Connected Society

The State of Mobile Internet Connectivity 2020

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with nearly 400 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 the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

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GSMA Connected Society

The Connected Society programme works with the mobile industry, technology companies, the development community and governments to increase access to and adoption of mobile internet, focusing on underserved population groups in developing markets. Key activities include:

- **Generating and disseminating insights and learnings** on the mobile internet coverage and usage gap.
- **Supporting mobile operators** to extend coverage and drive usage.
- **Undertaking advocacy and policy work** to ensure that mobile operators' efforts to achieve greater digital inclusion are being effectively supported by governments, the international community and other stakeholders.

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Foreword

We are living in extraordinary times. Many of us have been impacted by unprecedented restrictions to everyday life, following measures to contain the rapid spread of COVID-19. The pandemic has increased our collective reliance on the internet and in many cases accelerated the use of digital technologies. As an industry, we recognise the critical role we play at this time in ensuring and maintaining connectivity for citizens around the world. It is in this context that it is important to consider both the progress that has been achieved and challenges that remain to digital inclusion for all as highlighted in this report on the State of Mobile Internet Connectivity.

In the face of lockdowns, billions of individuals have turned to the internet to connect to friends and family, access education or health information, and safeguard a limited level of economic activity. Mobile is no longer just a convenient accessory. It has become indispensable to our daily lives, especially in low- and middle-income countries where mobile accounts for 87 per cent of all broadband connections.

Mobile operators all over the world have been pro-active, supporting our customers as well as governments with vital services and robust networks. Despite surging data traffic, for example, our industry has delivered a seven per cent improvement in download speeds during the pandemic, highlighting the investments that we have made to ensure networks have sufficient capacity and are resilient.

As this report highlights, mobile continues to accelerate digital inclusion and drive increased connectivity with 3.8 billion people now using mobile internet. There has been continued expansion of mobile broadband networks and the coverage gap fell from 10 per cent to 7 per cent of the population - or just under 600 million people. However, despite the significant advances in mobile broadband deployment and adoption, billions of people face considerable barriers to going online. There are still 3.4 billion people who live in an area covered by a mobile broadband network but who are not using the mobile internet – the usage gap. In fact, the usage gap is now 6 times larger than the coverage gap.

This lack of internet use not only excludes individuals from opportunities to overcome the social and economic impact of the current crisis, but also limits the ability of governments to effectively manage the pandemic and its economic fallout.

This report shows that the usage gap is a global challenge, but that significant regional disparities persist. If we don't take action now, we run the risk of reinforcing existing inequalities in the digital world and further marginalising vulnerable people.

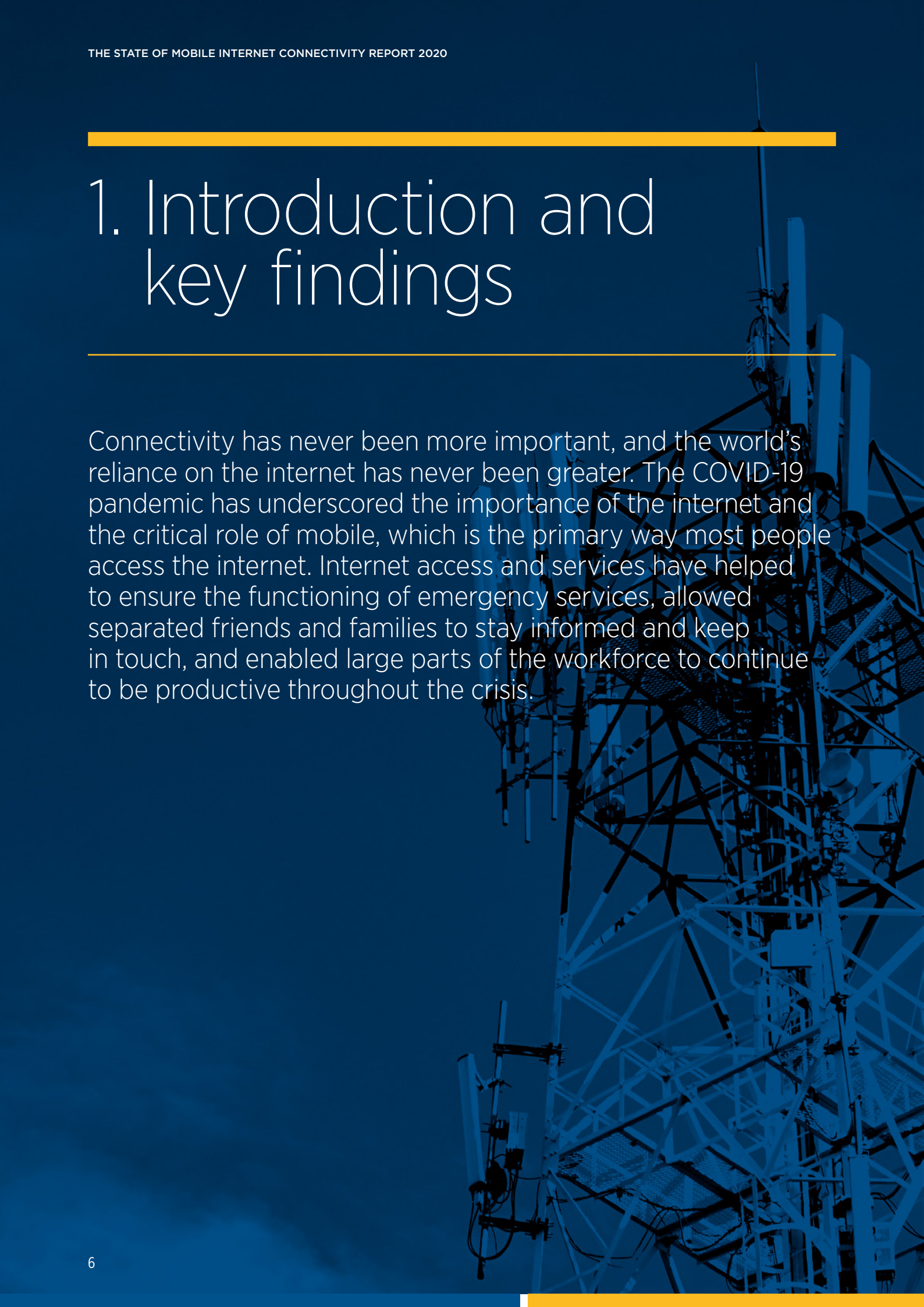
As an industry, we are working hard to overcome the barriers to mobile internet adoption, by improving access to affordable devices and data plans, building digital skills, investing in local digital ecosystems to make services more relevant, and by ensuring that the internet is safe and secure to use.

This crisis reminds us that mobile is more essential than ever. Connectivity opens a window to the world, over and above the limits of the pandemic. Let's ensure that together we continue to drive digital inclusion for all and deliver on the promise of a web that benefits humanity.

Stéphane Richard
CEO of Orange and Chairman of the GSMA

1. Introduction and key findings

Connectivity has never been more important, and the world's reliance on the internet has never been greater. The COVID-19 pandemic has underscored the importance of the internet and the critical role of mobile, which is the primary way most people access the internet. Internet access and services have helped to ensure the functioning of emergency services, allowed separated friends and families to stay informed and keep in touch, and enabled large parts of the workforce to continue to be productive throughout the crisis.



Since 2015, 1 billion people have gained access to the internet through a mobile phone – many for the first time. By the end of 2019, almost half the world's population was using mobile internet. Despite this growth, 51% of the population is still not using mobile internet, either because of a lack of mobile broadband coverage or key barriers such as a lack of awareness, affordability, or a lack of literacy and digital skills.

Bridging the persistent digital divide and providing mobile internet access to the 4 billion people still not connected is more important than ever in the current context. Meanwhile, it is becoming increasingly challenging as the unconnected tend to be poorer, have lower levels of education and live in rural areas. As this report shows, there has been strong progress over the last five years, with significant increases in mobile internet coverage and adoption. However, if current trends continue, more than 40% of the population in low- and middle-income countries will remain offline in 2025.

The State of Mobile Internet Connectivity 2020 report accompanies the fifth annual update of the GSMA Mobile Connectivity Index and analyses trends from 2014 to 2019. The report provides answers to the following questions:

- What are the key trends in connectivity over the period and how do these compare across regions, gender and rural/urban populations?
- What are the barriers and drivers to the use of mobile internet and how have these changed over time?
- What are the achievements and challenges in extending broadband coverage?

The findings of this report are based on two analytical tools – the GSMA Mobile Connectivity Index[1] and the GSMA Intelligence Consumers in Focus Survey. The Mobile Connectivity Index is a tool that measures the performance of 170 countries (representing 99% of the global population) against the key enablers of mobile internet adoption: infrastructure; affordability; consumer readiness; and content and services. The Consumers in Focus Survey has been carried out every year since 2017 and in 2019 included 15 low- and middle-income countries. Together, these provide objective, quantitative metrics to track the key enablers of mobile internet adoption and usage, as well as insights from consumers on what prevents them from using mobile internet.[2]

The analysis contained in this report relates to mobile internet use and its enablers up to the end of 2019, before the outbreak of the COVID-19 pandemic in early 2020. While it is not yet possible to identify the full implications of the pandemic, some of the potential impacts are discussed throughout.

