth and to extend the reach of mobile services into new services and adjacent industries.

Source: GSMA Intelligence



7. "Digital Agenda: New price caps for mobile data roaming expected to save families over €200 each year and business travellers over €1000"; May 2013

## 1.3.4 Digital Pioneers

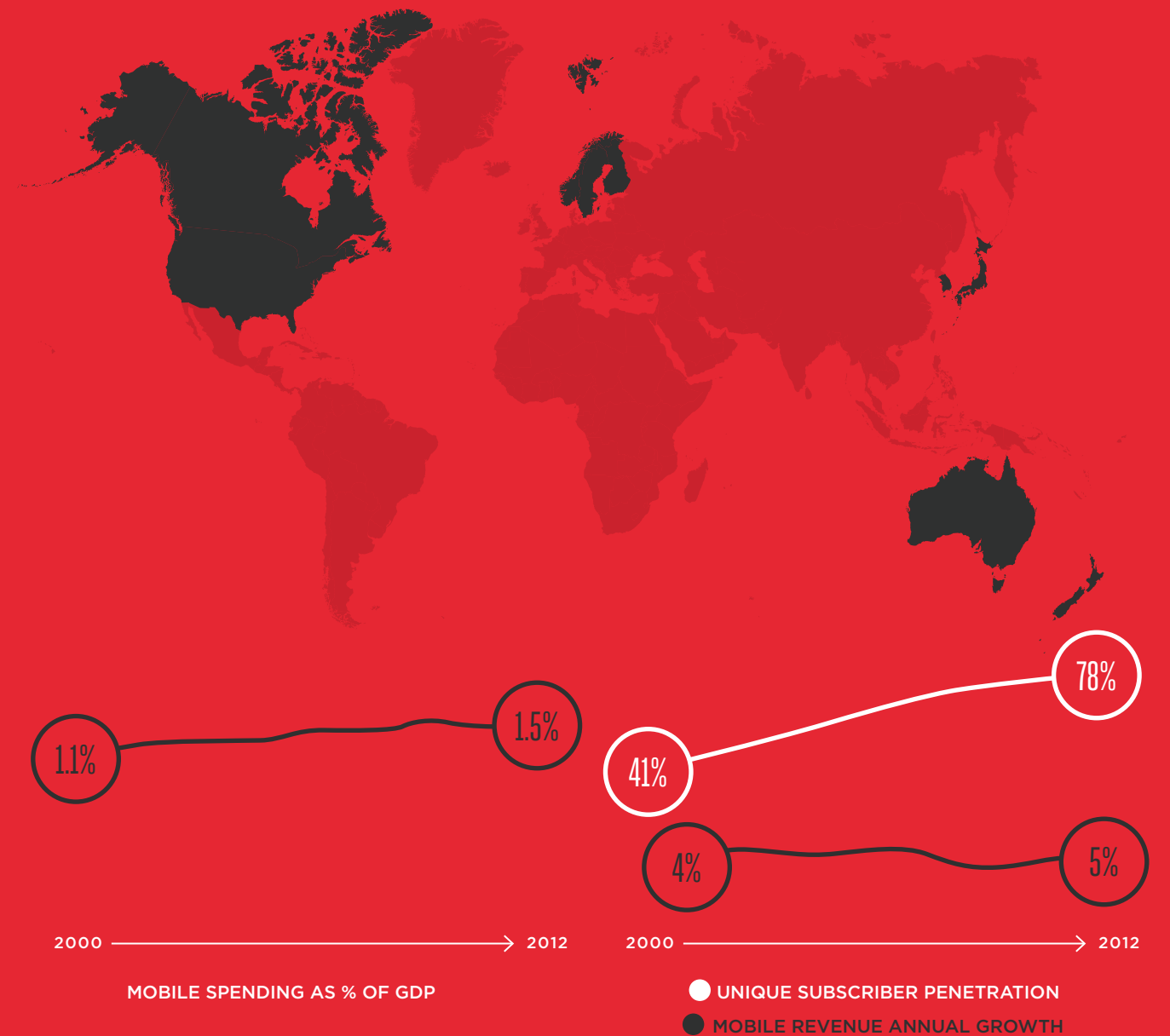
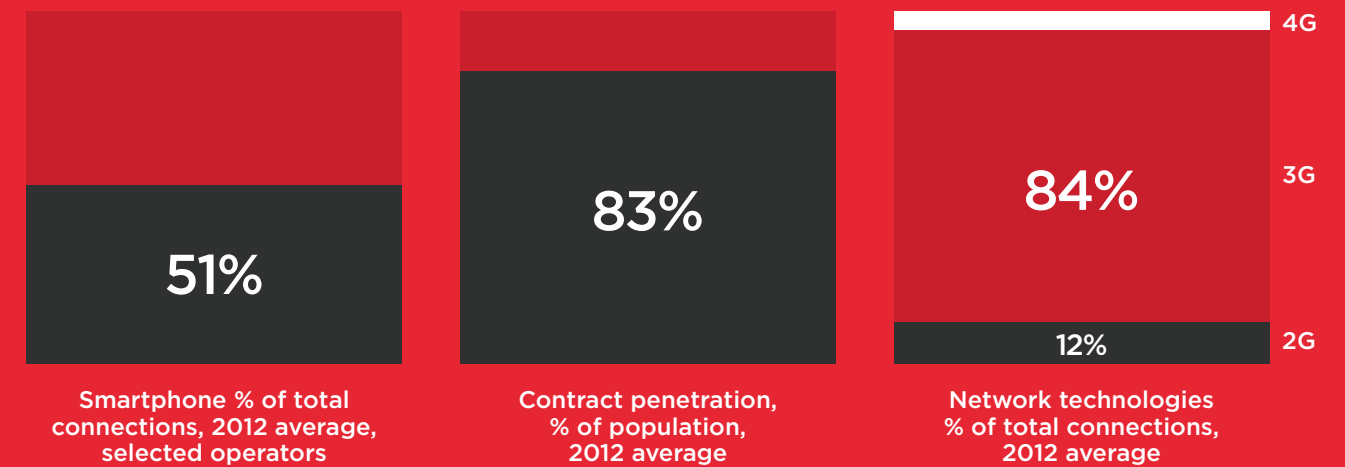
The Digital Pioneer segment includes the most advanced telecom markets in the world, including those in Northern America, Eastern Asia and the Nordics. In contrast to the Connected Players segment, mobile revenue growth for this segment has remained in positive territory over the last four years. While unique subscriber penetration rates for the segment are approaching the 80% threshold, this does not appear to be impacting revenue growth in the same way as in the Connected Player segment.

Operators in Digital Pioneer markets have been more successful than their Connected Player counterparts at monetising data growth—notably through the launch of LTE networks and compatible bigger-screen devices—and this has helped to boost operators' top lines. At the end of 2013, nearly a quarter of connections in North America were 4G, while the comparable figure for Europe was only 3%.

Digital Pioneers have some of the highest non-voice ARPU levels worldwide, on average 25% of the total. In addition, and in contrast to those in the

Connected Players segment, many of these markets are still experiencing ARPU growth. The challenge for operators going forward is to further integrate mobile into adjacent industries in order to continue to diversify their revenue streams and to further expand the mobile ecosystem. Competition in many countries in this segment has been less intense in recent years than for many Connected Player markets, with regulation often more supportive, though there is no guarantee that these more benign conditions will continue.

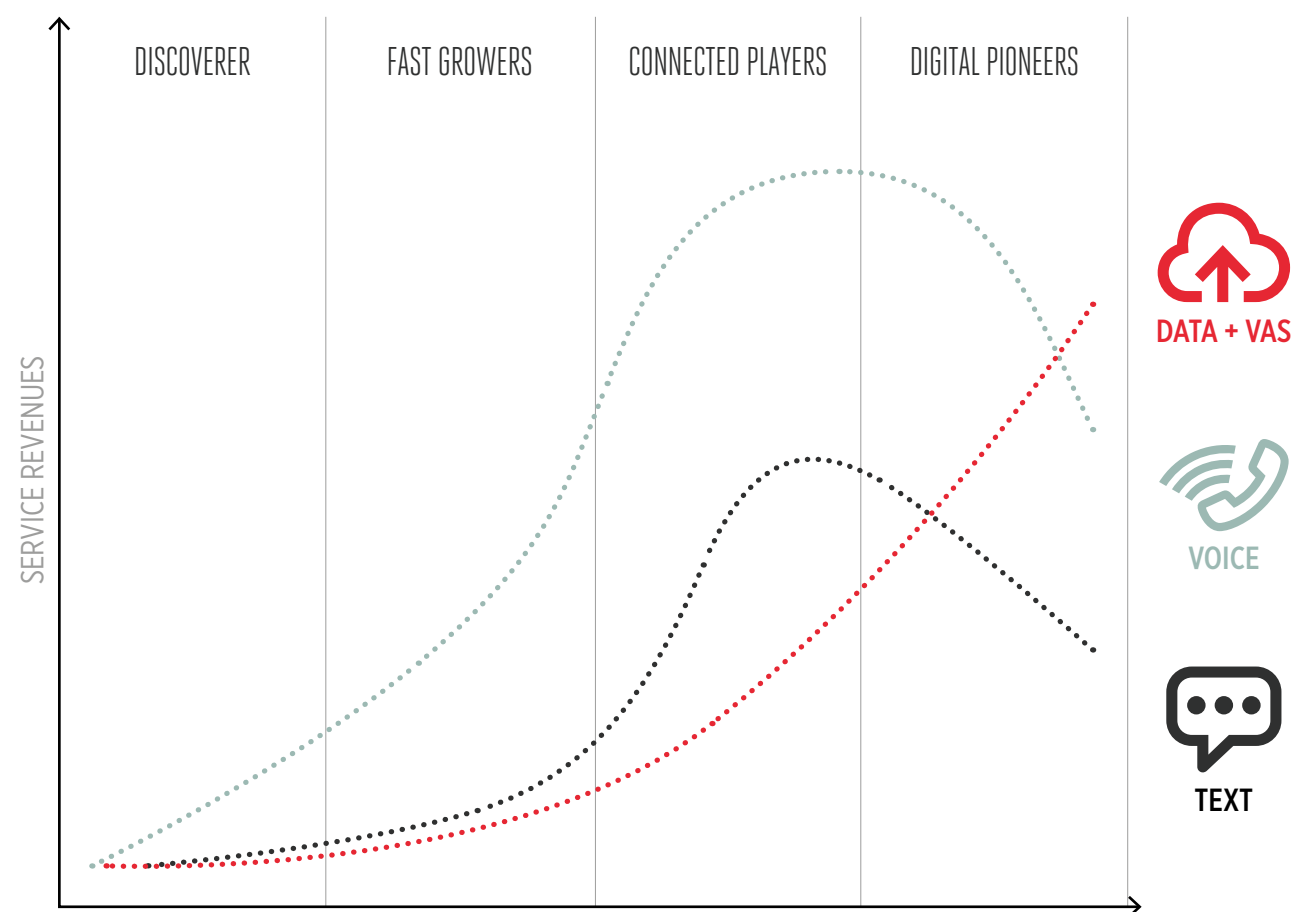
Source: GSMA Intelligence



## 1.4 Revenue mix and outlook

There are clear shifts occurring in the revenue composition of mobile operators at a global level and across the different segments. While revenues in the Discover segment are primarily from traditional voice and data services, revenues from these services begin to decline as markets mature and operators move into the Fast Grower segment and particularly the Connected Player segment. The challenge for these operators is then to diversify revenue streams towards new data and value added services, and in the process monetise the explosive growth in data traffic.

