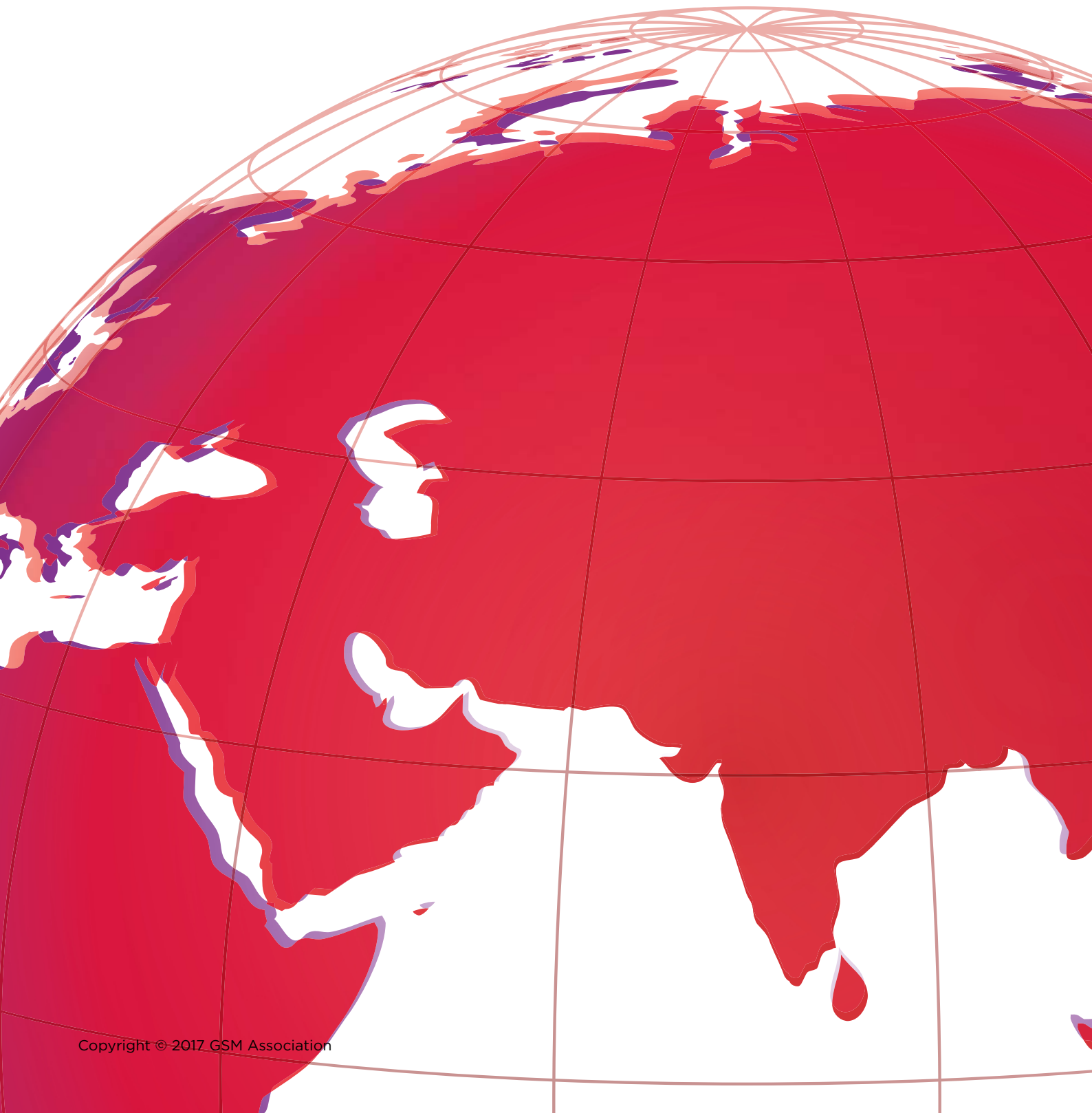




# India's Digital Promise





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### About the GSMA

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

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

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## GSMA Intelligence

GSMA Intelligence is the definitive source of global mobile operator data, analysis and forecasts, and 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.