1. The web tool is available at www.mobileconnectivityindex.com
2. Further details on the Mobile Connectivity Index and Consumers in Focus Survey can be found in Appendices 1 and 2

Key findings

1. **Almost half the world's population now use mobile internet**. By the end of 2019, there were 3.8 billion people using mobile internet (an increase of 250 million users since the end of 2018), with three quarters of all mobile internet users living in low- and middle-income countries (LMICs).

2. **The coverage gap –** those living outside of areas covered by mobile broadband networks – **continues to narrow**. It is now 7% (down from 10% in 2018) and stands at just under 600 million people, compared to 750 million in 2018. This reduction was driven primarily by South Asia – particularly India, where almost 99% of the population is covered by 4G, and by upgrades of 2G sites to 3G and 4G across Sub-Saharan Africa.

3. **4G coverage is catching up with 3G coverage**. It now accounts for more than 50% of mobile connections globally. In 2019, 82% of the population in LMICs were covered by 4G (compared to 90% for 3G). It has taken LMICs around seven years to reach more than 80% coverage for 4G, compared to 10 years for 3G.

4. **There is still a considerable usage gap**, as coverage continues to grow faster than usage. Approximately 3.4 billion people who live in areas covered by a mobile broadband network do not use mobile internet. **This usage gap is now six times larger than the coverage gap**.

5. **The rural-urban and gender gaps in mobile internet use remain substantial but are narrowing,** driven primarily by improvements in South Asia. People living in rural areas across LMICs are 37% less likely to use mobile internet than those living in urban areas. Women in LMICs are 20% less likely than men to use mobile internet, meaning around 300 million fewer adult women than men use mobile internet.

6. **Smartphones have become more affordable, but handset affordability remains the main barrier to mobile ownership in many LMICs**. The average cost of an entry-level, internet-enabled device in LMICs fell from 44% of monthly income in 2018 to 34% in 2019, driven primarily by increased availability of lower cost devices in Sub-Saharan Africa and South Asia.

7. **Mobile data is becoming increasingly affordable but is still a significant challenge for the poorest in society**. In 2019, the cost of 1 GB of data as a share of monthly GDP per capita had decreased by more than 40% in LMICs since 2016. However, more than half of LMICs still fall short of the Broadband Commission's target to make entry-level broadband services less than 2% of monthly income per capita.

8. **Awareness of mobile internet is increasing but is far from universal**. Nearly a quarter of adults are not aware of mobile internet across the LMICs surveyed. Encouragingly, awareness is growing disproportionately for rural populations and for women.

9. **A lack of literacy and digital skills persists as the main barrier to use** among mobile users who are aware of mobile internet in LMICs surveyed. In 2019, it was reported as the top barrier by a third of respondents, followed by affordability.

10. **In LMICs, mobile users increasingly see mobile internet as relevant to their lives and are using a wider range of services.** While instant messaging and social networking remain the most popular online activities, there was also increased use of mobile internet across a range of services in 2019, including for education, paying utilities, government services, applying for a job, reading the news and healthcare.

KEY FINDINGS

Almost **1/2** the world's population now use mobile internet.

By the end of 2019 there were **3.8bn** mobile internet users – an increase of **250m** in 1 year

The **coverage gap** continues to narrow and now stands at **7%** (600m people) down from **10%** in 2018

4G connections now account for **>50%** of **mobile** connections globally.

It has taken LMICs **7 years** to reach >80% **coverage for 4G** compared to **10 years** for **3G.**

3.4bn people live in areas covered by **mobile broadband** but do **not use** mobile internet.

This **usage gap** is now **6x larger** than the **coverage gap**.

IN LOW- AND MIDDLE-INCOME COUNTRIES

The rural-urban and gender gaps are narrowing.

But **rural populations** are still **37%** **less likely** than urban populations to use mobile internet

and **women** are still **20%** **less likely** than men to use mobile internet.

IN LOW- AND MIDDLE-INCOME COUNTRIES

The average cost of an internet-enabled device fell from **44%** of monthly income in 2018 to **34%** in 2019.

But handset affordability remains the main barrier to mobile ownership.

The cost of **1 GB of data** as a share of monthly GDP per capita decreased by **>40%** since 2016.

But **more than half** of low- and middle-income countries are not meeting the UN's affordability target.

Awareness of mobile internet is increasing but is far from universal.

Nearly **1/4** of adults are not aware of mobile internet.

Among mobile users who are aware of mobile internet, **a lack of literacy and digital skills** persists as the main barrier to use.

Mobile users increasingly see mobile internet as relevant to their lives

and are using a wider range of services, including for **education** and **staying informed**.

Addressing the coverage and usage gaps is an important way to contribute to the **UN Sustainable Development Goals**

2. Overview of state of mobile internet coverage and usage

Mobile internet adoption continued to grow in 2019: a further 250 million people were connected, with 90% from low- and middle-income countries (LMICs).[3] By the end of 2019, 3.8 billion people – nearly half the world's population – were using mobile internet (see Figure 1). LMICs accounted for three quarters (2.9 billion) of the connected population. Overall, 44% of the LMIC population is now connected, compared to around 75% in high-income countries.

The importance of the mobile internet cannot be overstated; mobile continues to be the primary way in which many users access the internet in LMICs. According to the International Telecommunications Union (ITU), in 2019, mobile accounted for 87% of broadband connections in developing countries.[4] In addition, across the 15 LMICs surveyed in the GSMA Intelligence Consumers in Focus Survey, a high proportion of respondents were found to access the internet exclusively over mobile, particularly in Africa and Asia. The median proportion of internet users accessing it exclusively over mobile was 69%, ranging from 43% in Mexico to 95% in Myanmar.

Usage gap grows as operators continue to close coverage gap

Those who are not connected can be split into two groups – the 'uncovered' and the 'covered but not connected'. The 'uncovered' are those who do not live in an area covered by a mobile broadband network. We refer to this as the **coverage gap**. The 'covered but not connected' are those who live within the footprint of a mobile broadband network but are not using mobile internet services. We refer to this as the **usage gap**.

In 2019, the coverage gap fell from 10% to 7% of the population - or just under 600 million people

3. Countries are classified over time according to the World Bank Country and Lending groups.
4. Source: ITU. Developing countries in this analysis are categorised according to UN classifications.

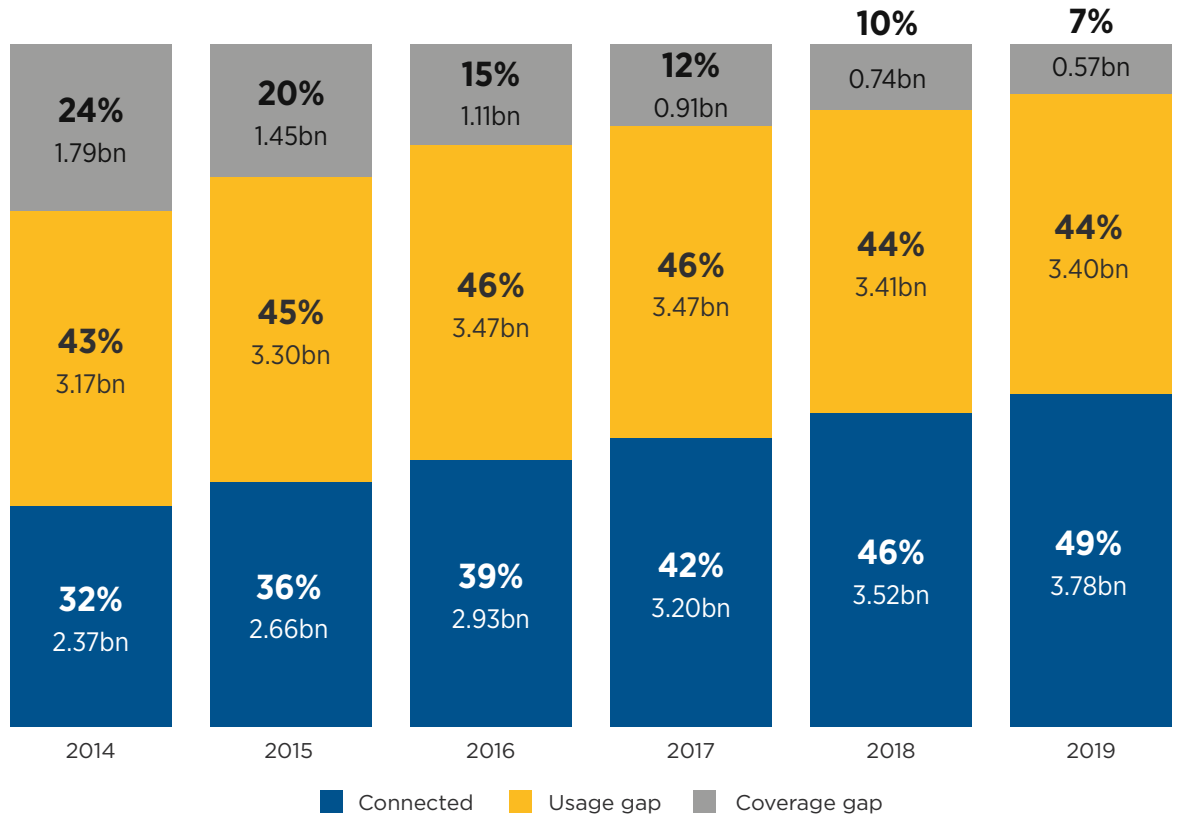
- resulting in more than 150 million people coming within reach of a 3G or 4G network not available in 2018. The reduction in the coverage gap has been relatively consistent each year since 2017, which represents significant progress as network rollout is usually expected to slow when the vast majority of the population has been covered, due to the challenges of extending coverage to rural and remote areas.