Source: GSMA



### 1.4.1 Revenue outlook

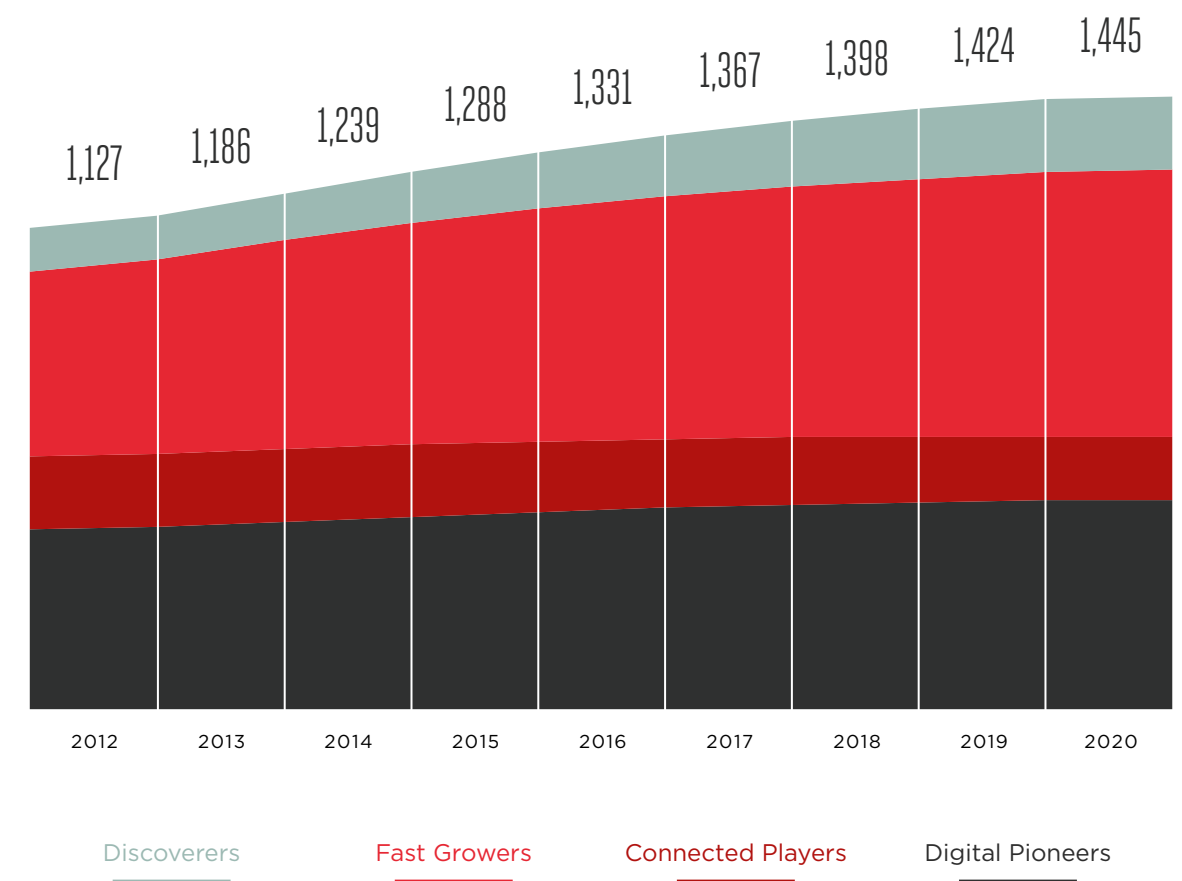
At a global level, mobile operator total revenues are forecast to grow by 2.9% per annum out to 2020, reaching a total of over US\$ 1.4 trillion.

Growth rates will vary across the regions and segments, with the fastest growth likely to continue to come from the Discover segment, while the Connected Players are likely to see ongoing revenue declines, albeit at a more modest pace than the declines in recent years.

Source: GSMA Intelligence

#### Mobile operator total revenue forecasts

(US\$ Bn)





Traditional revenues (voice and messaging) for the mobile operators have been impacted by new entrants to the mobile ecosystem, and particular new online messaging services such as WhatsApp and Skype. With smartphone penetration likely to increase across all segments in the coming years, this trend is likely to accelerate, increasing the pressure on mobile operators to diversify their revenue streams.

There are though clear opportunities for operators to diversify and grow their revenues, with revenues expected to grow at a faster rate in the broader mobile ecosystem at over 5% per annum.

By far the fastest growth rates in the broader ecosystem will come from the areas of applications, content and advertising, where annual revenue growth is expected to be 16% and to total US\$ 576 billion by 2020. This highlights the role of the mobile networks as enablers in allowing a broad and successful ecosystem to develop, based on high speed, ubiquitous mobile networks. A number of new players have already entered the mobile ecosystem, while the power of mobile networks has enabled the launch of new applications and services in a range of adjacent industries including the retail, finance and automotive industries.

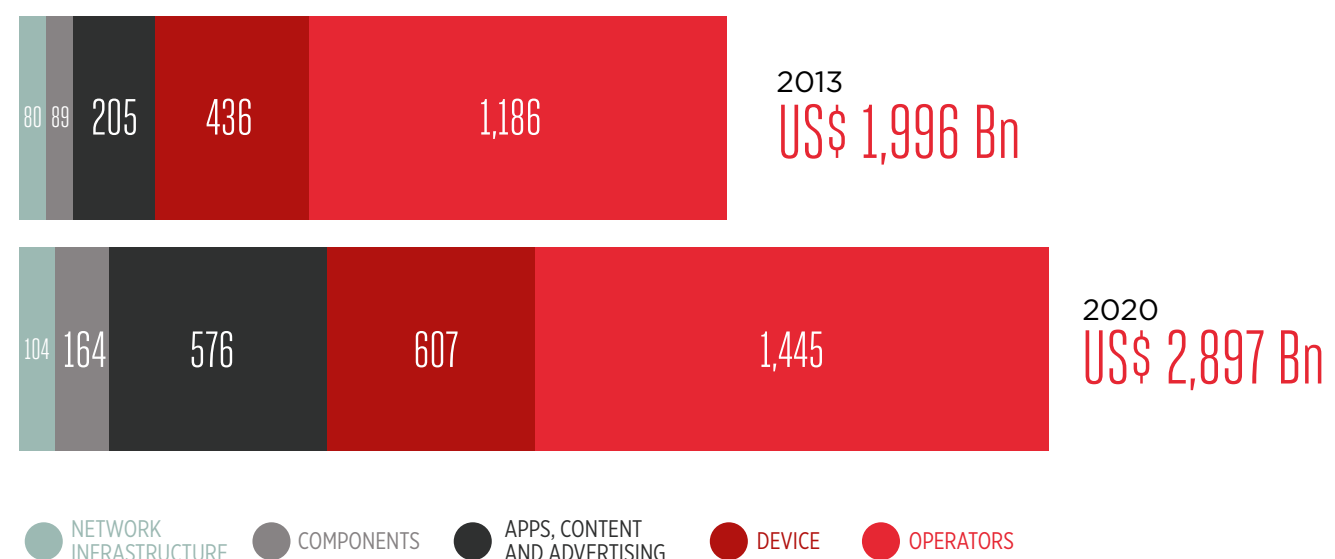
There are significant opportunities for mobile operators to generate additional revenues from these new applications and services, and by forging deeper links with players in these adjacent industries.

These revenues are not captured in the existing forecasts, and could provide material incremental revenues for the operators and help sustain industry profitability and cash flows, helping place the industry on a more sustainable footing and so to help fund the necessary network investments over the coming years.

Source: GSMA Intelligence

## Mobile ecosystem total revenue forecasts

(US\$ Bn)



US\$ 576Bn

By far the fastest growth rates in the broader ecosystem will come from the areas of applications, content and advertising, where annual revenue growth is expected to be 16% and to total US\$ 576 billion by 2020.



# AN INDUSTRY EMPOWERING PEOPLE AND SOCIETY

## GDP

### 2013 Mobile Industry Impact

US\$ 2.4tn



Mobile ecosystem directly contributed around 1.3% of global GDP in 2013

US\$ 870bn



Mobile operators around 1%



Handset manufacturers around 0.1%



Infrastructure and support services around 0.1%



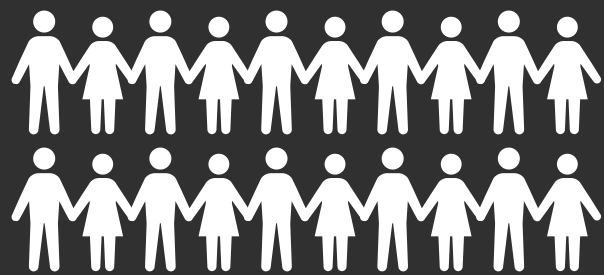
Distributors/retailers around 0.1%

2020

5.1%

Mobile industry estimated to contribute around 5.1% of global GDP in 2020

## Jobs



10.5M JOBS 2013

15.4M JOBS 2020

Supported by mobile ecosystem



## Public Funding

Contribution to public funding (excluding regulatory and spectrum fees)



US\$ 336bn 2013

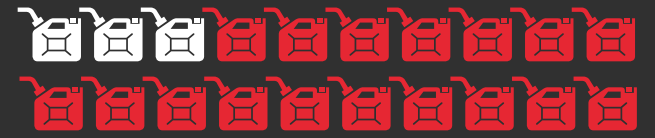
US\$ 465bn 2020

## Renewable Energy



US\$ 200m PER ANNUM SAVINGS

70%



Research shows that deploying green alternatives across Ghana, Cameroon, Senegal and Nigeria could realise savings of \$200m per annum and reduce diesel consumption by over 70%

## App Economy

A recent report estimated that there are already over

100bn

APP DOWNLOADS A YEAR



With the “app economy” generating revenues of over

€10bn

per annum in Europe alone

Source: Vision Mobile

## Mobile Money



2.5Bn  
PEOPLE IN LOWER AND MIDDLE-INCOME COUNTRIES ARE UNBANKED

1 Billion

HAVE ACCESS TO A MOBILE PHONE

The number of active mobile money accounts is growing fast, and in June 2013, there were over 50 million active mobile money users globally. An increasing number of services are also reaching scale and 10 have over 1 million active users



50Mn  
ACTIVE MOBILE MONEY USERS GLOBALLY  
2013

# 2 An industry empowering people and society

The rapid spread of mobile technology has had a profound socio-economic impact on the economies of every country in the world. This impact is not only deep but broad, spanning many aspects of economic, political and social life, making a striking contribution to everything from cross-sector innovation to GDP growth.

The mobile ecosystem makes a significant direct contribution to GDP as an industry in its own right, whilst there is also indirect impact of the mobile industry on the wider economy, both through raising productivity for “highly mobile” workers as well as in more informal areas such as small-holding based agriculture and fisheries services in developing markets. In 2013 the total contribution from the mobile industry was equivalent to 3.6% of global GDP, while the mobile ecosystem directly supported 10.5 million jobs and contributed US\$ 336 billion to public funding (even before considering regulatory and spectrum fees).

Mobile has empowered previously disenfranchised communities, bridging the digital divide by bringing voice services and Internet access to the previously unconnected. Access to the mobile Internet and related services has been demonstrated to improve

education, health and agriculture productivity, as well as create employment and entrepreneurial opportunities, leading to improved quality of life for individuals and their families.

The mobile industry is overcoming cost barriers and developing innovative new solutions to deploy networks in more remote and challenging environments, particularly in developing regions. The industry is already competitive and significant price reductions over recent years have helped to drive strong subscriber growth across the developing world. However, the industry faces a number of challenges if it is to fulfil its growth potential, and regulators and policymakers must be careful not to hinder this with short-term policies that maximise near-term tax revenues over the medium-term potential for growth and development.

## 2.1 Mobile is a cornerstone of the global economy

The mobile industry is a cornerstone of the global economy; this is evident both through the direct impact of mobile industry ecosystem, and through the indirect role that mobile technologies are playing in adjacent industry sectors.

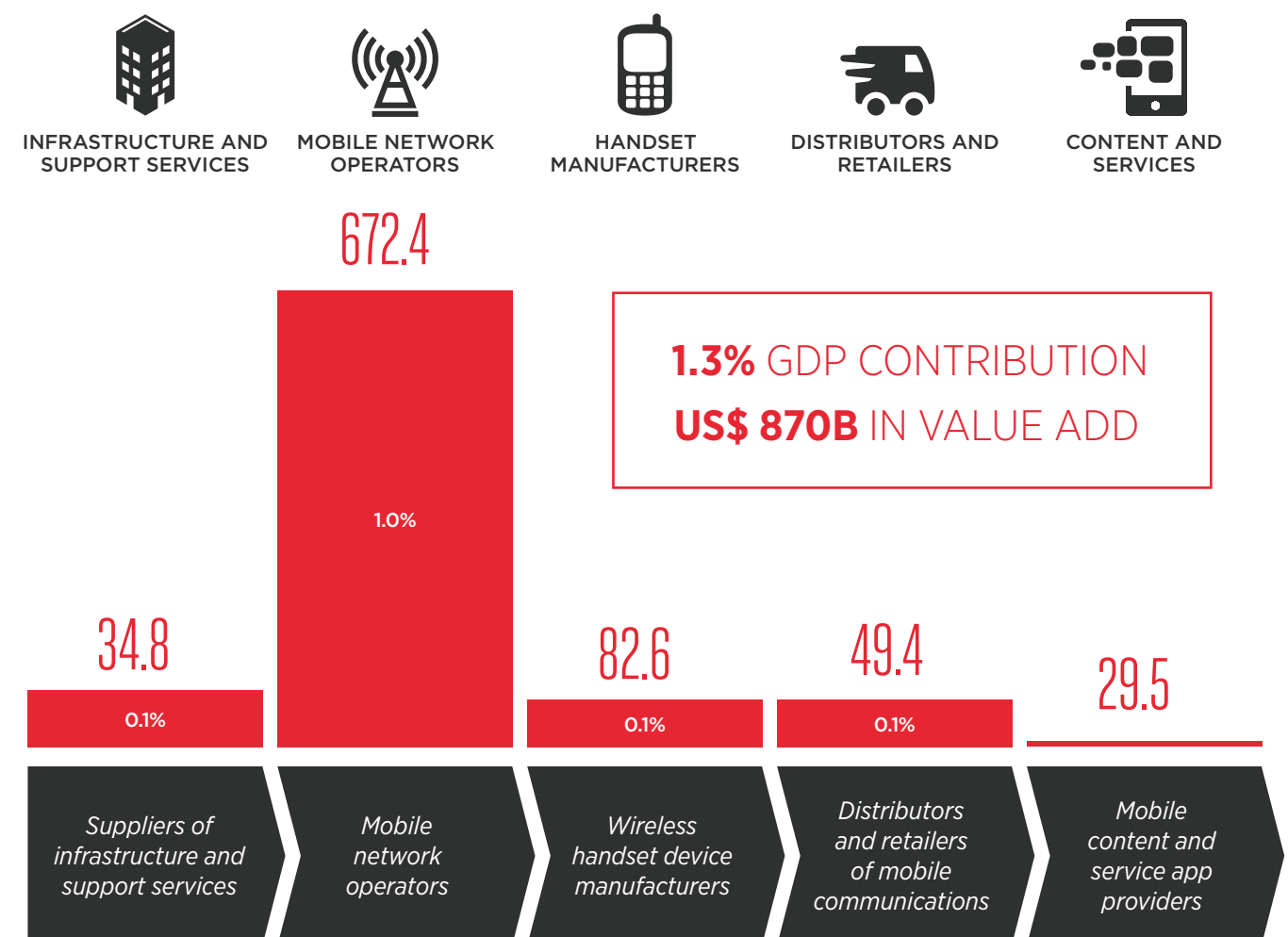
The mobile industry made a total contribution of around 3.6% of global GDP in 2013. This includes a direct contribution from the mobile ecosystem of US\$ 870 billion (1.3% of GDP), measured on the basis

of “value add” (estimated as gross profit, or revenue less direct cost of sales). The mobile operators made the largest contribution to this figure, equivalent to 1% of global GDP. The contribution from content and services in this review reflects only those that are solely delivered by mobile services, and therefore the figure may be smaller than in other studies that include services delivered by other technologies.