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# Executive Summary

## Indian mobile market scaling rapidly, driving growth and jobs

With 646 million unique mobile subscribers at the end of 2016, India is the second largest mobile market in the world. Almost half the country's population now subscribe to a mobile service. Improving affordability, a more supportive regulatory environment and better network coverage aided by operator investment will help deliver more than 300 million new unique subscribers by 2020, taking the penetration rate to almost 70%.

India is now the key driver of growth for the global mobile market. Almost 40% of the world's new subscribers over the next four years will come from the country, and it overtook the US as the world's second largest smartphone market in 2016. A further 350 million smartphone connections will be added by 2020, aided by the growth of local manufacturing and a focus on more affordable devices. Operator investments in networks and affordable tariffs are driving rapid migration to mobile broadband (and increasingly 4G), as well as an explosion in data traffic growth. The 4G connection base will grow rapidly from around 30 million at the end of 2016 to more than 300 million by 2020.

The mobile industry was responsible for 6.5% of India's GDP in 2015, a contribution that amounts to more than \$135 billion of economic value added. Mobile operators and the ecosystem provided direct and indirect employment to approximately 4 million people in India across both the organised and unorganised sectors. The mobile ecosystem also makes a highly significant contribution – some \$21 billion in 2015 – to the funding of the public sector.

## Recent policy developments aiding transformation to a digitally empowered society

The Indian government has launched a number of initiatives to help transform the Indian economy into a digital pioneer, supported by a range of specific policy and regulatory measures. Mobile technology looks set to empower the masses, drive digital transformation of adjacent industries and become the critical means of accessing a broad range of public services.

Digital India is the key initiative in the government's ambitious plan to transform India into a digitally empowered society and knowledge economy, with associated projects around areas such as smart cities, digital identity and digital payments. Digital India will be delivered on mobile broadband networks, with mobile apps and services rapidly emerging as the key delivery mechanism.

More than 170,000 kilometres of optical fibre have been laid to help bring internet access to unconnected areas, while new right-of-way regulations will help accelerate the rate of fibre build-out and mobile tower installation. The first 20 smart cities have already been identified for development over the next few years. The government is also engaging with industry to produce a framework for the future development of the Internet of Things (IoT) in the Indian market, with a new IoT Centre of Excellence launched in 2016 and further initiatives expected in 2017.

As part of the Aadhaar biometric digital identity project, more than 1 billion identification numbers had been issued by the end of 2016. The success of this project, given added impetus through the government's move to demonetise the economy, is set to drive a rapid expansion of digital payments.



With more affordable handsets, smartphones are set to emerge as the main platform for digital payments and e-commerce, addressing key goals around financial inclusion in the process. Airtel recently became the first operator to launch a payments bank – a new regulated entity permitted to offer financial services leveraging mobile technology to reach the underserved. Several other operators are set to follow.

Spectrum management has progressed in recent years, and a new policy framework has been introduced. Key developments include the introduction of spectrum sharing and trading – moves that are helping to improve efficient spectrum use in the Indian market.

The harmonisation of spectrum for the first time in India in 2016 made available larger blocks of contiguous spectrum for telecom service providers, releasing around 200MHz of additional spectrum. More mobile spectrum has been made available at auctions, which is helping to ease concerns around spectrum scarcity. The removal of the ‘wireless operating licence’ for mobile operators has simplified the licensing process under which operators currently have separate licences for installing and then operating base stations and other equipment. This will remove the need to obtain licences for the approximately 200,000 base stations that are established every year.