Despite better coverage, there is still a considerable usage gap. In 2019, 3.4 billion people lived within the footprint of a mobile broadband network but were not accessing mobile internet services. While mobile internet adoption continues to increase, the rate of increase is slower compared to that for coverage. As a result, the usage gap is now six times larger than the coverage gap (compared to 4.5 times in 2018). This supports the finding that in many countries there can be a lag between creating an enabling environment for mobile internet and seeing a significant increase in adoption.[5]

Although there continue to be significant increases in mobile internet adoption, GSMA Intelligence forecasts that by 2025 around 40% of the world's population will remain unconnected. Closing the coverage gap alone is not going to be enough to connect the unconnected; addressing the demand-side barriers discussed in Chapter 3 of this report will be critical.

Figure 1

Evolution of global mobile internet connectivity, 2014–2019



Base: Total population

Note: Totals may not add up due to rounding

Unique subscriber data is sourced from GSMA Intelligence, combining data reported by mobile operators with the annual GSMA Intelligence Consumers in Focus Survey. Coverage data is sourced from GSMA Intelligence, combining data reported by mobile operators and national regulatory authorities. Population data is sourced from the World Bank.

Source: GSMA Intelligence

5. State of Mobile Internet Connectivity 2018, GSMA, 2018. Analysis by GSMA Intelligence also shows that annual changes in mobile broadband coverage have a weak positive correlation with changes in mobile internet adoption, but the correlation becomes stronger (positive and statistically significant) when looking at lags in coverage increases, especially after two years.

South Asia and Sub-Saharan Africa drive coverage expansion while East Asia and the Pacific sees biggest increase in usage

The coverage and usage gaps and levels of increase vary by region (see Figure 2). The expansion in coverage in 2019 mostly occurred in South Asia and Sub-Saharan Africa, where 67% of the world's uncovered population is now living (compared to almost 75% in 2018). There were notable increases in mobile broadband coverage in Pakistan and India; in fact, almost half the population covered by mobile broadband networks in 2019 was driven by the expansion of 4G coverage in India to almost 99% of the country's population.[6] In Sub-Saharan Africa – where almost half the world's uncovered population lives – operators across several markets continued to upgrade 2G sites to 3G and 4G.[7]

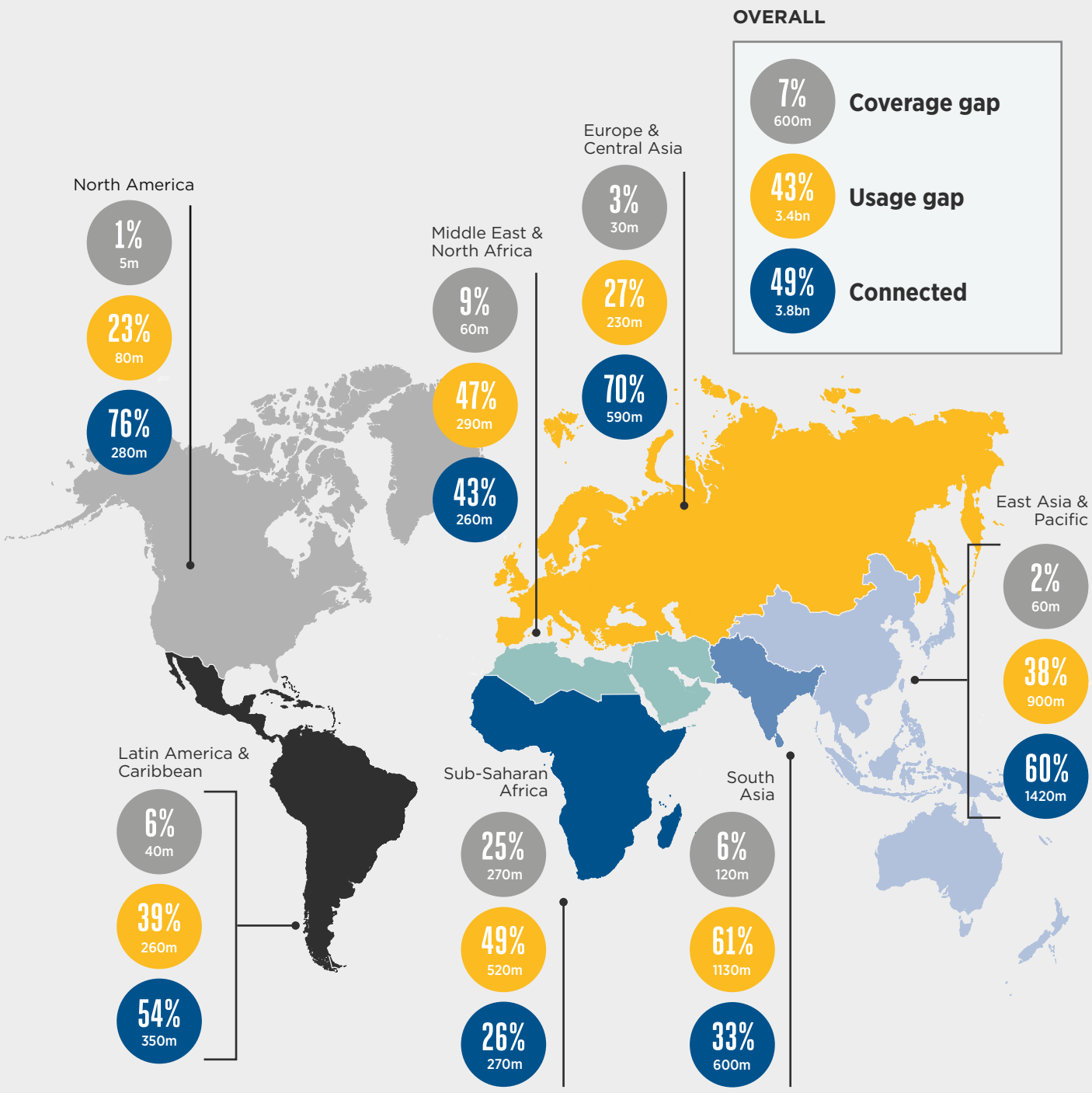
In the other regions, the coverage gap remained largely unchanged compared to 2018, reflecting the fact that mobile broadband coverage is already high (from 91% in MENA to 99% in North America). In those regions, the uncovered population predominantly lives in rural and/or sparsely populated areas where deploying infrastructure remains an economic challenge due to the high rollout costs and low returns.[8]

The region that saw the highest increase in mobile internet adoption was East Asia and the Pacific, which accounted for around 40% of new mobile internet subscribers in 2019. This was particularly concentrated in China and Southeast Asia, a region where many countries have seen broad-based improvements in their Mobile Connectivity Index scores in recent years (see Chapter 3 for further details). Adoption also increased in many Pacific Islands, as operators significantly expanded coverage and consumers benefitted from more affordable smartphones and mobile data plans (see Spotlight: Achieving greater coverage in the Pacific Islands in Chapter 4).

6. Source: GSMA Intelligence.
7. For further discussion, see The State of Mobile Internet Connectivity 2019, GSMA, 2019.
8. For further discussion, see Enabling Rural Coverage, GSMA, 2018.

Figure 2

State of mobile internet connectivity, by region, 2019



Base: Total population

Note: Totals may not add up to 100% due to rounding

Source: GSMA Intelligence

For the first time the majority of mobile connections worldwide now use 4G, boosting user experience

Mobile internet user experience varies significantly across and within countries, with some consumers benefiting from much faster and higher-capacity connections than others. In 2019, 4G for the first time accounted for more than 50% of mobile connections globally.[9] For example, in India and China (the two largest LMICs), 4G accounted for 56% and 80% of connections, respectively. Combined with improvements in network quality, this has resulted in consumers benefitting from significantly higher mobile speeds and lower latencies. Data from the Mobile Connectivity Index shows that global average mobile broadband speeds increased from around 5 Mbps in 2014 to 17 Mbps in 2019, while average latencies fell by 70% from around 200 ms to less than 65 ms over the same period.[10]

In Sub-Saharan Africa, 2019 marked the first year that there were more mobile broadband (3G and 4G) connections than 2G. Operators continued to expand mobile broadband coverage, while consumers benefitted from more affordable smartphones and smart feature phones and became increasingly aware of mobile internet and its relevance (see Chapter 3).