Source: GSMA Intelligence; Orbis; Gartner; IE Market Research; BCG Analysis

### Mobile ecosystem direct contribution to GDP

2013 GDP impact (US\$ Bn)



The mobile industry's economic contribution can be measured in terms of both supply and demand-side effects. The supply-side effects include the direct contribution from the mobile operators, as well as adjacent industries in the broader mobile ecosystem (as discussed above). In addition, there is the indirect impact of the mobile industry on the wider economy (referred to as the "multiplier effect"). This demand-side impact comes from the productivity gain from workers using mobile technologies for their work.

The productivity gain at the global level is mainly brought about by "highly mobile" workers (29% of the world's workforce are classified as highly mobile<sup>8</sup>) and their use of mobile technology. In more

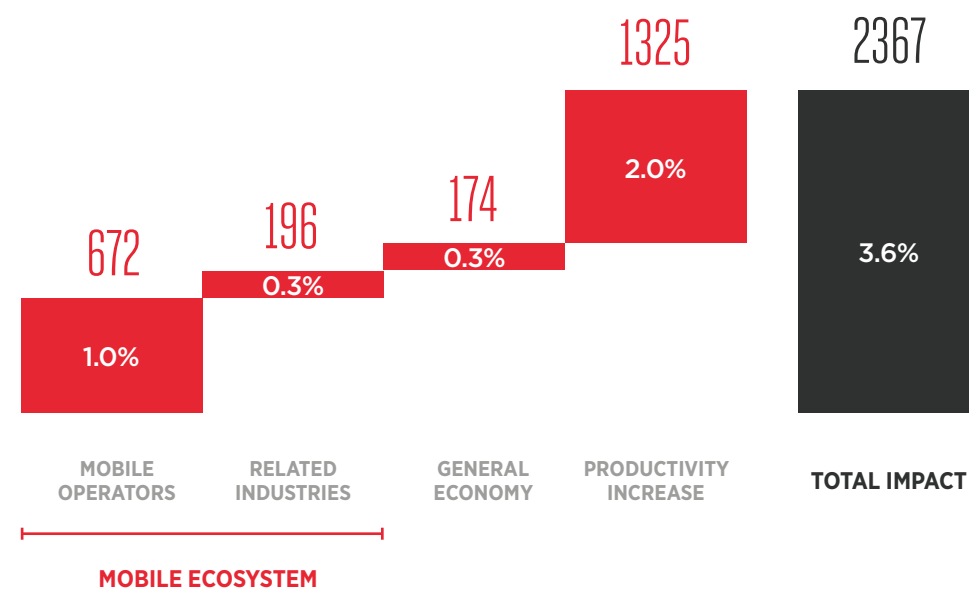
developing markets, there is also a productivity uplift for small-holding based agricultural and fisheries activities, where mobile services can bring benefits such as access to pricing information; online marketplaces and information to optimise production

Finally, there is a 20% uplift effect from the mobile ecosystem, which accounts for the broader range of goods and services in the economy used by the mobile ecosystem. The indirect factor and productivity increases together added a further 2.3% to global GDP, bringing the total GDP impact from the mobile industry to US\$ 2.4 trillion (3.6% of global GDP).

Source: GSMA Intelligence; EIU; BCG Analysis

## Total mobile industry contribution to global GDP

2013 GDP impact (US\$ Bn)



8. IDC Mobile Worker Population 2011-15



There are 10.5 million jobs supported directly by the mobile ecosystem across the globe.



The mobile ecosystem makes a significant contribution to public funding: in 2013 this contribution totalled US\$ 336 billion.

As well as the contribution to GDP, the mobile industry also makes an important contribution to employment across the globe. There are 10.5 million jobs supported directly by the mobile ecosystem across the globe, with the largest share (3.8 million) from the mobile operators. Among distributors and retailers (2.6 million), only companies working mainly with sale of mobile handset and services are included. In addition, mobile is assumed to have a substantial indirect employment contribution through sale of top-ups and accessories, which for some countries may

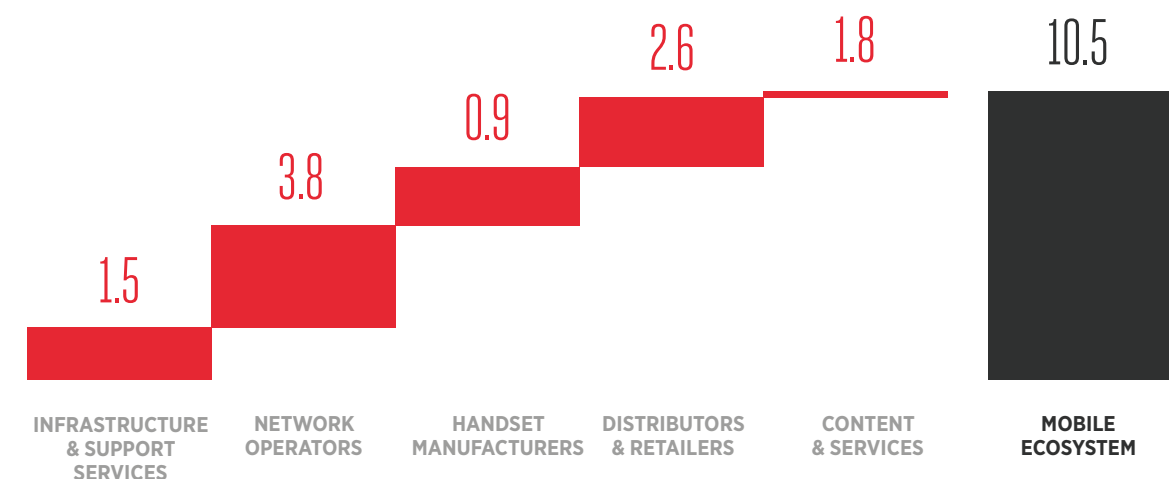
equate to five to 10 times the number of direct jobs.

Furthermore, the mobile ecosystem makes a significant contribution to public funding: in 2013 this contribution totalled US\$ 336 billion. Payments come from a range of areas including VAT and other indirect taxes, corporation taxes, social security and other employment taxes, as well as income taxes. These figures are even before considering regulatory and licence fees, which totalled over US\$ 34 billion over the last three years in Europe and the US alone.

Source: GSMA Intelligence; annual reports; EIU; BCG Analysis

## Job contribution from mobile ecosystem

2013 Jobs (Million)

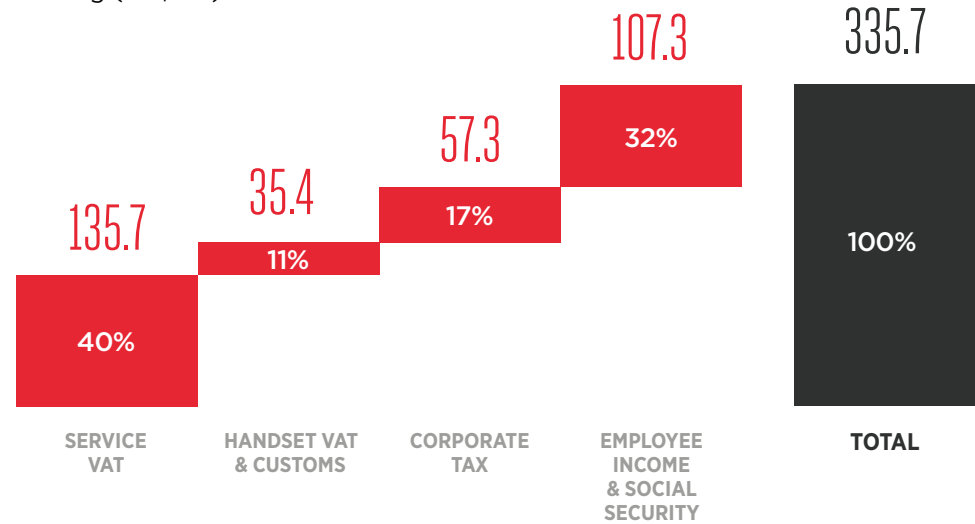


By 2020, the mobile industry’s overall contribution is forecast to reach 5.1% of global GDP, whilst generating US\$ 465 billion in public funding and directly contributing to over 15 million jobs. The increase in the overall GDP contribution from the mobile industry reflects a combination of factors including ongoing mobile subscriber growth; revenue growth in adjacent industry segments; and the indirect impact of the mobile industry on the wider economy (which is expected to increase as the global connection base migrates increasingly to mobile broadband<sup>9</sup>).

Source: GSMA Intelligence; annual reports; Factiva; BCG Analysis

Mobile ecosystem contribution to public funding

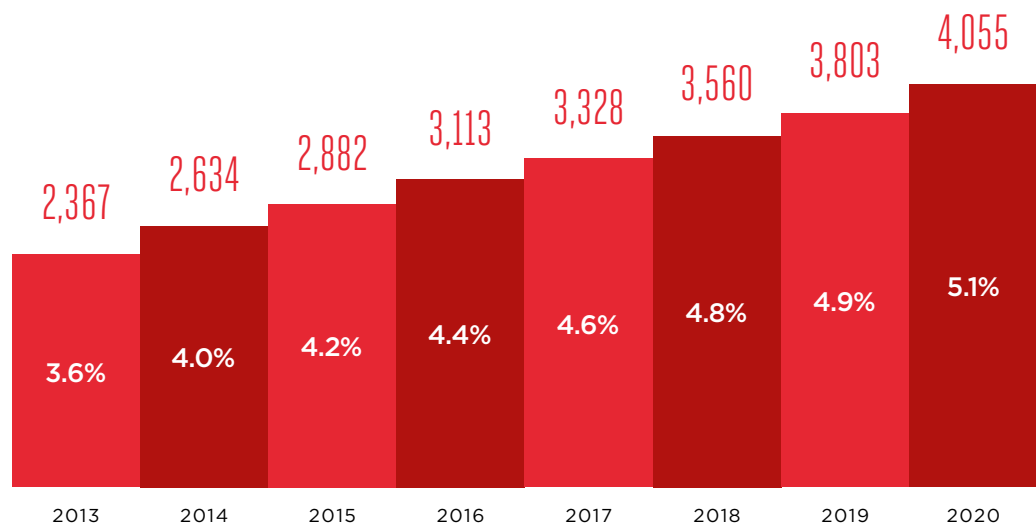
2013 Public funding (US\$ Bn)



Source: GSMA Intelligence; annual reports; Factiva; BCG Analysis

Total mobile contribution to GDP will increase further out to 2020

GDP contribution (US\$ Bn)