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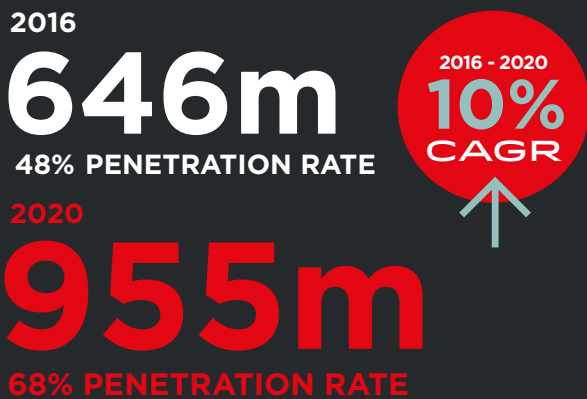
## **Further regulatory reform and improving ease of doing business will help boost mobile broadband**

Policy-makers across the world face the challenge of updating regulation against a backdrop of a rapidly evolving digital economy. A forward-looking policy and regulatory environment will enable mobile operators and the mobile ecosystem to make a much greater contribution to delivering the Digital India initiative. Review and reform in four key areas would help the government to meet its digital transformation goals:

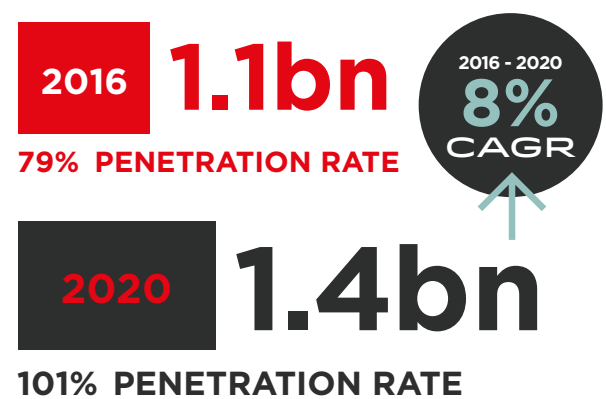
- India will benefit by adapting regulation to the realities of the new digital ecosystem. Obligations tied to a specific technology, rather than the service provided, distort the market, preventing operators from competing equally with other digital market players.
- Mobile operators in India carry significant debt as a result of the high prices for spectrum, administrative fees and levies. Effective and timely deployment of networks requires streamlined approval processes and tax and fee structures conducive to encouraging investment in infrastructure across the country.
- To cater for rising mobile broadband adoption, India should continue to license additional mobile bands and prepare a long-term spectrum roadmap. This should include renewed efforts for licensing the 700 MHz band at more affordable prices, and making future plans for the new bands it supported at WRC-15 (including 600 MHz).
- A proportionate regulatory framework and continued policy dialogue and support will allow the new payments banks to reach their full potential to join India’s digital payments ecosystem and reach unbanked and underbanked customers for the first time.

# 1 India: Mobile market update

## Unique subscribers

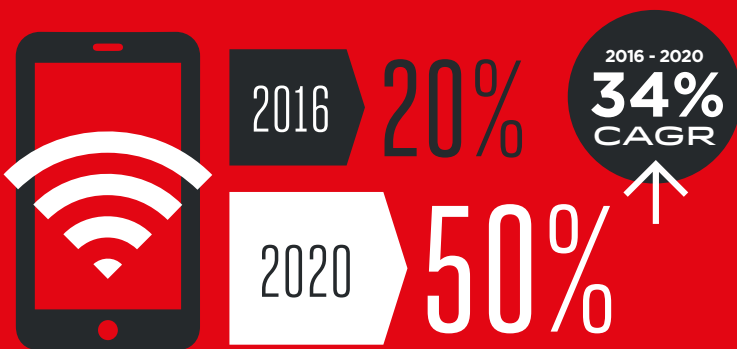


## Total SIM connections



## Accelerating moves to mobile broadband networks and smartphone adoption

### MOBILE BROADBAND CONNECTIONS



### SMARTPHONES



## Data growth driving revenues and operator investments



## Indian mobile market scaling rapidly

The mobile industry in India has grown rapidly over the last five years, with almost 650 million subscribers at the end of 2016. Around half of the country's population now subscribe to a mobile service, indicating the significant growth potential in the coming years, particularly from the rural and under-penetrated segments. Improving affordability, falling device prices and better network coverage aided by operator investments, together with positive policy support and healthy macro-economic conditions, will help deliver more than 300 million new unique subscribers by 2020.