It will become increasingly important not only to increase mobile internet connectivity but also to ensure that consumers are able to realise its full benefits; they will require access to the faster and high-capacity services that mobile broadband technologies enable. This is especially important in a post-COVID-19 world, as internet users are likely to remain increasingly reliant on digital technologies for work (including the use of video conferencing and teleworking), communicating with family and friends and accessing services such as education and healthcare. Since the beginning of the pandemic, mobile data traffic has increased by up to 50% in some countries[11] but network performance and quality has not degraded. For example, across the globe, average mobile download speeds have increased by 7% since the first quarter of 2020,[12] highlighting the investments that operators have made to ensure networks are resilient and have the necessary capacity.

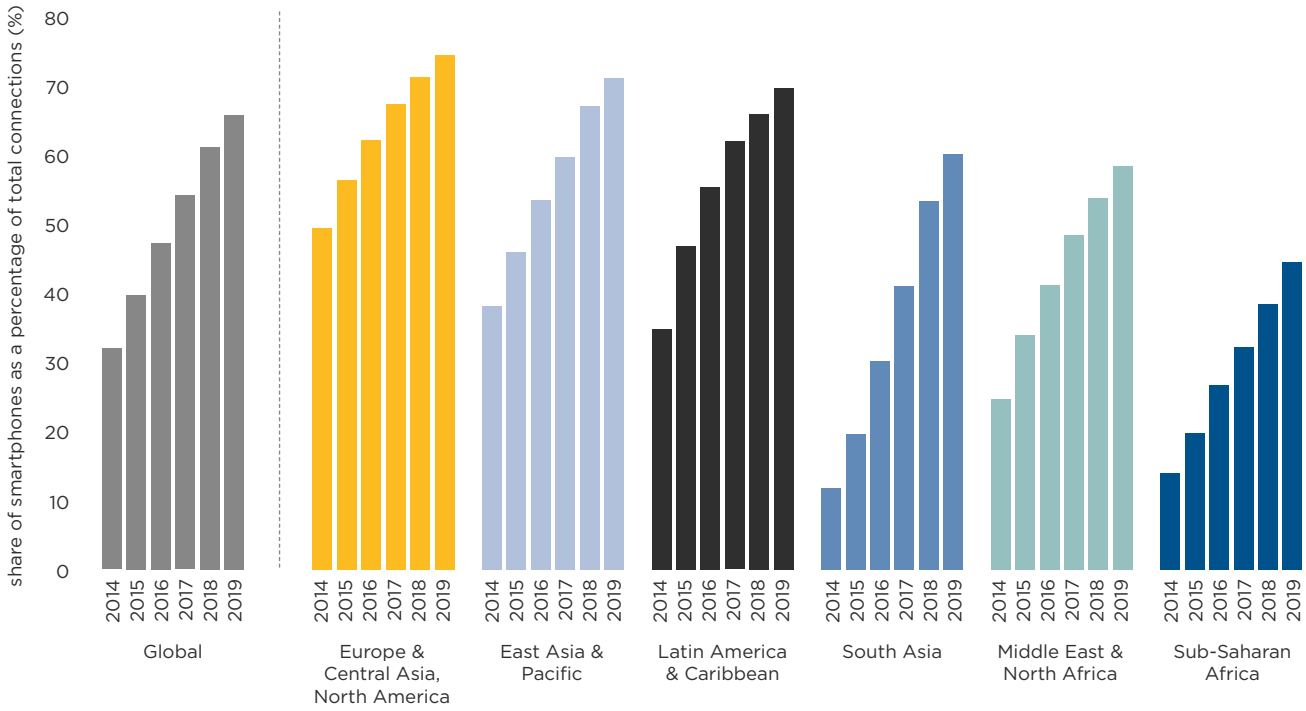
Smartphone usage has increased, enhancing ability to use the internet

Improvements in network quality and user experience are also reflected in the increased adoption of smartphones. Globally, smartphones account for around two thirds of total mobile connections (see Figure 3). Global smartphone connections have doubled in just five years but risen sixfold in South Asia. This has likely been driven at least in part by improved handset affordability (see Chapter 3). In Sub-Saharan Africa, the average annual growth rate in smartphone connections has been 28% since 2015, and smartphones now account for almost half of total connections.

9. A mobile connection is a unique SIM card (or phone number, where SIM cards are not used) that has been registered on a mobile network. Connections differ from subscribers in that a unique subscriber can have multiple connections.
10. GSMA Intelligence calculations are based on data provided by Ookla® Speedtest Intelligence®. For each country, an 'average download' speed was provided for 3G and 4G technologies, which represents the average speed experienced by Speedtest® users running tests in a given year. For each country, we take a weighted average of 3G and 4G download speeds, with weights determined by the proportion of mobile broadband connections that are 3G and 4G respectively. Data on mobile broadband connections is sourced from GSMA Intelligence.
11. COVID-19 impact: digital divide exposed further in emerging markets, GSMA Intelligence, 2020
12. Based on Ookla data. Compares mobile network performance in the week of 20 July 2020 to the week of 2 March 2020 for all countries except China, which is compared to the week of 6 January 2020.

Figure 3

Change in smartphone adoption, by region, 2014–2019



Source: GSMA Intelligence

The rural-urban and gender gaps in mobile internet use are narrowing but remain substantial

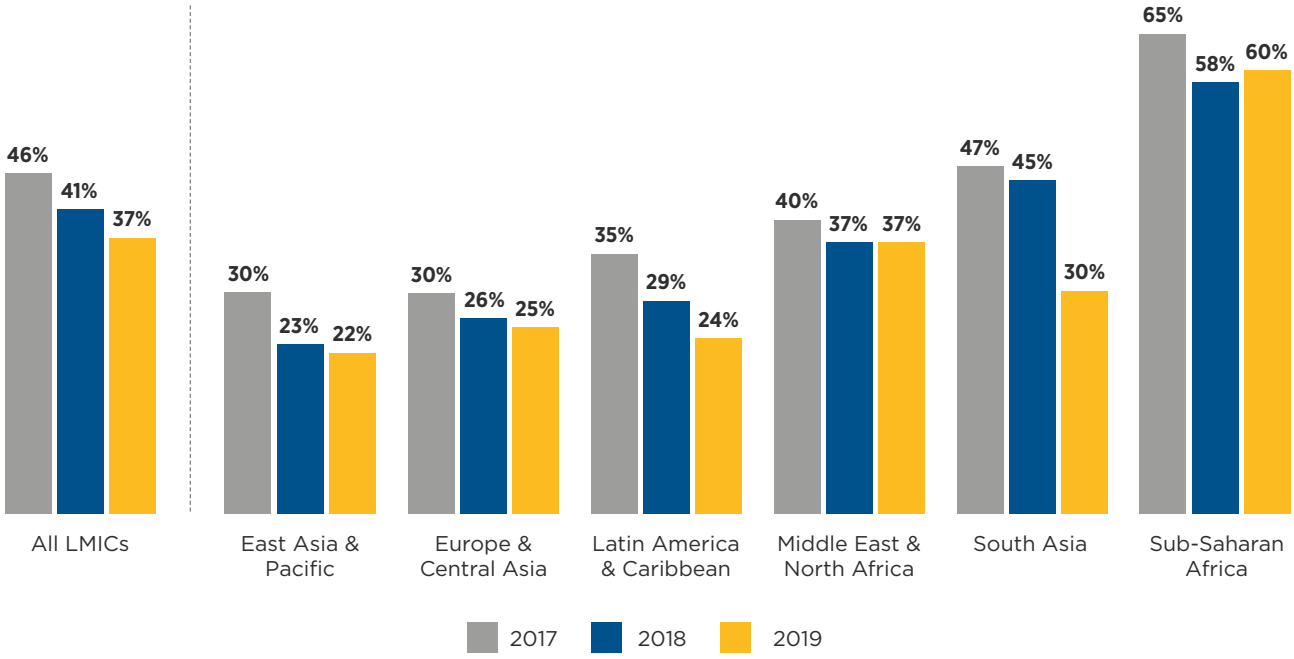
Within markets, there are strong disparities in mobile internet adoption between population segments. In 2019, use of mobile internet in rural areas was 34% in LMICs, compared to 54% in urban areas. This means those living in rural areas were 37% less likely to use the mobile internet than those in urban areas (see Figure 4).[13] However, the rural-urban gap has continued to reduce since 2017 and the reduction in 2019 was driven primarily by an improvement in South Asia, where the gap fell from 45% to 30%. This is likely due to a combination of expanding coverage, especially in rural areas in India, increased awareness of mobile internet and more affordable handsets and data in the region (see Chapter 3). Nevertheless, the global gap between urban and rural areas remains substantial and in 2019 did not significantly change in most other regions, including Sub-Saharan Africa, which has the largest gap at 60% (rural mobile internet use stood at 16%, compared to 40% in urban areas).

13. The GSMA calculates the rural-urban gap in mobile internet use as the difference between the proportion of urban and rural users divided by the proportion of urban users, expressed as a percentage.