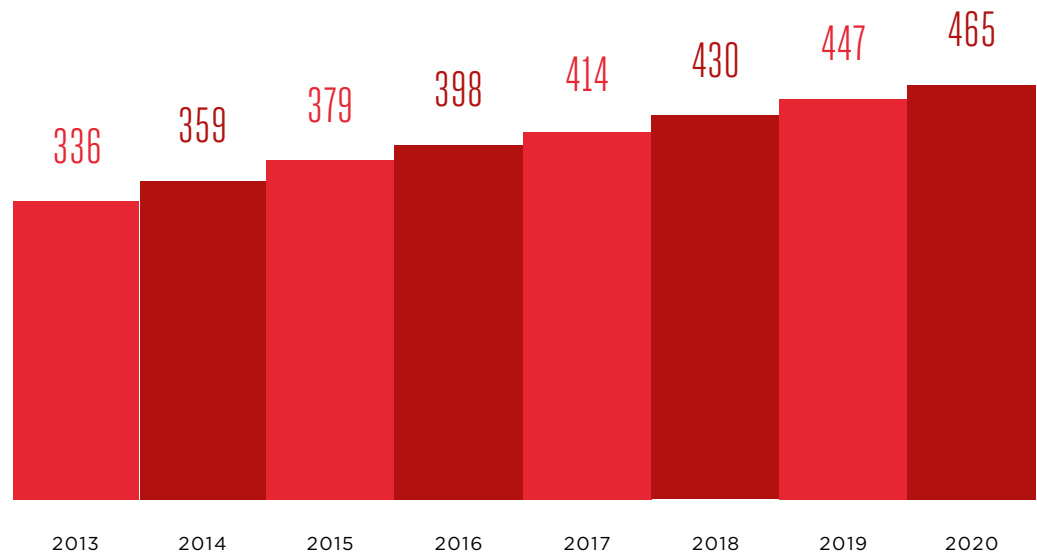


9. GSMA /Deloitte study (2012): "What is the impact of mobile telephony on economic growth"

Source: GSMA Intelligence; Ovum; EIU; BCG Analysis

Mobile ecosystem forecast contribution to public funding

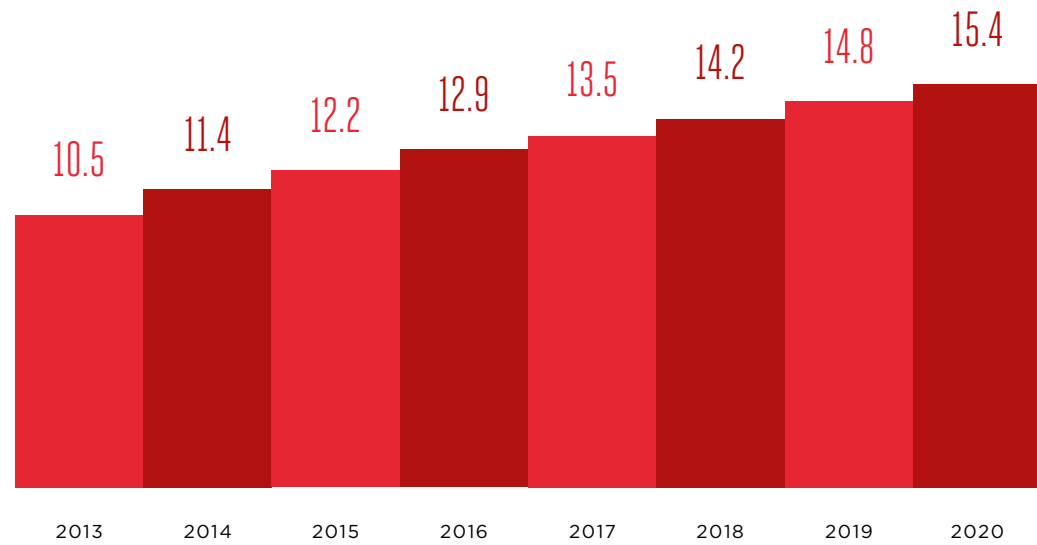
(US\$ Bn, excluding regulatory and spectrum fees)



Source: GSMA Intelligence; Ovum; EIU; BCG Analysis

Mobile ecosystem direct contribution to employment forecasts

(M)



## 2.2 Mobile at the heart of communication today – empowering people and society

Mobile is now at the heart of communication – from personal communication, mobile commerce, to entertainment and professional productivity. Furthermore, mobile has become an integral part of everyone's lives. At work or at home, while traveling or looking for information, we increasingly rely on mobile applications and services.

### 2.2.1 Driving digital inclusion in the developing world

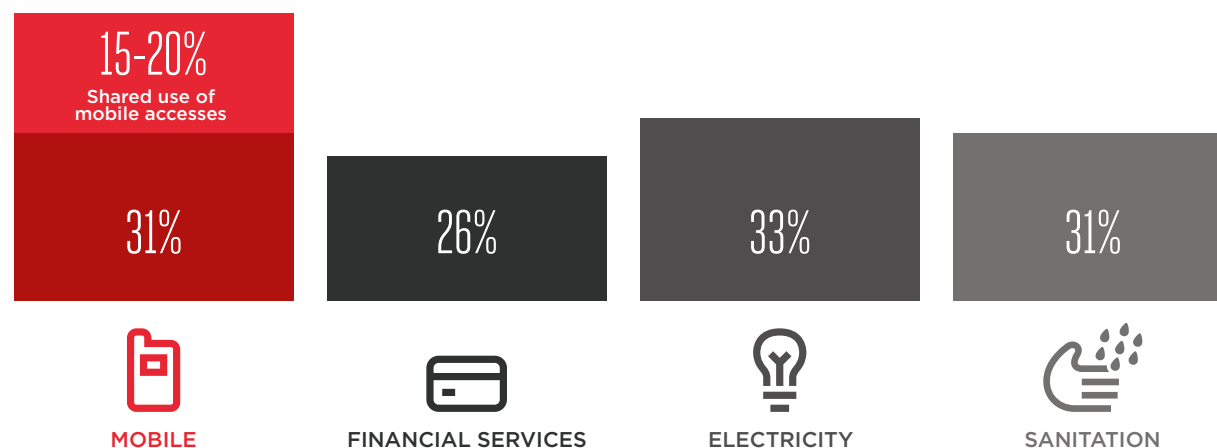
Mobile connectivity has transformed daily life across the globe, but mobile is playing a particularly strong role in socio-economic development in many developing regions of the world. Affordable mobile phones and the opportunities they usher in for the poor, through increased access to communications and information is already becoming one of the most dramatic game-changing technologies the world has ever seen.

In some of the least developed regions, such as parts of Sub-Saharan Africa ("SSA"), there are much higher levels of mobile access compared to other basic services, such as electricity, sanitation and financial services. For example, in Nigeria there are 56 million people living without access to electricity, and 38 million without access to clean water. However, most of the population have the potential to access health, banking and other essential services through mobile networks (with network coverage for some operators at 90% of the population).

Source: GSMA Intelligence; IEA, World Bank

#### Access to basic services in Sub-Saharan Africa

(%)



Mobile connectivity, customer data and distribution networks are enabling an explosion of innovative new products and services that can extend access to these basic services to populations in rural and remote areas. For example, Grundfos Lifelink's mobile-enabled solar-powered water pumps provide safe drinking water to small communities in parts of SSA thanks to mobile enabled remote monitoring in the pump unit. Mobile technologies can widen access to education, particularly in remote areas. Mobile devices can act as a platform to provide access to educational content, as well as helping to address the shortage of teachers evident in many developing world countries. The role of mobile

services in driving financial inclusion is examined in more detail later in this section of the report.

Mobile is playing a crucial role in bridging the digital divide, delivering internet access to previously unconnected populations, especially in developing markets. A recent survey by Analysys Mason found that 87% of the respondents across Africa indicated that mobile devices were the main means through which they connected to the Internet<sup>10</sup>. This highlights the importance of mobile, and the need for the further deployment of higher speed mobile broadband networks, to bring internet access and mobile services to new sections of the population.

Mobile broadband can provide affordable service to households at the bottom of the pyramid in several ways.



#### Reduced Prices

Firstly, driven by competition in the wireless market, mobile broadband prices, both in personal computer connectivity (through USB modems) plans and in data plans for smartphones, have been significantly reduced in recent years. Service tariffs in Latin America have dropped between 7.3% for dongles and 52% for smartphones in the last three years.



#### Pricing Flexibility

Secondly, mobile broadband offers pricing flexibility that allows consumers to purchase services based on what they can afford (by day, by download volume, or by type of Internet service being accessed).



#### Mobile Access To The Internet

Thirdly, mobile access to the Internet through smartphones overcomes other barriers to broadband adoption at the bottom of the pyramid (such as, for example, the cost of purchasing a personal computer, limited digital literacy, or lack of access to electricity).

10. <http://www.analysismason.com/Templates/Pages/KnowledgeCentreArticle1.aspx?id=13066>



Increasing mobile internet access for underserved communities in developing countries has been demonstrated to deliver social and economic impacts, such as employment and entrepreneurial opportunities and overall improved productivity and economic growth for populations and economies. For example in India, commercially profitable mobile advisory services have helped boost productivity and income of smallholder farmers by up to 50%,

and in SSA, mobile-based solutions will be used to save one million lives and deliver education to 180 million students<sup>11</sup>.

On an individual level, access to the Internet and related services has been demonstrated to improve education, health and agriculture productivity, leading to improved quality of life for individuals and their families.

The World Bank<sup>12</sup> estimates that mobile broadband has a higher positive economic impact than fixed line broadband particularly in emerging markets, and found that a 10 per cent increase in mobile broadband penetration drives a 1.4 per cent increase in GDP for low-to-middle income countries.

On a broader population level, access to the Internet has been found to impact the economic growth of a country overall—increasing GDP, creating more jobs and reducing poverty—all of which help fuel a virtuous circle that includes improved infrastructure and services and increased internet access and usage.

Further, empowering women through mobile internet access also has more wide reaching benefits to broader societies. Women have been found to play a key role in the social and

economic development of countries as they are often responsible for the health, education, economic stability and wellbeing of their families and communities. The Food and Agricultural Organisation for example reported that 80 per cent of the food in many low and middle-income countries is cultivated by women and the Organisation for Economic Co-operation and Development (“OECD”) reported that up to 90 per cent of women’s income is directed to their families and communities<sup>13</sup>.

## 2.2.1.1 Realising the further growth potential of mobile in developing regions

The mobile industry is overcoming cost barriers and developing innovative new solutions to deploy networks in more remote and challenging environments, especially in developing regions. The industry is already competitive and significant price reductions over recent years have helped to drive strong subscriber growth across the region. However, the industry faces a number of challenges if it is to fulfil its growth potential, and regulators and policymakers must be careful not to hinder this with short-term policies that maximise near-term tax revenues over medium-term potential for growth and development.

There are several challenges to be addressed if the medium-term potential of the mobile sector is to be realised:



**THE FIRST CHALLENGE** is the need to improve the affordability on mobile services, especially when considering the low income levels in many markets and especially in those segments of the population who have still to gain access to mobile;



**THE SECOND** of these is the need to improve the business case for further mobile network build outs; a particular challenge given low population densities in developing regions which mean that most of the new subscriber growth will come from rural (and increasingly remote) areas;



**THE THIRD CHALLENGE** is to provide the right conditions for the uptake of mobile broadband and more advanced handsets and devices in the region.

11. GSMA: The rise of connected devices will drive mobile operator data revenues past voice revenues globally by 2018  
12. The World Bank  
13. GSMA mWomen: Women & Mobile: A Global Opportunity, 2010

Prices for mobile services have fallen substantially over recent years, driven by a range of factors including increasing competition in a number of markets, falling equipment prices (both in terms of handsets and for mobile networks), as well as growing scale for the operators. The mobile operators themselves have played an important role with ongoing investments to improve network coverage as well as to introduce new service offerings that can attract lower income subscribers.