The Indian mobile market is seeing rapid migration to new technologies, with the accelerating adoption of both smartphones and mobile broadband services. By 2020, almost half of the total connections will run over mobile broadband networks. There is also an accelerating move to 4G, with the 4G connection base forecast to grow rapidly – from around 30 million at the end of 2016 to more than 300 million by 2020.

## India now a key driver of global growth

India is at the centre of the geographic shift in mobile growth. Asia is set to account for two thirds of all global subscriber growth over the next four years. India is the key driver of this shift, overtaking China as the world's main engine of mobile growth. India is set to account for nearly 40% of total global subscriber growth.

India is now the world's second largest smartphone market, overtaking the US in the first half of 2016. The installed base of smartphone connections reached 320 million at the end of 2016. With the country set to add a further 350 million connections by 2020, India is now shaping the global smartphone market and seeing the growth of a domestic manufacturing industry.

## Mobile makes a significant contribution to economic growth

In 2015, the mobile industry was responsible for a total of 6.5% of India's GDP, a contribution that amounts to more than \$135 billion of economic value added. The figure accounts for the direct economic activity generated by mobile operators and the ecosystem of mobile industries in India, and the broader knock-on effects on the rest of the economy, including the indirect impact on the broader economy and the productivity boost from the use of mobile technology by individuals and firms.

Mobile operators and the ecosystem provided direct employment to approximately 2.2 million people in India across both the organised and unorganised sectors in 2015. Further to the employment that is directly sustained within the ecosystem, additional jobs were indirectly supported in other industries, as the ecosystem generated demand and jobs in other sectors that benefit from the activity of the mobile industry, particularly in the direct supply chain. In 2015 approximately 1.8 million jobs were supported in this way, bringing the total impact (both direct and indirect) of the mobile industry to nearly 4 million jobs in 2015.

The mobile ecosystem also makes a significant contribution to the funding of the Indian public sector, with approximately \$21 billion in 2015. This contribution comprised \$10 billion in general taxation, \$6 billion in mobile-specific taxation<sup>1</sup>, and payments of approximately \$5 billion for the licensing of spectrum acquired as a result of the multi-band spectrum auctions in March 2015 (800, 900, 1800 and 2100 MHz).<sup>2</sup>

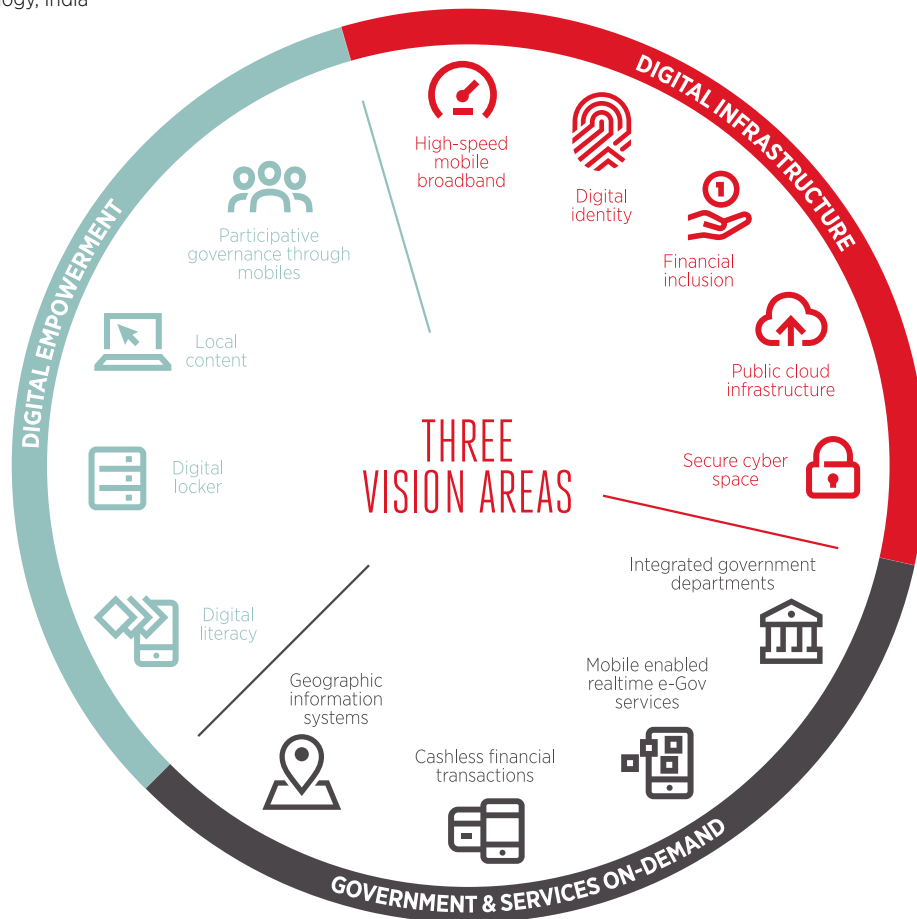
1. Regulatory fees in the form of the universal service obligation, licence fees and spectrum fees.