Seattle

Figure 4

Rural-urban gap in mobile internet use in LMICs, by region, 2017–2019



The 'rural-urban gap' refers to how much less likely a person living in a rural area is to use mobile internet than a person living in an urban area. It is calculated as 1-(mobile internet adoption in rural areas/mobile internet adoption in urban areas).

Data was sourced from the GSMA Intelligence Consumers in Focus Survey and Gallup World Poll (for countries not included in the former). There are differences between the two questions used for the analysis. The GSMA Intelligence Consumers in Focus Survey refers to individuals that have used the internet on a mobile phone at least once in the last three months. The Gallup World Poll survey refers to individuals that have access to the internet in any way, whether on a mobile phone, computer or some other device. The survey questions are therefore not wholly comparable. However, data for countries covered in both surveys have a high correlation (0.8) and the 28 countries included in the GSMA Intelligence Consumers in Focus Survey represent 75% of the total adult population of all LMICs.

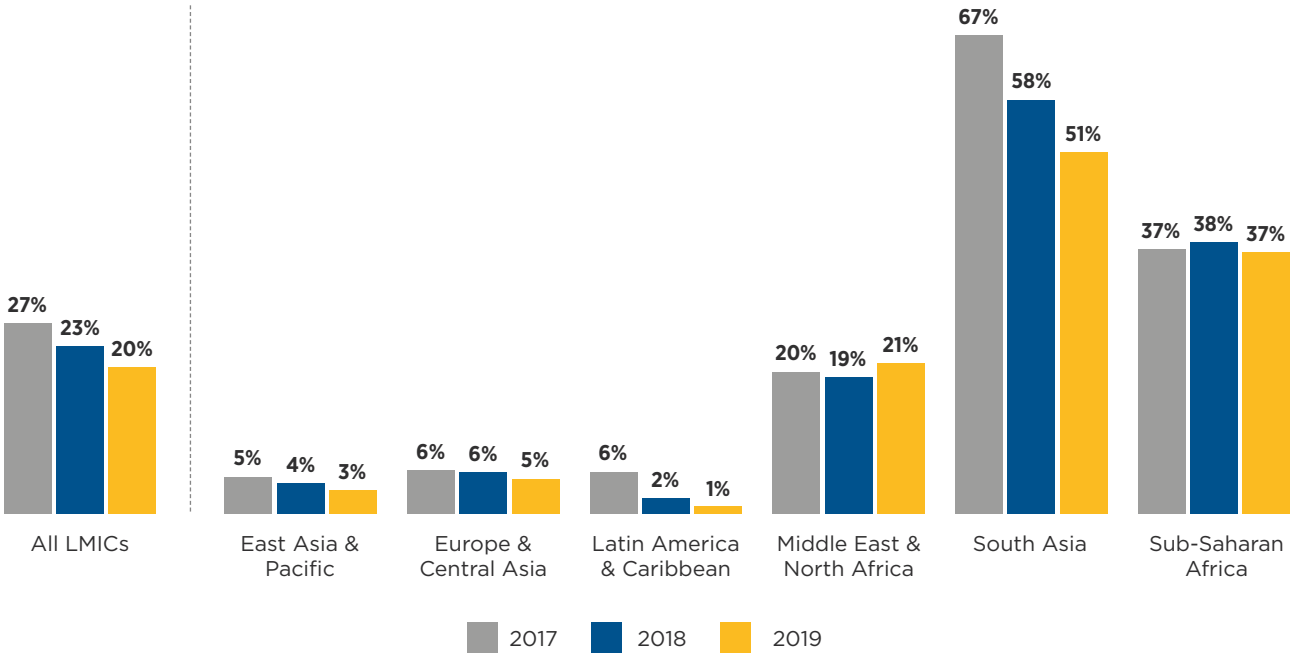
Source: GSMA Intelligence calculations

There also remains a persistent gender gap in mobile internet use. As with the rural-urban gap though, there is at least promising evidence that some of the gap is beginning to close, again notably in South Asia, where it is widest. Women in LMICs were 20% less likely than men to use mobile internet in 2019, down from 27% in 2017. Despite this progress, the gender gap in mobile internet use in LMICs remains substantial, with more than 300 million fewer adult women than men using mobile internet.[14] It is also showing no signs of declining in the other two regions where it remains relatively high – namely, Sub-Saharan Africa and MENA.

14. See The Mobile Gender Gap Report 2020, GSMA, 2020, for further analysis and discussion of the gender gap.

Figure 5

Gender gap in mobile internet use in LMICs, by region, 2017–2019



The gender gap refers to how much less likely a woman is to use mobile internet than a man.

Based on survey results and modelled data for adults aged 18+.

Source: GSMA Intelligence

3. Mobile internet adoption and use: barriers and drivers

Acquiring, using and learning about digital services is not necessarily a linear process. Nevertheless, certain key stages and milestones can pose barriers to mobile internet adoption and usage. This chapter looks at the main barriers at different stages of the mobile internet user journey (see Figure 6) and how they have changed in recent years – from a consumer perspective (using data from the GSMA intelligence Consumers in Focus Survey) and based on analysis from the Mobile Connectivity Index. The focus is on LMICs, as they account for more than 90% of the world's unconnected population and 98% of the uncovered population.

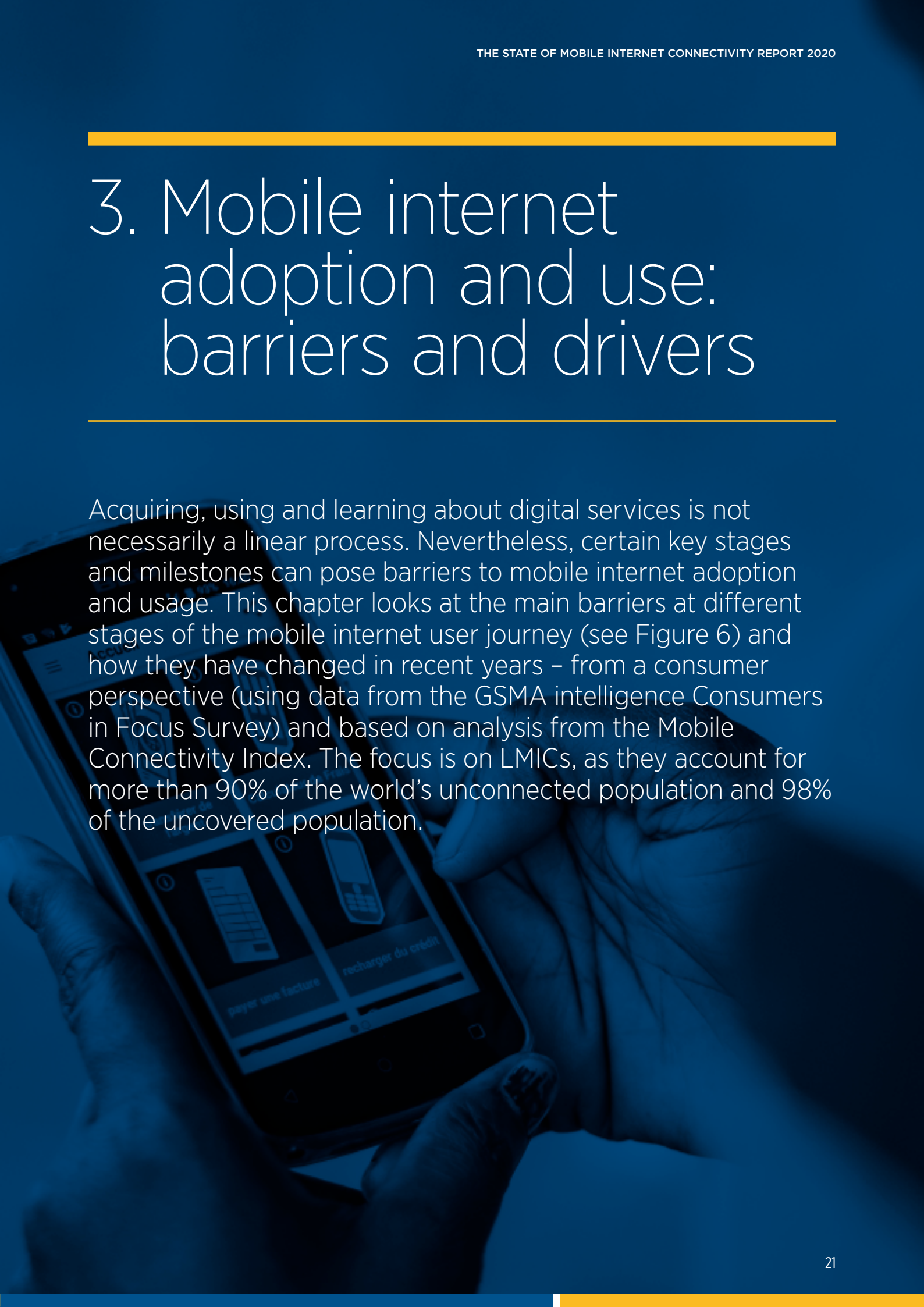
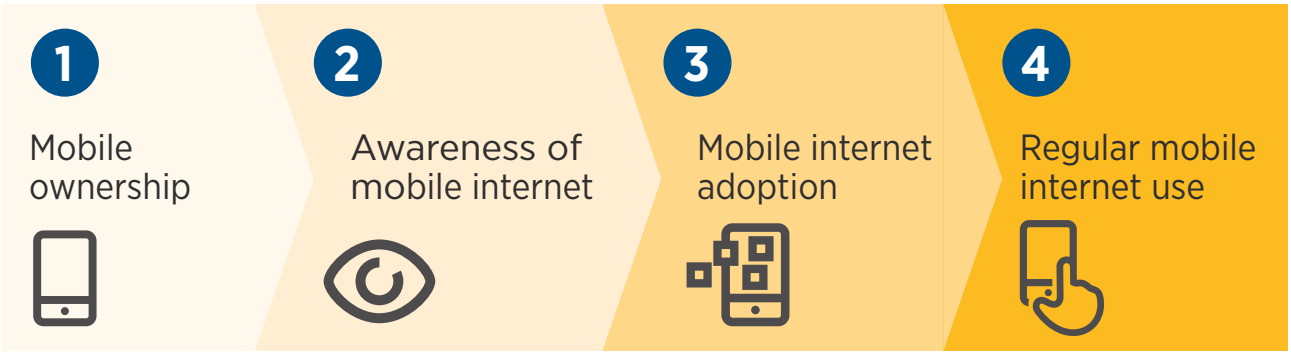