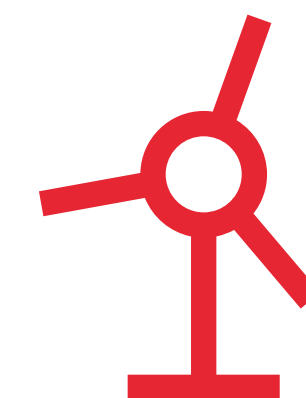
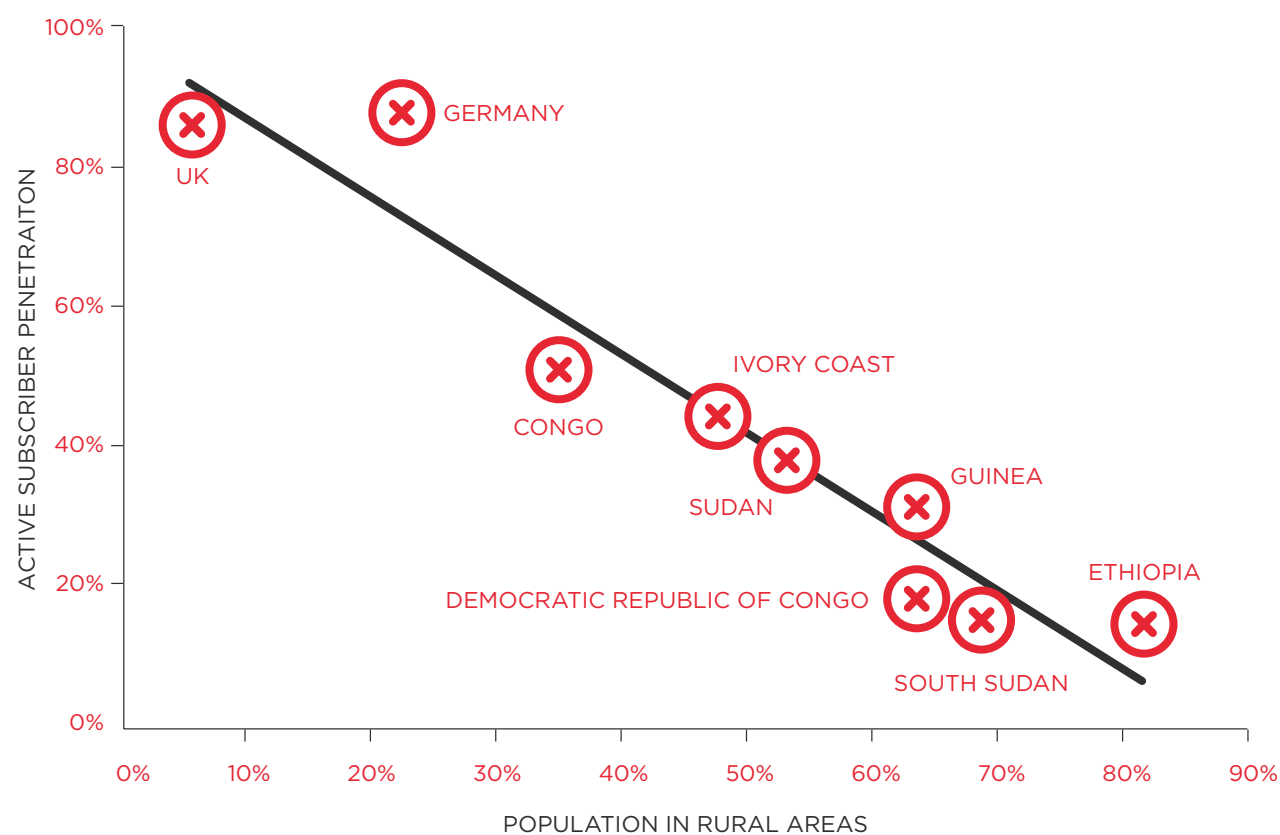
The first key challenge for operators in their efforts to further deepen mobile penetration rates is to improve the affordability of services. This will bring mobile services to a broader range of the population, especially in the developing world. Handset device prices continue to fall, both for feature phones as well as smartphones, which is a key factor in bringing mobile services to lower income segments. There is an important role to play for regulators and other

government agencies in further improving the affordability and reach of mobile services. Taxes on mobile devices or usage will further hinder efforts to improve the affordability of mobile services across many developing regions.

The second key challenge to realising the growth potential of mobile in developing regions lies in improving network coverage, especially in more remote and rural parts. Future subscriber growth will increasingly come from rural areas, where network coverage is typically poor or indeed often non-existent. For example, the lack of electricity infrastructure and low road density has negatively affected network coverage expansion in several African countries, with minimal levels of urbanisation corresponding directly to low subscriber penetration figures (see the chart below).

Source: GSMA Intelligence

## Mobile adoption versus rural population



# US\$ 200M

Research shows that deploying green alternatives across Ghana, Cameroon, Senegal and Nigeria could realise savings of US\$ 200 million per annum and reduce diesel consumption by over 70%<sup>14</sup>.

Commercially driven network sharing deals are an increasing feature of the mobile landscape in many developing regions, such as in SSA. A number of operators in the region are sharing passive elements of their networks, with several independent tower companies offering their services to operators across SSA. These deals can reduce both capex and operating costs for the operators.

The third challenge is to help realise the potential of mobile broadband. The lack of fixed line infrastructure in many developing regions means that mobile will play a crucial role in bringing internet access to the broader population. In addition, the role of 2G networks and feature phones should not be overlooked, as issues around both smartphone affordability and network coverage mean that

many users are accessing the Internet on these devices and over lower speed networks. However, many countries in the developing world are only at the first stages of mobile broadband adoption, meaning that the full range of economic and social benefits that this can bring to the region have yet to be fully realised. The introduction of mobile broadband networks is expected to positively impact a country's socio-economic development. According to a Deloitte/GSMA study<sup>15</sup>, for a given level of total mobile penetration, a 10% substitution from 2G to 3G penetration increases GDP per capita growth by 0.15%.

14. [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/07/GPM-Bi-annual-Report\\_July13.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/07/GPM-Bi-annual-Report_July13.pdf)

15. <http://www.gsma.com/publicpolicy/wp-content/uploads/2012/11/gsma-deloitte-impact-mobile-telephony-economic-growth.pdf>

## 2.2.2 The Role of Smart Cities

Some developing regions have particularly high levels of urbanisation. For example, urbanisation rates in a number of Latin America countries average 79% for the region as a whole<sup>16</sup>, ahead of Europe and only just behind North America. Latin America has four out of the 15 largest urban conglomerates in the world: Mexico City (ranked 3<sup>rd</sup>), Sao Paulo (6<sup>th</sup>), Buenos Aires (12<sup>th</sup>) and Rio de Janeiro (14<sup>th</sup>). The region is expected to have 585 million urban citizens by 2030. The issue of managing this rapid urban growth and moving to a more sustainable development path is one of the key challenges of the 21<sup>st</sup> century.

In the developing world context, the primary challenge for cities is typically over-congestion (both urban density and traffic volume) caused by the unprecedented rapidity of urbanisation in the past 10-20 years. A further challenge is to develop the educational, transport and communication infrastructure to incubate talent and to attract industry and commerce.

In some developing regions, urban growth has often translated into an increasing number of people living in informal settlements, increasing poverty and inequality. Many developing market cities are characterized by insufficient basic infrastructure, particularly in low-income areas, where mobile

services could provide cost effective solutions and provide the basis for more sustainable urban growth.

City administrations across the world are looking to harness information and communications technologies ("ICT"), including mobile connectivity, to help address the many challenges of urbanisation, such as traffic congestion, waste disposal and rising energy usage. ICT can be used to deliver "smart city" initiatives that improve citizens' quality of life, make public services more efficient, generate new sources of revenue and fuel economic growth.

16. [http://esa.un.org/unup/pdf/WUP2011\\_Highlights.pdf](http://esa.un.org/unup/pdf/WUP2011_Highlights.pdf)

## 2.2.3 Mobile enabling innovation across the world

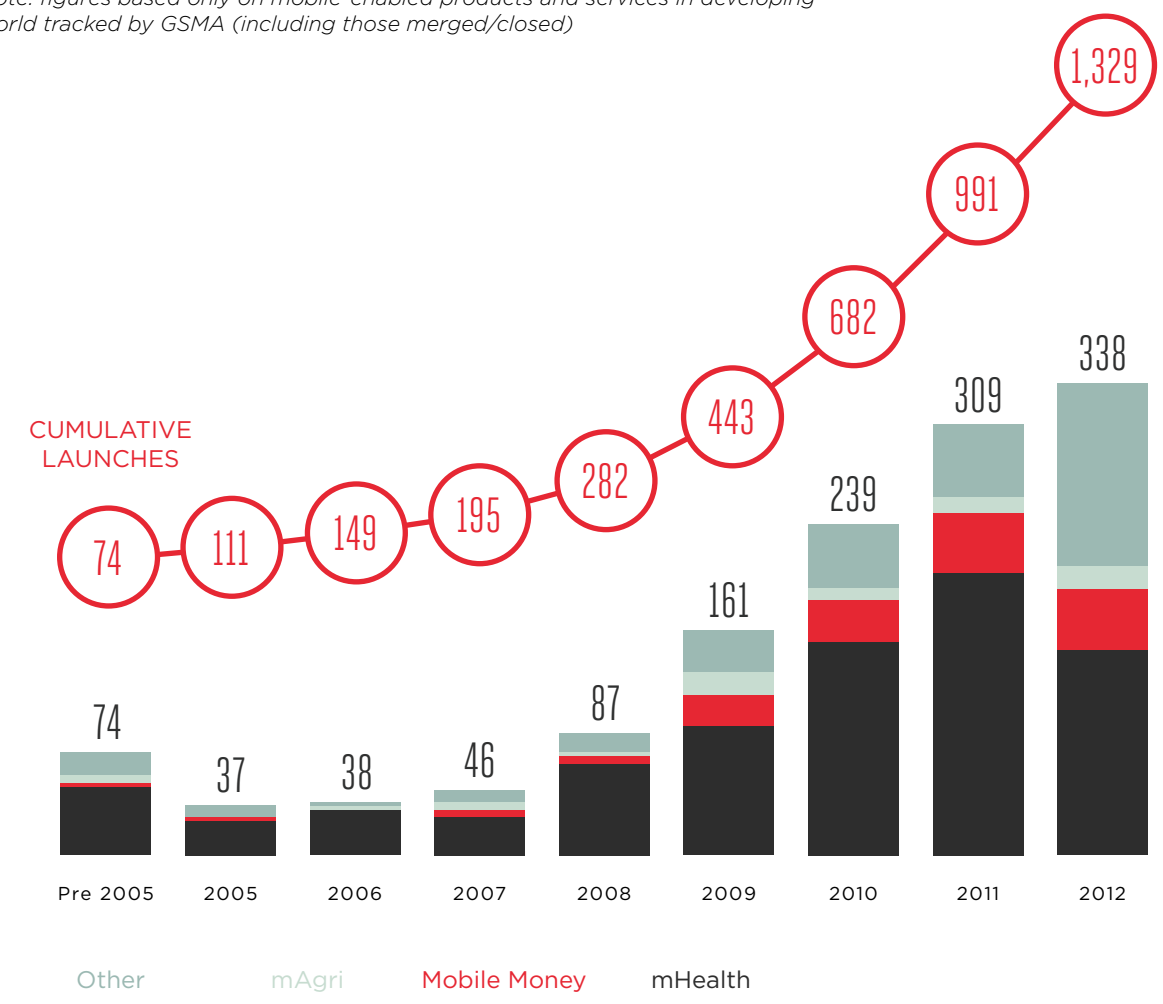
The mobile industry has played a crucial role in the global economy as an innovation platform for new services. Mobile operators provide unique opportunities to reach new customers (through mobile connectivity and operators' trusted distribution networks) and to monetise products and services. There

has been an accelerating rate of new service launches in developing regions over recent years. While the health sector still accounts for the majority of services overall, recent growth has been driven by financial services, learning and entrepreneurship/employment.

Source: GSMA Intelligence

### Timeline of mobile enabled product launches in developing markets

Note: figures based only on mobile-enabled products and services in developing world tracked by GSMA (including those merged/closed)



Mobile platforms, advanced devices and the growing range of new applications are driving productivity, growth and jobs.

Mobile platforms and the growing number of app stores and innovation hubs across the world have lowered entry barriers for developers. A recent report estimated that there are already over 100 billion app downloads a year, with the “App Economy” in Europe alone generating revenues of over €10 billion per annum<sup>17</sup>.

The industry has enabled the emergence of a number of “innovation hubs” across the world, in both developed and developing markets.

These are increasingly active communities of start-ups, hubs, incubators and accelerators, investors and business angels, academic institutions and government ministries. An increasing number of innovative solutions, such as those that improve access to energy and water, are emerging along with the development of mobile innovation ecosystems in the developing world.

As mobile technology has developed into a platform for digital services, many industry sectors have a role in creating and delivering mobile enabled services.

In Kenya for example, various stakeholders from private and public sectors are collaborating to support the development of a mobile innovation ecosystem. “m:Lab” in Nairobi, which is a centre for mobile entrepreneurship developed by The World Bank’s infoDev group, is one example. m:Lab provides incubation, developer training, application testing, and ecosystem building, with support from The World Bank, Qualcomm, Samsung, Nokia, Microsoft, and others. These mobile innovation ecosystems contribute to the empowerment of individuals and societies not only through the opportunities they create, but also through the solutions and services they deliver.