2. The figure attributed to 2015 is only a fraction of the overall figure and reflects the actual cash down-payment required from Indian operators in 2015, with the remainder of the total cost required in subsequent years.

# 2 Policy initiatives

## Building Digital India through mobile

Source: GSMA Intelligence, Department of Electronics and Information Technology, India



NINE PILLARS	<b>Broadband Highways</b>	<b>Public Internet Access Programme</b>	<b>Electronics Manufacturing</b>	<b>e-Governance</b>
	<i>Broadband for all</i>	<i>Ongoing programme</i>	<i>Existing structures inadequate</i>	<i>Critical for transformation</i>
<b>IT for jobs</b>	<b>eKranti</b>	<b>Universal Access to Mobile connectivity</b>	<b>Information for all</b>	<b>Early harvest programmes</b>
<i>Ongoing and new schemes</i>	<i>Ongoing programme to be revamped with new elements</i>	<i>Ongoing programme</i>	<i>Utilise existing infrastructure</i>	<i>To be completed within a year</i>





### **Digital India: a national transformation**

Launched in 2015, Digital India is the Indian government's ambitious plan to transform India into a digitally empowered society and knowledge economy. The initiative is playing a key role in driving the digital transformation of the Indian economy and broader society.

Providing citizens with a digital identity is a key part of the programme. The Indian government launched the Aadhaar project in 2010 to authenticate the identity of citizens through a unique identification number. As of the end of 2016, more than 1 billion identification numbers had been issued through the project. The success of this project is enabling the expansion of digital payments and e-commerce, addressing key goals around financial inclusion in the process.

The Indian government recognises the potential of the mobile sector in advancing financial access, improving information, and raising productivity in the economy. There are efforts to address the digital divide by extending inclusive internet access to every Indian, as mobile technology looks to empower everyone and become the critical avenue for accessing a broad range of public services.



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Other key achievements under the Digital India initiative include the following:

- The National Optical Fibre Network programme (rebranded as BharatNet in 2015) to provide broadband to 250,000 gram panchayats<sup>3</sup> had by the end of 2016 seen the deployment of almost 170,000 kilometres of optical fibre. The new right-of-way rules will reduce the cost and complexity for telecoms operators for both fibre and tower deployments, helping to accelerate the rate of broadband build-outs.
- The first 20 candidates for smart cities have already been identified by the government for development over the next few years. The cities have undergone extensive and rigorous rounds of evaluation for government funding, which will be released in annual instalments.
- The first Centre of Excellence for the Internet of Things was launched in 2016 in Bengaluru. The initiative aims to jump-start the IoT ecosystem by taking advantage of the country's IT strengths and help India play a leading role in the convergent area of hardware and software. More broadly, the government is also engaging with industry to develop a framework for the future development of IoT in India.
- The government is also working on expanding the Common Services Centres (CSCs) across India, allowing individuals without internet access or smartphones to access e-government services in a secure environment.
- The Skill India campaign aims to provide the next generation of workers with the necessary skills for a digital future. The government has commenced new partnerships with various sectors and companies in India to train and employ around 400,000 people over the next three years.