Figure 6

The mobile internet user journey



Affordability of handsets and data remains a key barrier to mobile internet adoption

Despite the growing importance of connectivity, there is a persistent gap in mobile phone ownership. At the end of 2019, 14% of adults in LMICs did not own any type of mobile phone; this has not significantly changed since 2017.[15] In South Asia and Sub-Saharan Africa, more than 20% of adults do not own a mobile phone. Affordability of handsets remained the top reported barrier to mobile ownership in many LMICs in 2019 (see Appendix 3). Among mobile users aware of mobile internet, the affordability of smartphones and data remains the second most important barrier to mobile internet use, after literacy and skills.

Cost of internet-enabled devices is high but declining in countries with lowest levels of affordability, and uptake is increasing

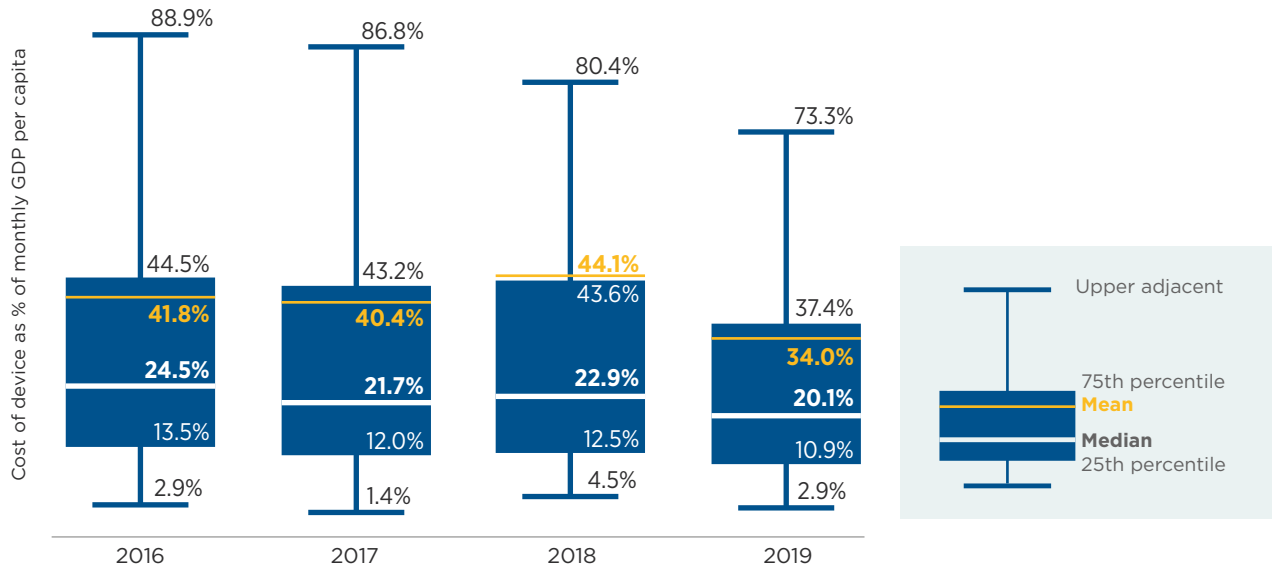
A major component of mobile internet affordability is the affordability of internet-enabled devices. In this context, it is important to consider the affordability of the cheapest internet-enabled device (whether a smartphone or feature phone), measured as the cost relative to monthly income per capita.[16]

Despite the relatively stable median cost of an entry-level internet device since 2016, progress has been made in the last two years in countries with the lowest levels of affordability. In 2019, this drove a notable reduction in the average cost of an entry-level internet device from 44% to 34% of monthly GDP per capita (see Figure 7).

15. Source: GSMA Intelligence modelled estimate from the Consumers in Focus Survey. For further details on methodology, see The Mobile Gender Gap Report 2020, GSMA, 2020.
16. This is one of the indicators in the affordability enabler of the Mobile Connectivity Index.

Figure 7

Affordability of an entry-level internet-enabled phone in LMICs, 2016–2019



Source: GSMA Intelligence calculations based on pricing data from Tarifica. Price of device is the cheapest internet-enabled feature phone or smartphone available (at the time of collecting data) sold by mobile operators or mobile phone retailers. To determine affordability, we divide the price by monthly GDP per capita (sourced from IMF World Economic Outlook).

As device prices are gathered from websites of mobile operators and phone retailers, they will not reflect prices paid in stores or sales in the second-hand or black markets, which are thriving in many LMICs.[17]

Looking at trends by region reveals some different dynamics (see Figure 8). In Europe and Central Asia, East Asia and Latin America there has been no obvious trend, with the cost of a device either stable or showing some volatility. This likely reflects the fast-changing nature of the device market, with many new devices made available each year and consumers possibly preferring better quality phones.

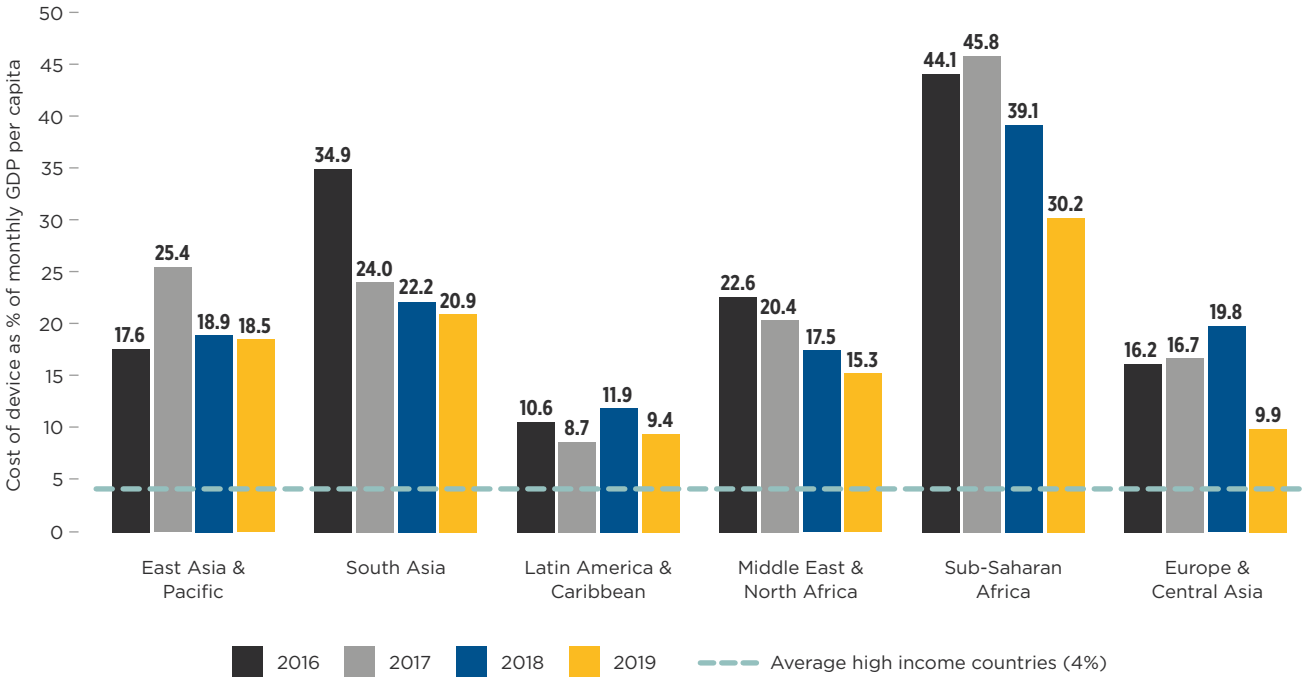
However, in MENA, South Asia and Sub-Saharan Africa, there has been a general improvement in device affordability over time. In Sub-Saharan Africa and South Asia, the median cost of an internet-enabled device in 2019 was around $35, compared to $40–60 in other regions. This has been driven by the increased availability of low-cost smartphones at less than $40 and, more recently, low-cost 'smart feature phones' for prices as low as $20 – notably the new generation of KaiOS phones (see Spotlight: The emergence of 'smart feature phones').[18]