17. <http://www.visionmobile.com/product/the-european-app-economy/>

Source: iHUB

Innovation hubs across SSA

NORTHERN AFRICA	WESTERN AFRICA	EASTERN AFRICA	SOUTHERN AFRICA	
WikiStartp.tn Flat6Labs.com PlugAndPlayEgypt.com Tahrir2.com	JokkoLabs.net iLabLiberia.org MobileWebGhana.org mFriday.org CCHubNigeria.com WennovationHub.com ActivSpaces.com	IceAddis.com iHub.co.ke HiveColab.org TheHubKampala.com kLab.rw Teknohama.or.tz	mLab.co.za Google.co.za/Umbono BongoHive.com i-Hub.mg	
SENEGAL	TUNISIA	EGYPT	ETHIOPIA	KENYA
<b>Dakar</b> jokkolabs	<b>Tunis</b> wiki start up	<b>Giza</b> Flat6Labs <b>Cairo</b> PlugAndPlayEgypt.com <b>Alexandria</b> Tahrir2	<b>Addis Abeba</b> Iceaddis	<b>Nairobi</b> iHub Nailab
UGANDA	RWANDA	TANZANIA	MADAGASCAR	ZAMBIA
<b>Kampala</b> HiveColab 2010 @TheHubKampala	<b>Kigali</b> kLab 2012	<b>Dar es Salam</b> DTBi 2011 Kinu	<b>Antananarivo</b> Hub 2011	<b>Lusaka</b> BongoHive 2011
SOUTH AFRICA	CAMEROON	NIGERIA	GHANA	LIBERIA
<b>Cape Town</b> Umbono <b>Pretoria</b> mlab 2011	<b>Douala</b> ActivSpaces	<b>Lagos</b> Co-CreationHub Nigeria We”innovation”Hub	<b>Accra</b> Mfriday Mobile Web Ghana Mest	<b>Monrovia</b> iLabLiberia 2011

## 2.2.4 Empowerment through financial inclusion

Access to financial services can help low-income households manage day-to-day risks and provide a safety net to insulate them from financial shocks (e.g. a death in the family, illness, job loss, or natural disasters). However, an estimated 2.5 billion people in lower and middle-income countries are unbanked<sup>18</sup>. The traditional bricks-and-mortar model adopted by most banking and payments providers struggles to serve the poor, and these people are forced to rely instead on informal financial services that are usually unsafe, inconvenient, and expensive.

However, among the unbanked population, more than one billion people have access to a mobile phone<sup>19</sup>. The mobile channel can be utilised to provide access to financial services such as payments, transfers, insurance, savings, and credit, in ways that are more cost-efficient, safe and convenient than existing alternatives. In many developing countries, mobile network operators have unique assets and incentives to deliver these services in a sustainable and scalable way: trusted brands, widespread distribution, and secure channel access.

Mobile money is now available in most developing and emerging markets. At the end of 2013, there were 219 mobile money services in 84 countries. While the majority of services remain in Sub-Saharan Africa, mobile money has significantly expanded outside of the region in 2013. With 19 planned mobile money launches, Latin America has the second largest number of planned services after Sub-Saharan Africa. The question is no longer whether mobile money services are available, but how to ensure that the industry continues to grow sustainably.



# 50 million

The number of active mobile money accounts is growing fast, and in June 2013, there were over 50 million active mobile money users globally. An increasing number of services are also reaching scale and 10 have over one million active users.

Mobile money is becoming a strategically important service for a growing number of providers, evidenced by the fact that three quarters of providers plan to increase their investment in mobile money in 2014.

With an increasing number of providers overcoming operational challenges around the distribution of mobile money and its adoption, mobile money will continue to be the main driver of financial inclusion in developing countries. At the end of 2013, nine markets already had more mobile money accounts than bank accounts, compared to just four last year. In these markets, the mobile money industry has made financial services accessible to

more people than the traditional banking industry ever has. Mobile money providers who follow best practices presented in this report will also see interesting returns on investments. Development of their product offering and of a broad ecosystem of companies and merchants using mobile money will help them increase both usage of their services and revenues.

The development of other mobile financial services including mobile insurance, mobile credit and savings will allow service providers to deepen financial inclusion by offering financial services beyond money transfer and payment.

18. Jake Kendall, Nataliya Mylenko and Alejandro Ponce, "Measuring Financial Access Around the World" (June 2010), Policy Research Working Paper 5253, The World Bank. Available at <http://elibrary.worldbank.org/doi/book/10.1596/1813-9450-5253>  
19. CGAP, GSMA, and McKinsey & Company "Mobile Money Market Sizing Study" (2010)



# THE DIGITAL FUTURE

## The world in 2020 (technology)

### TOTAL CONNECTED DEVICES

ALL TECHNOLOGIES



### MOBILE CONNECTED DEVICES

PC, TABLET, HANDSETS AND M2M



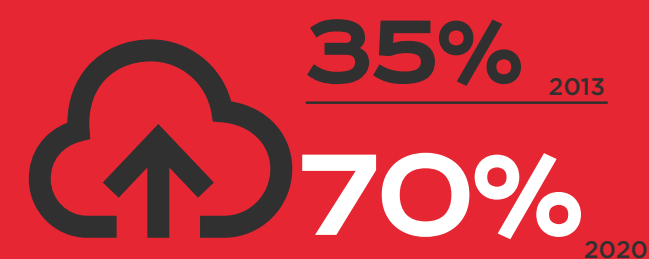
### BIG DATA ANALYTICS

ADDRESSABLE AMOUNT OF DATA FOR BIG DATA ANALYTICS



### CLOUD TECHNOLOGY

PERCENTAGE OF CLOUD-BASED DATA TRAFFIC



### 3D PRINTING

US\$ 200 - 400 BILLION WORTH RELEVANT PRODUCTS COULD BE 3D PRINTABLE



### AUTONOMOUS DRIVING

PROPORTION OF DRIVERLESS OR NEAR-DRIVERLESS VEHICLES



Source: GSMA; Machina Research

## Future Economic Growth

Looking to the future, the world will continue to see robust economic growth, but also a range of new challenges which society will endeavour to meet. As much as US\$ 48 trillion will have been added to the global economy as the world's population hits 7.7 billion and average GDP per capita jumps a staggering 50%.



## Addressable opportunity for operators in selected vertical sectors



Automotive

**US\$ 196Bn**



Smart Cities\*

**US\$ 92Bn**



Handsets/Tablets

**US\$ 336Bn**



Health

**US\$ 24Bn**



PCs/Laptops

**US\$ 351Bn**



Other M2M

**US\$ 48Bn**



Consumer Electronics\*\*

**US\$ 70Bn**

\*GSMA definition of Smart \*\* Handsets, PCs/laptops & tablets

## Ecosystem Revenue Growth



**US\$ 4.5 trillion**  
**PER ANNUM**

The connected devices market will open-up critical new revenue streams, facilitate new business models, drive efficiencies and improve the way existing services across many different sectors are delivered. In total, the positive impact on the global economy could be worth as much as US\$ 4.5 trillion per annum.

# 3 Ensuring a healthy and prosperous digital future

The world of 2020 will offer a range of life-enhancing services powered by a vibrant mobile ecosystem that connects the physical and digital worlds. The benefits of mobility will spread beyond communications to provide dramatic improvements in sectors such as energy efficiency, security, health and education.

The GSMA has identified four key growth areas that present both significant opportunities and benefits for consumers. These areas also provide clear opportunities for mobile operators to collaborate and, in doing so, play an active role in delivering them. Delivering the digital future will require a more

collaborative approach between mobile operators and other ecosystem players. A new focus on collaboration will bring greater scale to operator activities in the global race to meet the needs of the customer in the future.

## 3.1 The Digital Future

Looking to the future, the world will continue to see robust economic growth, but also a range of new challenges which society will endeavour to meet. As much as US\$ 48 trillion will have been added to the global economy as the world's population hits 7.7 billion and average GDP per capita jumps a staggering 50%<sup>20</sup>. Emerging markets will continue to grow in importance, with 45% of GDP now generated from urban areas. This will create a new wave of middle class consumption. At a global level one in six people will be over 60, which will have a dramatic impact on core public services such as health-care at a time when there are likely to be ongoing pressures

on government spending.

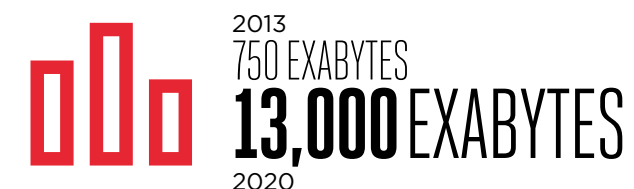
Innovation in technology presents the opportunity to address these pressing needs of society. The combination of strong growth in the number of connected devices together with exponential growth in average data consumption highlight the important role that connectivity will play in addressing these issues in 2020. When coupled with innovations in big data analytics, cloud computing and 3D printing the opportunity to connect the physical and the digital provides a unique platform to improve quality of life and productivity.

Source: GSMA; Machina Research

### The world in 2020 (technology)

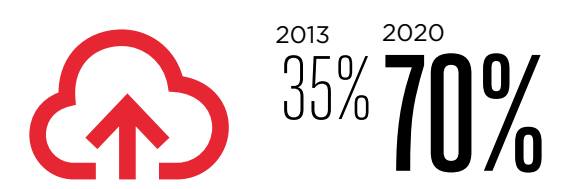
#### BIG DATA ANALYTICS

Addressable amount of data for big data analytics



#### CLOUD TECHNOLOGY

Percentage of cloud-based data traffic



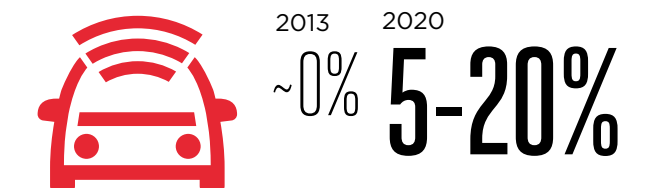
#### 3D PRINTING

US\$ 200 - 400 billion worth relevant products could be 3D printable involving cost savings as well as added value from customisation



#### AUTONOMOUS DRIVING

Proportion of driverless or near-driverless vehicles



<sup>20</sup> Economic growth forecasts prepared by GSMAi

# THE WORLD OF 2020

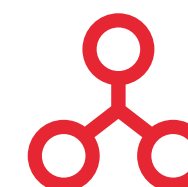
The world of 2020 will offer a range of life-enhancing services powered by a vibrant mobile ecosystem that connects the physical and digital worlds.

The world of 2020 will offer a range of life-enhancing services powered by a vibrant mobile ecosystem that connects the physical and digital worlds. This convergence will unleash a new dimension of services that improve the quality of consumers' lives and the productivity of enterprises. The benefits of mobility will spread far beyond communications to provide dramatic improvements in sectors such as energy efficiency, security, health and education.

The GSMA has identified four key growth areas that present both significant opportunities and benefits for consumers, as well as providing clear opportunities for mobile operators to collaborate and in doing so to play an active role in delivering these opportunities and benefits.



**Personal Data**  
Become the secure guardians of consumer data



**Connected Living**  
Connect the physical and digital worlds



**Digital Commerce**  
Enable and build the digital commerce ecosystem



**Network 2020**  
Create the network for secure, smart and seamless services



## 3.2

### The Personal Data opportunity

The opportunity unearthed by the mobile broadband era means that increasingly large sections of society already have access to a broad range of new services and applications; the growth in smartphone adoption and widespread data connectivity has democratised access to digital services across the world. As highlighted earlier in the report, this trend is likely to accelerate, with almost 4 billion mobile broadband connections forecast to be added in the period out to 2020.

The digital future will encompass a wide variety of services that are always online, available cross-platform, and accessible from any location. As access to digital services spreads and technology develops further, the mix of mobile services will also evolve to encompass new ecosystems in areas such as mobile commerce, health, and e-government. However, as individuals use digital identities to conduct an ever wider range of activities in the digital world, so the level of risk they are exposed to has increased. As a result, the need for new identity solutions has become ever more critical.

By 2020, consumer access to digital services could be verified by a widely adopted, operator provided digital identifier. Identity linked to the phone number and secured via the SIM would enable users to benefit from 'bank grade' authentication to services such as digital passports and financial services.

The benefits of a secure digital identity extend across all areas of society. For governments this would allow the further development of eServices, which would streamline the interface between governments and citizens and allow the delivery of efficient and effective services. For enterprises this would allow greater security around corporate data, as well as allowing more efficient and effective work-flows.

There are many major industries that would have their development constrained without the development of secure digital authentication services. These include public services (including eHealth), financial services, and the eCommerce market.

## 3.2.1

### The industry opportunity around Personal Data

Initially, the mobile medium will most likely provide identity management services within the context of online services; but in the longer term it could add convenience, security and privacy within the context of real-world identity use cases—from entering a building to buying goods in a supermarket. Identity is a very broad ranging enabler, and mobile identity solutions can yield value within a far broader setting than just the mobile world.

There are already a number of new players in the digital arena, such as Facebook, Amazon and Google. Most of these new players have their own solutions to manage digital identities, a number of which could be used as the authentication medium for an individual's online activities.

This brings a challenge to the mobile operators to retain customer relevance and to play an active role in the developing personal data market. As the market evolves towards ubiquitous digitalisation the value of verifiable users and their profile data is increasing<sup>21</sup>. Retaining customer relevance depends on operators' ability to securely identify users, while value is unlocked by operators' ability to provide personalised services based on the user's profile.

As trusted and regulated players operators are in a strong position to offer a solution to these challenges. Further, operators hold key data assets, such as demographic, behavioural and contextual information. The capability to secure and mediate this personal data across the wider ecosystem will enable the seeds of a personal data market to emerge.