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## Make in India: growth of domestic smartphones

The Make in India campaign aims to promote local manufacturing, a trend clearly evident in the smartphone market. While Samsung remains the largest player in India, a number of local manufacturers have emerged and grown rapidly, including Micromax, Intex, Lava and Karbonn. Chinese vendors such as Lenovo and Xiaomi have taken significant share in recent quarters, with four of the top 10 vendors now Chinese. However, overseas vendors are investing heavily in local manufacturing sites, with most of Xiaomi's models assembled locally and all the main manufacturers committing to further investments in India over the coming year.

Recognising the central role of smartphones in enabling the growth of digital payments and digital identity use cases, the Indian government is now encouraging local manufacturers to focus on improving affordability at the lower end of the market. Both the government and Google's CEO Sundar Pichai have identified the \$30 (INR2,000) price point as one that could be key in driving more rapid mass-market adoption. Although this price point may prove challenging, given the average selling price in 2016 is closer to \$70, the rapid growth of domestic manufacturing should ensure more affordable smartphones for the Indian market.

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3. local administrative areas to administer villages

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## New framework for spectrum management

There have been considerable advances in the area of spectrum management over recent years that have seen the introduction of a new framework. Key developments include the following:

- The government approved both spectrum sharing and spectrum trading guidelines, which are helping to intensify the use of the mobile band frequencies. These moves have helped reduce concerns over the availability of spectrum in the Indian market, as well as offer opportunities for smaller operators in particular to respond to financial pressures in a highly competitive market.
- More spectrum has been made available at auctions, helping to address a key concern around spectrum scarcity. This was achieved in part as a result of moves towards spectrum harmonisation, facilitated by collaborative efforts among key stakeholders including the defence and mobile sectors, under discussions led by the Department of Telecommunications. At the 2016 auction the 700 MHz band became available for the first time (although reserve prices proved an obstacle to selling spectrum in this band).
- The government has removed the 'wireless operating licence' for mobile operators, simplifying the licensing process under which operators currently have separate licences for installing and then operating base stations and other equipment.
- The high point in spectrum management has been the harmonisation of spectrum for the first time in India in 2016. This has made available larger blocks of contiguous spectrum for telecom service providers and released about 200MHz of additional spectrum valued at more than \$3 billion.

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## Financial inclusion and digital payments

The government of India has a lengthy and rich history of targeting financial inclusion, both through government mandates and through policy and regulation to encourage a market-led approach. Most recently, the Pradhan Mantri Jan Dhan Yojana initiative opened an impressive 246 million bank accounts for unbanked households, largely driven by public sector banks.

The government also has a stated policy objective to digitise payments transactions across the economy. Mobile technology is seen as a critical channel for delivering low-cost digital financial services, and the government has recently taken steps to leverage the so-called 'JAM' trinity of Jan Dhan, Aadhaar, and mobile, to achieve its financial inclusion goals.<sup>4</sup>

In 2013, the Reserve Bank of India (RBI) recognised the potential to leverage the strengths of new market players – such as mobile operators – to

achieve financial inclusion goals by issuing the Guidelines for Licensing of Payments Banks. Payments banks will provide payment and domestic remittance services and demand deposit products<sup>5</sup>, but they are not permitted to lend. It is expected that payments banks will adopt a low-cost operational model, use technology to provide connected services at all access points, and contribute to realising the Indian government's goal of universal access to banking and an increasingly cashless economy.

Four of the eight remaining licensees have a mobile operator as one of the founding shareholders. Operator-led payments banks are expected to leverage their ecosystem, distribution network and infrastructure to offer low-cost banking services.