This is one of the factors driving higher levels of smartphone adoption among adults in the two regions: in South Asia, it increased from 36% in 2017 to 47% in 2019, while in Sub-Saharan Africa it increased from 26% to 38% over the same period.[19] Smartphone ownership is particularly important in driving mobile internet use. Across the 15 LMICs surveyed in our 2019 study, on average 86% of smartphone owners used mobile internet, compared to only 12% of basic or feature phone owners. Smartphone owners were also more likely to engage in a wider range of mobile internet use cases.[20]

17. See for example GSMA, Accelerating affordable smartphone ownership in emerging markets, GSMA, 2017.
18. These lower cost smartphones have also benefitted from investments outside of operators and handset vendors; for example, Google has invested in KaiOS and is partnering with operators to develop new smartphones (e.g. Reliance Jio India) and providing access to quality devices at an affordable price for low-income customers (e.g. Safaricom PLC in Kenya).
19. Source: GSMA Intelligence modelled estimate from the Consumers in Focus Survey. For further details on methodology, see The Mobile Gender Gap Report 2020, GSMA, 2020.
20. For further analysis, see The Mobile Gender Gap Report 2020. GSMA, 2020.

Figure 8

Affordability of an entry-level internet-enabled phone in LMICs, by region, 2016–2019



For each region, the median average is taken based on the countries for which we have available data."

Source: GSMA Intelligence calculations based on pricing data from Tarifica. Price of device is the cheapest internet-enabled feature phone or smartphone available (at the time of collecting data) sold by mobile operators or mobile phone retailers. To determine affordability, we divide price by monthly GDP per capita (sourced from IMF World Economic Outlook).

Affordability of devices remains a challenge for the poorest segments

Despite improvements in affordability, the cost of a device will remain a barrier for many of the unconnected, particularly those on the lowest incomes. For many potential users, even a $20 phone represents a significant one-off cost. In Sub-Saharan Africa, for example, the median cost of an entry-level internet-enabled handset represents more than 120% of monthly income for the poorest 20% of the population in 2019. In addition to reducing the cost of handsets, other solutions to increase affordable access of devices need to be considered. During the past few years, many consumers in LMICs that could not afford to purchase a phone in a single upfront payment have benefitted from asset financing models (such as payment instalment plans, subsidies, loans, leases or rentals). Operators are also innovating with alternative credit-scoring models.[21] Several operators and third-party providers (such as pay-as-you-go utility companies) have launched such initiatives.[22]

21. Accelerating affordable smartphone ownership in emerging markets, GSMA, 2017
22. See, for example, Safaricom in partnership with Google device financing scheme "Safaricom targets one million with hire purchase 4G phones", africapulse.com, July 2020 and Robi Joyeeta smartphone bundle programme and Vodafone India loan scheme "Affordability: How mobile operators can improve the affordability of their services for women to help close the mobile gender gap", GSMA, October 2019

Spotlight: The emergence of 'smart feature phones'

One of the key drivers of improved affordability of devices in LMICs, especially in South Asia and Africa, is the emergence of the 'smart feature phones' category of devices. These are usually more affordable than smartphones. While they do not share the full capabilities of a smartphone, they typically allow for the installation of popular apps, such as Facebook, YouTube, WhatsApp and Google Assistant. Many connect to 4G networks, providing a much faster and better browsing experience than traditional feature phones.

In India, Jio partnered with KaiOS Technologies — the company behind the lightweight KaiOS operating system that powers the emerging "smart feature phone" category of devices. Together they created JioPhone – an LTE-enabled handset launched in 2017 and available for less than $10. More than 100 million devices have been sold since launch, providing an affordable entry point for first-time internet users in India unable to afford a more expensive smartphone or those who have never owned a mobile before.[23] This is one of the reasons why mobile internet adoption among women and rural populations has increased so much in recent years in India, alongside expansions in rural coverage.

In 2019, KaiOS Technologies also started partnering with mobile operators to introduce smart feature phones in several Sub-Saharan African markets. This included Vodacom's Smart Kitochi 4G phone in Tanzania, the Orange 4G Sanza in Botswana, the MTN Kamunye in Uganda and Telma Wi-Kif + 4G in Madagascar (all priced at or close to $20). The emergence of KaiOS and its partnerships with operators across Africa is helping overcome the affordability barrier for low-income users. The free resources that are offered, such as the 'Life' app, also help new users develop digital skills and understand how the internet can be relevant to them.[24]

In many countries significant portions of the population are using feature phones to access the internet. For instance, based on data from the GSMA Intelligence Consumers in Focus Survey, 14% of mobile internet users in India and Bangladesh have a feature phone. Adoption of feature phones among mobile internet users is also more than 10% in Nigeria, Cote d'Ivoire, Kenya, Tanzania and Uganda. The emergence of the smart feature phone category of devices promises to provide an affordable entry point for new internet users and a better experience and wider range of services than provided from a standard feature phone.

23. JioPhone by Jio case study in Reaching 50 million women with mobile: a practical guide, GSMA, 2020.
24. "First-time internet users: 5 insights gleaned from research", kaiostech.com, July 2020

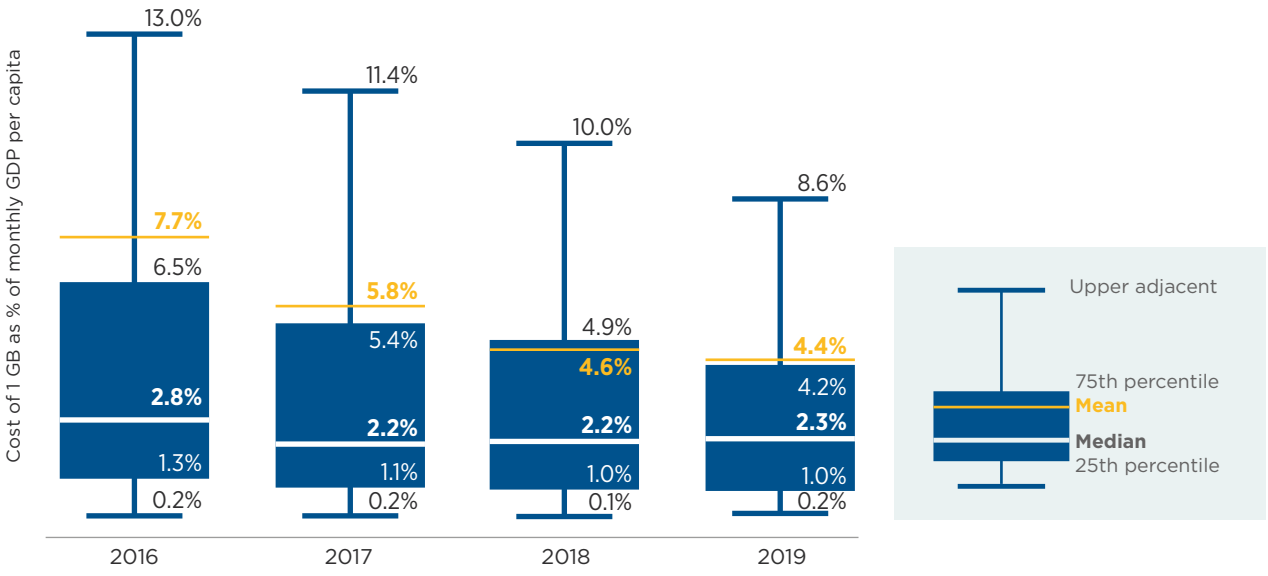
Data has become more affordable in some countries, but the majority of LMICs have still not achieved the UN affordability target

The other component of affordability for mobile internet is related to data bundles. The UN Broadband Commission has set a target to make entry-level data services less than 2% of monthly income per capita by 2025.[25] This section focuses on the affordability of 1 GB of monthly data.[26] Across LMICs, the cost of data as a share of monthly GDP per capita decreased by more than 40% between 2016 and 2019 (see Figure 9). Similar to mobile devices, there has been an improvement when looking at countries with the lowest levels of affordability. However, the median cost of 1 GB still exceeds 2% of monthly income, meaning more than half of LMICs still fall short of the Broadband Commission's target.[27]

Across regions, affordability of data remains largely unchanged compared to 2018. Sub-Saharan Africa still has the highest monthly cost of 1 GB as a proportion of income and only 28% of countries in the region currently meet the UN affordability threshold (see Appendix 3). Only in South Asia, Europe and Central Asia do the majority of countries meet the 2% threshold, while in Latin America the median cost increased above 2% in 2019.