21. The Value of Our Data, Boston Consulting Group, 2012





### 3.3

## Connected Living – linking the physical and digital worlds

There will be a dramatic rise in the number of mobile connections (including handsets, tablets and machine-to-machine devices), with the number forecast to reach 11 billion by 2020 (while the total number of connected devices across all access technologies could reach 25 billion). This new class of devices will be a key enabler of a new category of services that improve quality of life and productivity of consumers, society and enterprises by linking physical and digital worlds.

Mobile is already delivering connectivity to a broad range of devices, allowing the development of innovative new services and applications. This is bringing a new wave of connectivity, beyond tablets and laptops; to connected cars and buildings; TVs and game consoles; smart meters and traffic control; with the prospect of connecting almost anything and anyone. The Internet of Things (“IoT”) is the ability of devices to communicate with each other independent of any human. Mobile networks enable a host of innovative products and services that benefit consumers and businesses across a growing number of sectors. This is what the GSMA refers to as the “Connected Life”.

The connected devices market will open-up critical new revenue streams, facilitate new business models, drive efficiencies and improve the way existing

services across many different sectors are delivered. They will represent a very important demand-side stimulus that helps finance the deployment of mobile broadband networks around the world. In total, the positive impact on the global economy could be worth as much as US\$ 4.5 trillion per annum, according to research commissioned by the GSMA in partnership with Machina Research<sup>22</sup>.

Connected Living promises a revolutionary step change in customer quality of life and enterprise productivity. Through a widely distributed, locally agile/intelligent network of smart devices, the Connected Life has the potential to enable extensions and enhancements to fundamental services in areas such as education and health while offering the next ecosystem for application development.

22. [http://connectedlife.gsma.com/wp-content/uploads/2012/02/Global\\_Impact\\_2012.pdf](http://connectedlife.gsma.com/wp-content/uploads/2012/02/Global_Impact_2012.pdf)

Source: Machina Research, October 2013

2020 Addressable opportunity for operators in selected vertical sectors

#### Total Connected Devices

11.3Bn 2013  
25.7Bn 2020

#### Mobile Connected Devices

6.9Bn 2013  
10.8Bn 2020



**Health**  
**US\$ 24Bn**



**Automotive**  
**US\$ 196Bn**



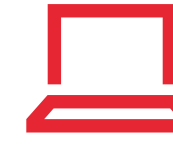
**Smart Cities\***  
**US\$ 92Bn**



**Consumer Electronics\*\***  
**US\$ 70Bn**



**Other M2M**  
**US\$ 48Bn**



**PCs/Laptops**  
**US\$ 351Bn**



**Handsets/Tablets**  
**US\$ 336Bn**

\*GSMA definition of Smart  
\*\* Handsets, PCs/laptops & tablets



Source: McKinsey &amp; Company

## Customer Vision of Internet of Things in 2020

The IoT ecosystem will revolutionise our customers' lives from multiple perspectives

**ON THE GO***Connected Devices/Cars*

Pervasive smart connectivity brings consumers' physical and digital life closer together

**IN THE HOME***Connected Home*

Connected intelligent buildings bring the benefits home by driving dramatic improvements in (energy) efficiency and security and extending benefits of health and education to the home

**IN THE CITY***Smart Cities*

Smart cities ensures a networked urban society shares in the benefits of intelligent traffic management, smart energy grids and security

**AND BEYOND***Agriculture*

While spreading the benefits to rural areas by enabling innovation in agriculture and improving access to key services such as education and health

New services have been launched and are already having an impact in a range of industries including financial services, healthcare, education and agriculture; in both developed and developing markets.

**3.3.1**

## The industry opportunity for Connected Living

The proliferation of connected devices will create a significant revenue opportunity for mobile operators; will put the mobile industry at the centre of connecting adjacent industries; and ultimately deliver the connected life. In order to fully develop this market to its full potential, it is important that mobile operators prepare to play a central role in the delivery of new Internet of Things ("IoT") services by supporting the emerging new requirements and business models.

In the near term there is a need to deliver increased network efficiency in order to accommodate the increasing number of IoT devices; while there is a longer term need to define the evolution of the network and operator capabilities in order to support IoT services and new business models.

The mobile industry is in the process of agreeing the definition of a Machine SIM that addresses remote provisioning requirements, as defined in the GSMA's Embedded SIM Fast Track Project. These devices have fundamentally different requirements than personal devices. Such devices are expected to remain in the field for up to 10-20 years, have wide-ranging form factors, have uncertain after sales locations and be remotely located, which render traditional removable SIM cards unsuitable.

In addition, the industry needs to aim to unlock the potential of Connected Living services in a number of markets by working to eliminate existing barriers, for example, by highlighting the need for a differentiated regulatory/policy treatment of the Machine SIM. Operators will need to engage with stakeholders in key adjacent industries, as well as with governments and regulators in order to provide the key foundations of the IoT and to help form the basis of a vibrant ecosystem for the next generation of connected services.



## 3.4

### Digital Commerce – placing mobile at the heart of future commerce

New mobile technologies are profoundly changing the way in which people and businesses buy and sell goods and services. Mass-market smartphones, with touchscreens, fast connections and an array of feature-rich applications, are extending the convenience and interactivity of online commerce into the physical bricks and mortar world.

All types of commerce will have the potential to be completed on connected devices, unrestricted by geographical boundaries and with digital wallets integrating all stores of value. Intelligence will be integrated into the commerce environment via digital identity to maximise the value for the customer and optimise efficiency for the service provider.

Individuals increasingly interact with mobile commerce services from many different providers and in many different ways. To reduce this complexity, consumers need a straightforward and consistent approach to organising digital vouchers, loyalty programmes, payment cards, tickets and other items. A mobile wallet can meet that need: a

mobile wallet is designed to aggregate and manage mobile commerce services, supporting payment cards, tickets, loyalty cards, receipts, vouchers and other items that might be found in a conventional wallet (or purse).

A mobile wallet will enable an individual to easily subscribe to and browse through many services, including payment cards, offers, vouchers, loyalty programmes, tickets and other items they need in their daily lives. Consumers can also typically use services in the wallet to validate tickets, redeem vouchers, initiate transactions, utilise multiple loyalty services and simplify other day-to-day tasks.

## 3.4.1

### The industry opportunity for Digital Commerce

By 2020, digital commerce could generate ecosystem service revenues of US\$ 67 billion<sup>23</sup>, not including coupons and loyalty. Whilst the addressable revenue for individual operators will be dependent on the role taken within the value chain and business models, this new ecosystem presents a significant opportunity for new revenue growth for all players.

A key element in enabling a digital commerce service via the mobile device is identification of the user and secure authentication of their transaction. As such, digital commerce provides potential for the monetisation of operators' digital identity initiatives.

Within the digital commerce ecosystem no one single group of stakeholders has the assets required to be able to offer an end-to-end proposition. As such, partnerships will be required between stakeholders with different assets and capabilities to create and enable a secure, seamless and intelligent ecosystem.

23. GSMA forecast based on Informa data. Service revenues do not include the value of goods sold or value transacted.



## 3.5

### Network 2020: a key pillar of the digital future

Mobile networks will be at the heart of the all-IP mobile broadband era. They will serve an ever-increasing volume of data, enabling a vast array of innovative services. In order to be able to provide connectivity on a cost-effective and sustainable basis, mobile networks will need to be smarter, responsive, modular, flexible, scalable, adaptable and open.

If the current pace of change in customer demand and behaviour is to be met, and market forecasts for data traffic growth become a reality, then capex and operational expenditure will need to come under considerable scrutiny to make the business case for continued network evolution viable for operators. Capex spend in particular must enable new functionalities to be installed into the network which can be used to unlock new revenue streams.

Mobile services will increasingly migrate into the Cloud to deliver on the promise of service access anytime, anywhere through any device; such services will be dependent on the availability of consistent high speed, low latency connections.

This will present business opportunities for operators in providing the requisite connectivity (through 4G/LTE) as well as monetisable service delivery components such as differential quality of services (QoS).

The networks of 2020 will need to be more “self-aware” and dynamically configurable, not only to efficiently cope with the increased traffic demand, but also to provide a more optimal Quality of Experience (QoE) to the customer and the ability to transition to policy-based charging.

## 3.5.1

### The industry opportunity for Network 2020

The operator community will need to collaborate on the definition of common processes, guidelines and standards in the network space to meet the challenges and opportunities of the future. Operators should look to avoid fragmentation, guarantee interoperability of services and enable new business opportunities at a regional or global scale. Only through this collaboration will the industry be able to meet increasing demands for capacity and provide the level of service customers will demand as mobile networks play an increasingly important role in their everyday lives.



## 3.6 The importance of industry and ecosystem collaboration

Realising the potential of this digital future will require increased industry and ecosystem collaboration. While revenue growth for the mobile operators has been slowing, for the broader ecosystem revenue trends have been improving. New entrants to the ecosystem have often come from adjacent industry sectors that have already seen significant consolidation. Companies in areas such as component manufacturing; devices and OS; advertising and applications typically have between two and three times the market share of the largest mobile operators, which in turn leads to return on capital that are significantly higher than those generated by the mobile operators.

The gulf in performance highlights the importance of scale economies and the advantage of global coordination in responding to rapid developments in technology evolution and shifts in customer behaviour. Increased collaboration among operators is an obvious lever for closing the performance gaps with industry peers.

Operators have already made individual efforts to prepare for the world of 2020 and such initiatives will play a crucial role in preparing for the changes required to meet the needs of their customers in 2020. However, in addition to these initiatives, operators have an untapped opportunity to develop a select number of collaborative actions to help improve the industry.

New players in the mobile ecosystem can also benefit from increased collaboration and cooperation. Mobile operators are already partnering with a range of industry partners, including equipment vendors and device manufacturers, in order for example to define common technical standards that can help drive the take up of new services.

At the 2013 Mobile World Congress in Barcelona, a number of mobile network operator chief executive officers raised the issue that the services provided by Online Service Providers (“OSPs”) are able to benefit directly from operator investments in network quality and speed, without incurring any of their own costs. With OSP services depending on network operators’ ongoing investments in their networks, a more collaborative approach could benefit all parties and allow the ecosystem to develop on a more sustainable basis.

## INCREASED COLLABORATION

Realising the potential of this digital future will require increased industry and ecosystem collaboration.



# POLICY MEASURES TO DRIVE THE GROWING ECONOMIC AND SOCIAL BENEFITS OF MOBILE SERVICES

## Spectrum measures for mobile evolution



GLOBAL MOBILE DATA USAGE IS GROWING STRONGLY

**600-800MHz** **ADDITIONAL SPECTRUM WILL NEED TO BE ALLOCATED FOR MOBILE USE BY 2025**

The fundamental building block of any mobile network is radio spectrum. The amount, type and conditions of use of spectrum operators have, directly impacts the speed and reach of mobile services.

## Mobile Spectrum Benefits

### Europe



Digital Dividend



€119Bn

Additional GDP (by 2020)



156,000

Additional jobs (by 2020)

### Asia Pacific



700MHz Band



US\$ 1Tn

Additional GDP (by 2020)



2,100,000

Additional jobs (by 2020)

### Latin America



700MHz Band



US\$ 370Bn

Additional GDP (by 2020)



112,000

Additional jobs (by 2020)

### Sub-Saharan Africa



Digital Dividend



US\$ 49Bn

Additional GDP (by 2020)



506,000

Additional jobs (by 2020)

### Arab Middle East



Digital Dividend,  
2.6GHz & 1.8GHz



US\$ 57.5Bn

Additional GDP (by 2025)



1,900,000

Additional jobs (by 2025)

### North Africa



Digital Dividend,  
2.6GHz & 1.8GHz



US\$ 50.5Bn

Additional GDP (by 2025)



4,000,000

Additional jobs (by 2025)



# 4

## Policy measures to drive the growing economic and social benefits of mobile services

Mobile infrastructure underpins economic and social development in the same ways as roads, railways and ports. Policymakers should ensure that the right conditions are in place for the full transformational potential of mobile services to be realised. As the mobile Internet gathers momentum, policy change is required to ensure that adequate investment and innovation comes from all ecosystem players.

### 4.1 Spectrum measures for mobile evolution

The fundamental building block of any mobile network is radio spectrum. The amount, type and conditions of use of spectrum operators have, directly impacts the speed and reach of mobile services. Global mobile data usage is growing strongly, with GSMA research indicating that this growth means an additional 600-800MHz of spectrum will need to be allocated for mobile use by 2025. Given the timeframe it takes to secure new spectrum for mobile typically takes around 10 years, it is vital that the governments and regulators act now in order to meet the expected mobile data demands in 2025. Securing additional long term harmonised spectrum is critical.