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4. "India has started linking Jan Dhan scheme, Aadhaar and mobile numbers", Live Mint, January 2017

5. In India, 'Demand deposits' can be withdrawn on demand, in contrast to 'term deposits', which are received by a bank for a fixed period of time and can only be withdrawn after the fixed period has ended.

# 3 Reforming regulation to accelerate mobile broadband adoption

## INDIAN MARKET POLICY PRIORITIES AND BEST PRACTICES



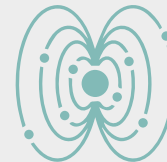
### FUTURE FIT REGULATION

Reduce overall regulatory burden on operators and adopt regulatory framework to the realities of new digital ecosystem



### USOF

Review Universal Service Obligation Fund mechanism and gradually reduce

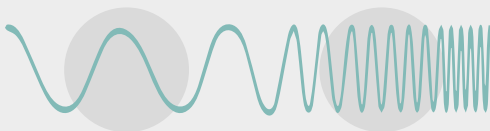


### ELECTROMAGNETIC FIELD

Adopt globally accepted technical standards

### SPECTRUM PRICING AND AVAILABILITY

High price affects quality, speed and reach of mobile broadband services  
More spectrum needed beyond 2020 to meet the growing mobile data levels



### PAYMENTS BANKS

More proportionate regulations on ongoing capital requirements and continued policy support



Despite the significant adoption of mobile services in India over recent years, only around half of Indian citizens today have a mobile subscription, and mobile broadband penetration remains low, at less than 20% of the population. Digital India's ambitious goal is universal access to online services, but there is still a long way to go for this to be realised. In addition to the work of operators to expand and improve networks, further efforts from government and the regulator are needed to build on recent reforms and create the right conditions for continued investment.

Review and reform in key areas can accelerate mobile broadband access and adoption across the country. A deeper assessment of the regulatory framework is required to more accurately reflect the dynamics of the digital economy. It is also important that the costs, barriers and administrative processes that delay network deployment are reduced. Finally, spectrum policy, planning and pricing play a crucial role in achieving the country's goal of broadband access for all.

### Modernising regulation for Digital India

Telecoms markets have changed considerably over the past few years with the convergence of technologies and services, and the emergence of internet players and the digital ecosystem. The lines between telecoms providers and digital content and service providers have blurred, breaking down once-distinct economic segments. The resulting shift in value to other parts of the internet ecosystem has created an investment challenge for mobile operators, which must raise the capital to build the networks to accommodate the growth in internet usage.

While market dynamics can shift quickly, regulation (in India but also many markets across the world) has not kept up, and this is causing increasing market distortion that serves neither consumers nor the government's policy goals. Telecoms service providers (TSPs) are subject to regulatory and

public policy obligations that other players in the digital ecosystem are not, giving the latter more flexibility and competitive advantage.

India will benefit by modernising regulation to the realities of the new digital ecosystem. Obligations tied to a specific technology, rather than the service provided, distort the market, preventing operators from competing equally with other digital market players, thus deterring industry investment. The current licensing framework therefore requires an ambitious review. Obligations placed on TSPs should be minimised and replaced with cross-sector regulations. Outdated and ineffective regulations should be removed, giving preference instead to *ex post* review and enforcement.

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## A long-term plan for spectrum required

Indian policymakers' moves to approve spectrum trading and sharing is positive, as are the moves towards spectrum harmonisation to release larger contiguous bands of spectrum. With dialogue and collaborative efforts from stakeholders, the government has successfully made available additional spectrum in the 1800 MHz and 2100 MHz bands through the 2016 auction. However, growing uptake and evolving usage will require greater access to spectrum. Without sufficient spectrum, mobile services will struggle to meet demand and networks will fail to deliver a satisfactory internet experience. The government should therefore continue to license new bands to support mobile broadband growth, helping it achieve its goals of further economic growth and greater social inclusion. A renewed focus should be on the 700 MHz band as this will have the most transformative impact on broadband access in India.