# 4.1.1 The challenge of acquiring new spectrum

Securing appropriate new spectrum to deliver the capacity and coverage needed to bring high speed mobile services to both urban and rural consumers will be hard. For mobile to get new allocations, particularly of the bandwidth and characteristics needed to deliver competitive, mass market services, governments will need to examine improving the efficiency of, or potentially moving, incumbent users, such as broadcasters and the military. Critically, they need to act in concert with the international community to ensure that the new spectrum is harmonised. By allocating the same new frequency bands across entire regions, not just individual countries, the cost of consumer mobile devices and operator network infrastructure

can be dramatically reduced while also enabling international roaming. If this endeavour is to be successful, the mobile industry together with governments and regulators, needs to agree on the required amount of new spectrum for mobile, identify the appropriate new bands, and demonstrate how the existing users can be viably accommodated in different bands or with a reduced amount of spectrum. Critical work needs to be completed by November 2015 when the International Telecommunication Union's ("ITU") World Radiocommunication Conference (WRC-15) will address the provision of new spectrum bands for mobile networks and other services.

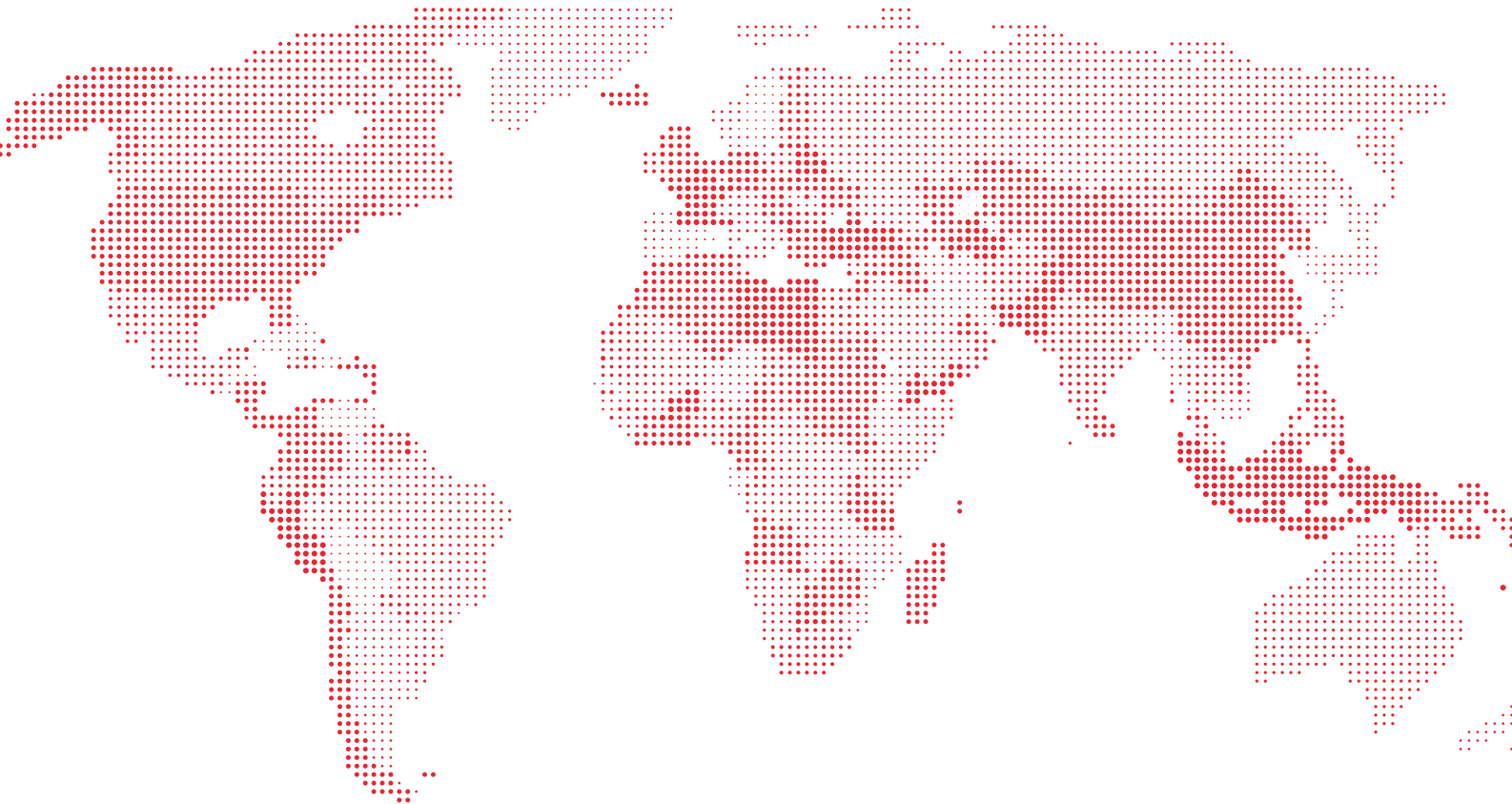
REGION	NEW SPECTRUM TYPE	ADDITIONAL GDP <i>(by 2020)</i>	ADDITIONAL JOBS <i>(by 2020)</i>
Europe	Digital Dividend	€119Bn	156,000
Asia Pacific	700MHz band	US\$ 1Tn	2,100,000
Latin America	700MHz band	US\$ 370Bn	112,000
Sub-Saharan Africa	Digital Dividend	US\$ 49Bn	506,000
Arab Middle East	Digital Dividend, 2.6GHz & 1.8GHz	US\$ 57.5Bn*	1,900,000*
North Africa	Digital Dividend, 2.6GHz & 1.8GHz	US\$ 50.5Bn*	4,000,000*

\*By 2025

# 4.1.2 Driving the Digital Dividend

The most important new spectrum that has been allocated for mobile use in recent years is the Digital Dividend. This refers to the frequency bands made available for mobile broadband as terrestrial television broadcasters start to use their vast spectrum resources more efficiently – by adopting digital radio transmissions. Digital Dividend bands are at relatively low frequencies so have excellent coverage properties, making them a crucial means of providing mobile broadband to rural areas in both developed and developing markets where fixed-broadband frequently fails to reach. This offers a unique opportunity to ensure that the economic and social benefits of broadband can be enjoyed by all. The first phase of this transition is currently in progress with new 4G networks operating in the 800MHz band in many nations in Europe, Africa and Middle East, and in the 700MHz band in the Americas and Asia Pacific.

In 2015, a critical second phase should begin if the ITU gives final approval for the 700MHz band to be allocated to 4G services in Europe, Africa and the Middle East. This will provide vital additional mobile capacity in these regions as well as create a global 4G band which will help reduce the cost of mobile devices. However, emerging markets will only be able to benefit from 4G networks operating on Digital Dividend spectrum if consumers can afford the devices. This is why the GSMA is driving industry dialogue on how we can foster a new generation of low-cost LTE devices which will open up the Internet to millions of new users.



### 4.1.3 Licensing spectrum effectively

The process of licencing frequency bands to mobile operators requires a clear and predictable process to ensure that the benefits of this limited resource can be maximised. Unless this process is managed properly, spectrum can go unsold or sold at such a high price as to reduce opportunities for network investment.

The most common method for spectrum allocation is the license auction process—both for new spectrum and, in some countries, for existing spectrum if a licence has expired and is not renewed. It is essential that this process is carefully managed in order to give operators the confidence to purchase spectrum and maximise long-term investment in the resulting network.

This requires a transparent, predictable and consultative regulatory framework that includes a clearly defined approach to renewals and the conditions for use. The prospect of licence expiry without certainty inhibits mobile operators from making long-term investment decisions.

Governments and regulators should work with the presumption of licence renewal for the existing licence holder to prevent services abruptly stopping. Exceptions should only apply if there has been a serious breach of licence conditions. Mobile licences should be granted for 15-20 years so operators can be encouraged to invest in their networks and be service neutral so that operators can easily adopt the latest technologies such as 4G.

Successful auctions should also reflect the socio-economic value of the spectrum—as they are a means for transparently and fairly assigning spectrum not raising major tax revenues. It is important to appreciate that the money operators spend on licenses could have been spent on building a network with broader reach and greater capacity. This means regulators should carefully manage the cost of licenses and should allow operators to pay in appropriate instalments to encourage strong initial network investment.

### 4.1.4 Spectrum caps

Spectrum caps are limits imposed by regulators on how much spectrum can be licensed by any mobile operator. While they can be a useful tool in markets where there is insufficient competition, there is a danger that they can be misused leading to unfortunate outcomes for consumers.

Operators should not be penalised for their success or prevented from delivering new services. Operators with the largest market share are usually the ones that most urgently need more spectrum. Penalising their success by artificially restricting access means their large customer base will suffer from falling service levels.

Instead, licence conditions for network deployment and spectrum use normally lead to better services for consumers while market monopolisation can be better addressed through antitrust measures.

## 4.2 The importance of best practice taxation

Mobile use continues to grow around the world and in particular in developing countries where it can have a profound socio-economic effect. In order to be able to reach the poorest, whose lives the mobile phone has the most potential to change, mobile services must be affordable. Mobile operators and the rest of the ecosystem have worked to deliver this via extensive investments in networks and innovations in technologies, handsets and pricing models. But this effort is impeded when government increases the cost of ownership and network roll-out via excessive sector specific taxes and fees.

The GSMA supports a best practice taxation approach that strikes the right balance between encouraging the growth of the digital economy and fair revenue collection for governments. Governments should not impose sector-specific taxes on the mobile industry/consumer above the taxation levels for other enterprises. Where mobile-specific taxes exist, governments should implement phased reductions of such taxes to create a harmonised tax environment. While to an observer this might initially be seen as self-interest, it is clearly also in the interests of extending mobile connectivity to all sections of society and generating significant socio-economic benefits.

Furthermore, it is also in the interest of the governments in question. By not artificially inflating the cost of ownership with sector specific taxes and fees, an increased number of citizens will be able to benefit from mobile services, which will in turn drive economic development and generate more tax revenue than is available from imposing sector specific fees.

The GSMA has long argued that there is a clear link between lowering the tax burden on mobile services and the rate of growth of the mobile industry in a country. Excessive taxation on mobile services—in the developing world in particular—is ultimately counterproductive. It limits the significant impact that mobile can have on the poorest in society, restricts economic development that could otherwise be achieved for the benefit of all and ultimately governments lose out on the advantages of growth which would have outweighed the short-term benefits of tax receipts.

## 4.3 Sustaining effective competition and encouraging investment

Ensuring sustainable effective competition in the mobile industry is important if it is to remain a vibrant and innovative sector. But a trade-off exists between increased competition and leveraging economies of scale. Mobile markets are dynamic and benefit from economies of scale and scope. In some countries, network sharing agreements or joint ventures are already enabling cost efficiencies that enables marginal investments—like network coverage in rural areas—to be made.

In many markets consolidation is expected which is an often observed feature of maturing industries that require high levels of capital investment.

Streamlining merger reviews and taking a more cautious approach to the imposition of remedies should reduce impediments to the efficient consolidation of mobile markets.

Regulators should focus on healthy competition that attracts sufficient long-term investment instead of favouring new market entrants and short-term price cuts. Policies focused on increasing the number of competitors in dynamic markets can cause unintended harm in the long-term.

## 4.4 Supporting innovation with a common position on Intellectual Property Rights

As a result of a number of high-profile lawsuits in relation to the so-called “Patent Wars” in the telecommunications industry, together with the development of the European Unitary Patent and Unified Patent Court proposals, Intellectual Property Rights (IPR) have recently risen in prominence and garnered the public’s attention. The GSMA has established an Intellectual Property Rights Working Group, bringing together the leading IPR experts from major operators and manufacturers across the globe, to address the industry’s approach to IPR and ensure the continued health of the operator community, its suppliers and customers.

A fair and robust IPR regime is paramount in order to encourage innovation and the GSMA continues to reach out to the ecosystem in order to muster support for a common position amongst operators, manufacturers and regulators aimed at maintaining a balanced IPR regime within the telecommunications industry, which will ensure that IPR-related disruption is kept to a minimum for the benefit of the whole mobile ecosystem.

## 4.5 Avoiding unnecessary restrictions on network management

Net neutrality—the idea that all internet traffic should be treated equally—is often raised in relation to mobile and fixed communications network management regarding the prioritisation of traffic. One argument is that legislation is necessary to ensure that all data on the Internet is treated in the same way. But, the reality is that traffic management is a necessary requirement where capacity constraints exist, as they do—especially in mobile networks.

In order to avoid congestion, investment in network capacity should be complemented by service and customer-oriented network management.

Mobile operators already have to prioritise between types of data (i.e. voice versus data) and types of user (i.e. handset or application type) in order to ensure the service levels that consumers expect. In order to be able to maintain these service levels mobile operators need to be free to innovate and

create pricing models that are better aligned with the services that the consumer is both wanting to use and willing to pay for.

Mobile networks are more traffic-sensitive than fixed networks, making traffic management even more important. Mobile operators need to deal with continually changing traffic patterns and congestion within the limits imposed by finite radio-network capacity where one user’s traffic can have a significant effect on overall network performance. These characteristics, combined with users’ mobility, require operators to have greater flexibility in choosing how to manage their networks in order to ensure an optimum consumer experience. Inappropriate over-regulation on traffic management and service differentiation would negatively impact innovation and consumer choice.



Source:

Key policy enablers for the mobile world in 2020