The long lead time needed for the introduction of new services and new spectrum bands requires long-term planning. India should start planning now for its spectrum needs in 2020–2025. At WRC-15 additional spectrum bands were identified for mobile broadband, particularly the L band (1427–1518 MHz) and part of the C band (3.3–3.4 GHz). Support was also expressed for the sub-700 MHz range (470–698 MHz) which would enable a 600 MHz mobile band. The India government should prepare a roadmap for licensing these bands in future. At the same time, use of any unlicensed services in the 470–698 MHz band (e.g. TV whitespace) should not compromise the licensing of a 600 MHz band for mobile broadband and opportunities for mobile operators to introduce new services envisaged under 5G.

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## Reducing costs to foster investment

Mobile operators in India carry significant debt as a result of the high prices for spectrum, administrative fees and levies. Effective and timely deployment of networks requires streamlined approval processes and tax and fee structures conducive to encouraging investment in infrastructure across the country.

Although spectrum pricing is a global challenge faced by most economies, it is particularly a concern in India. High spectrum fees<sup>6</sup> lead to increased debt levels and reduce the funds available for investment, thus negatively affecting the quality, speed and reach of mobile broadband services.

Regulators should consider local market conditions while setting reserve prices for spectrum auctions.

Where spectrum has been auctioned, any ongoing charges for spectrum use should also be limited to recovering the cost of spectrum management; hence there is scope for further reduction. The government will have greater capacity to generate revenues in the long term by expanding the digital economy through improved broadband access.<sup>7</sup>

The Universal Service Obligation Fund (USOF) levy is also an area that merits review. The current state of mobile coverage in India does not warrant the 5% USOF levy, particularly compared to universal service rates in other countries.<sup>8</sup> The state of connectivity in India would be well served by a review of the effectiveness of the USOF in supporting broadband deployment.

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6. Between 2010 and 2016, the Indian government raised a total of more than INR350,000 crore across six different spectrum auctions

7. Digital inclusion and mobile sector taxation in India, GSMA, December 2015

8. Universal Fund Study, GSMA, April 2013

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## Improving ease of doing business

Administrative and regulatory inefficiencies also hinder the rollout of new and improved digital services. Streamlined approval processes are needed to reduce the burden of administrative costs and to prevent delays in the deployment of network resources. India has taken much-needed steps to simplify its rights-of-way policies to enable faster network deployment, including reformulating Indian Telegraph rights-of-way rules. However, regulatory

obstacles such as overly restrictive electromagnetic field (EMF) exposure limits still slow the rollout of networks and discourage investment. Updates in 2017 to the World Health Organization's EMF health risk assessment and the opening of the forthcoming EMF Portal provide an opportunity for India to adopt globally accepted technical standards, removing a barrier to efficient mobile network deployment.

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## Realising the full potential of payments banks and mobile money services

Digital payments and commerce present a new widespread use of mobile broadband that is growing under the government's new cashless agenda. The payments banks are designed to leverage mobile and other technology to drive the growth of digital transactions and achieve the policy goal of financial inclusion. Despite gains in financial access in India, there is a significant opportunity for providers and policymakers to do more and take advantage of added impetus arising from the government's move to demonetise the economy. Traditionally a cash-based economy, India has physical currency in circulation estimated at over 12%<sup>9</sup> of GDP. Some 65% of adults in India are considered financially included, but only 45% of account holders report using their accounts in the last 90 days.<sup>10</sup>

The success of the payments bank model hinges on dedicated, innovative, commercial players and a regulator willing to maintain an open dialogue with the industry to ensure proportionality as the payments banks go to market and expand their products and services. More proportionate regulations on ongoing capital requirements and continued policy support, to bring down the high direct costs of account acquisition and maintenance, will allow the payments banks to reach their full potential to join India's digital payments ecosystem and reach unbanked and underbanked customers for the first time.

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9. "India's love for cash costs \$3.5bn a year", The Times of India, January 2015

10. Defined as having an account at a financial institution that offers at least one of the following services: savings, insurance, investment, or money transfer. "Financial Inclusion Insights: India - Wave Report FII Tracker Survey", Intermedia, June-October 2015





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