Figure 9

Affordability of 1 GB of data in LMICs, 2016–2019



Source: GSMA Intelligence calculations based on pricing data from Tarifica and ITU. Price of 1 GB is the cheapest plan available (at the time of collecting data) to purchase at least 1 GB of data per month. Further details on how pricing data is gathered can be found in the Mobile Connectivity Index Methodology. In order to determine affordability, we divide the price by monthly GDP per capita (sourced from IMF World Economic Outlook). The box and whisker plot is based on affordability of 1 GB for all LMICs for which we have pricing data.

25. See 2025 Targets: Connecting the Other Half, Broadband Commission, 2018. While the Commission's target refers to affordability based on GNI per capita, we use GDP per capita in the Index to incorporate more up-to-date data on income per capita. In any case, GDP and GNI per capita are very highly correlated, so our results do not materially change based on the income metric used.
26. The Index includes four indicators measuring the affordability of monthly data baskets of 100 MB, 500 MB, 1 GB and 5 GB. For each basket, affordability is measured by taking the cheapest tariff that allows users to consume the relevant monthly data amount relative to monthly income per capita. For further details on how baskets and prices are derived, see the Mobile Connectivity Index methodology document
27. This specifically refers to 136 LMICs for which we had pricing data.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To close the usage gap and drive digital inclusion, the poorest in society need to afford a suitable amount of data. However, affordability for the poorest 20% (or quintile) remains significantly higher than the 2% target for all regions. In Sub-Saharan Africa, the poorest quintile would on average need to spend more than 16% of their monthly income on 1 GB of data. In some countries, affordability for the poorest is more than 50% of monthly income – for example, in Yemen, Guinea-Bissau, Zimbabwe, Democratic Republic of Congo and Central African Republic. In these countries more than 50% of citizens live on less than $1.90 per day,[28] highlighting the need for innovative solutions to make mobile affordable.

COVID-19 could reverse recent improvements in affordability, though operators have been proactive in efforts to mitigate the pandemic's negative impacts

Since the outbreak of the COVID-19 pandemic, the subsequent economic shocks have been unprecedented: in the short term, GDP is expected to fall by 4.9% in 2020 (the largest contraction since the Great Depression).[29] It is likely that the poorest and most vulnerable people will be disproportionately affected by the economic impacts of the pandemic, with the UN forecasting an overall decline in global human development for the first time since 1990.[30]

This will have implications for the affordability of mobile devices and data plans. As people see their income shrink, they may allocate less budget to connecting to the internet. Furthermore, lockdown-related store closures are likely to have an impact as around 35% of smartphones are currently sold through operator retail stores,[31] with many prepaid subscribers also reliant on this channel to recharge their allowances.

Operators have been proactive in taking short-term measures to sustain connectivity, such as increased data allowances, upgrading speeds and making data free to help users access information, health and educational services or use conferencing/teleworking systems.[32] Several operators have also helped ensure customers can stay connected by, for instance, providing extensions to customers' account validity as well as free balance transfers from one user to another, as many people have been unable to recharge or faced difficulties recharging. Other operators have also increased third-party sales channels such as bank ATMs, pharmacies and grocery stores.[33] In some countries, governments have been supportive in keeping mobile affordable – for example, subsidising mobile internet use in Thailand and Egypt or removing transaction fees, including on mobile financial services.[34]

28. Source: World Bank
29. World Economic Outlook Update, June 2020
30. COVID-19 and Human Development, United Nations, 2020
31. Device portfolios and strategies in the 5G era, GSMA Intelligence, 2020
32. "COVID-19: We're tracking digital responses worldwide. Here's what we see", World Bank, May 2020
33. COVID-19 impact: digital divide exposed further in emerging markets, GSMA Intelligence, 2020
34. 5 ways to protect critical digital connectivity during COVID-19, WEF, 2020

Awareness of mobile internet is improving, particularly among rural populations and women, but is far from universal

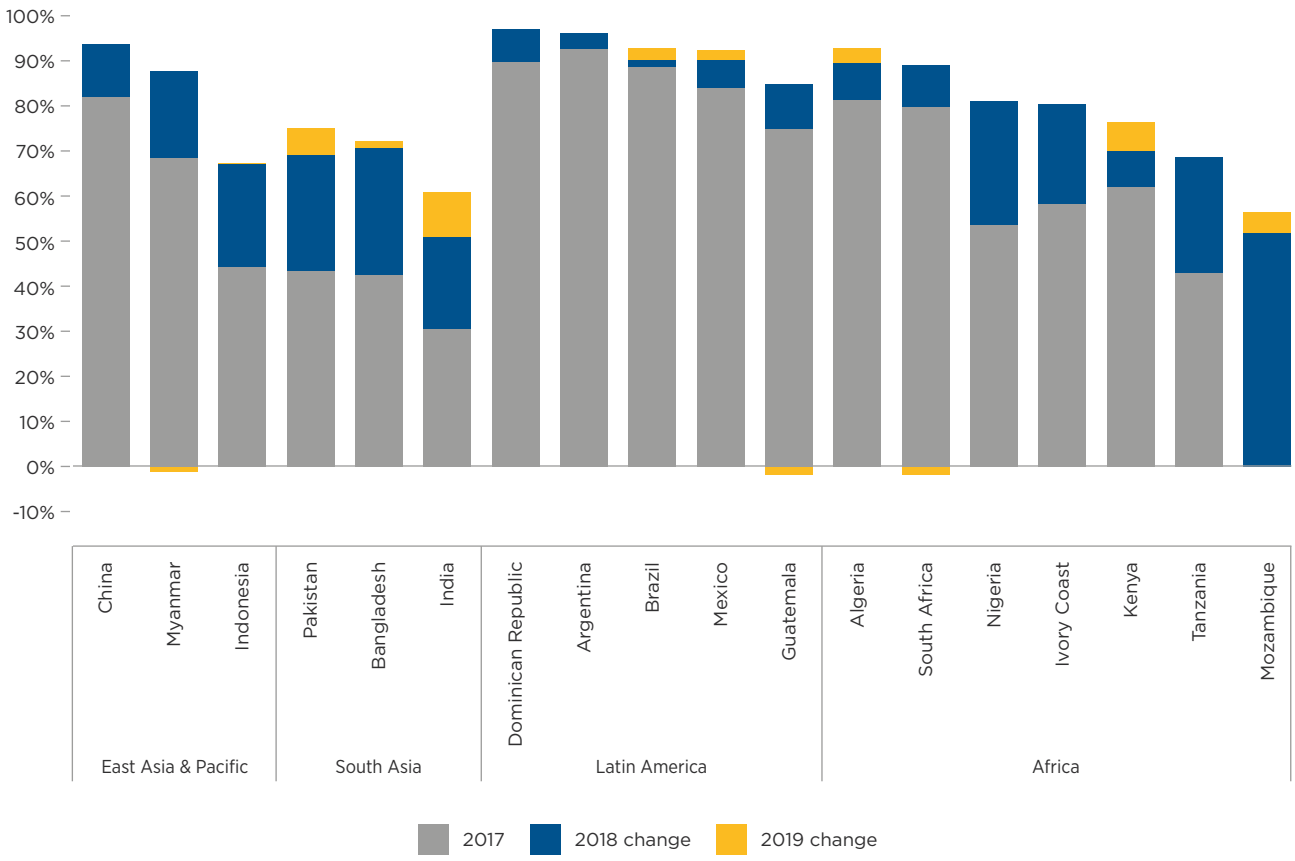
An important enabler of mobile internet adoption is whether consumers know about and understand the benefits of mobile internet. In the LMICs surveyed, almost a quarter of adults were not aware of mobile internet.[35] However, awareness of mobile internet has been growing in recent years, particularly in South Asia and Africa (see Figure 10).

Another encouraging trend is that awareness is growing disproportionately for rural populations and women. The average rural-urban gap in awareness[36] in countries surveyed halved from 25% in 2017 to 12% in 2019. The average gender gap in awareness[37] also decreased from 17% to 8% over the same period.[38] This has resulted in significant gains – for example, in Bangladesh, awareness among women increased from 34% to 71% and there is now almost no disparity by gender. In India, awareness among rural populations increased from 25% to 58%, while in Nigeria it increased from 33% to 70%.

35. A person is considered aware of mobile internet if they have either used mobile internet before or have not used mobile internet but are aware they can access the internet on a mobile phone.
36. The GSMA calculates the rural-urban gap in awareness as the difference between the proportion of urban and rural population aware of mobile internet divided by the proportion of urban awareness, expressed as a percentage.
37. The GSMA calculates the gender gap in awareness as the difference between the proportion of male and female aware of mobile internet divided by the proportion of male awareness, expressed as a percentage
38. For further data and analysis on the gender gap in awareness, see The Mobile Gender Gap Report 2020, GSMA, 2020.

Figure 10

Mobile internet awareness by country, 2017–2019



Mozambique was not surveyed in 2017. China, Argentina, Dominican Republic, Ivory Coast and Tanzania were not surveyed in 2019.

Base: Total population aged 18+

A person is considered aware of mobile internet if they have either used mobile internet before, or have not used mobile internet but are aware they can access the internet on a mobile phone.

N = from 1,000 to 2,000

Source: GSMA Intelligence Consumers in Focus Surveys 2017, 2018 and 2019

Lack of literacy and digital skills persists as a significant barrier to use

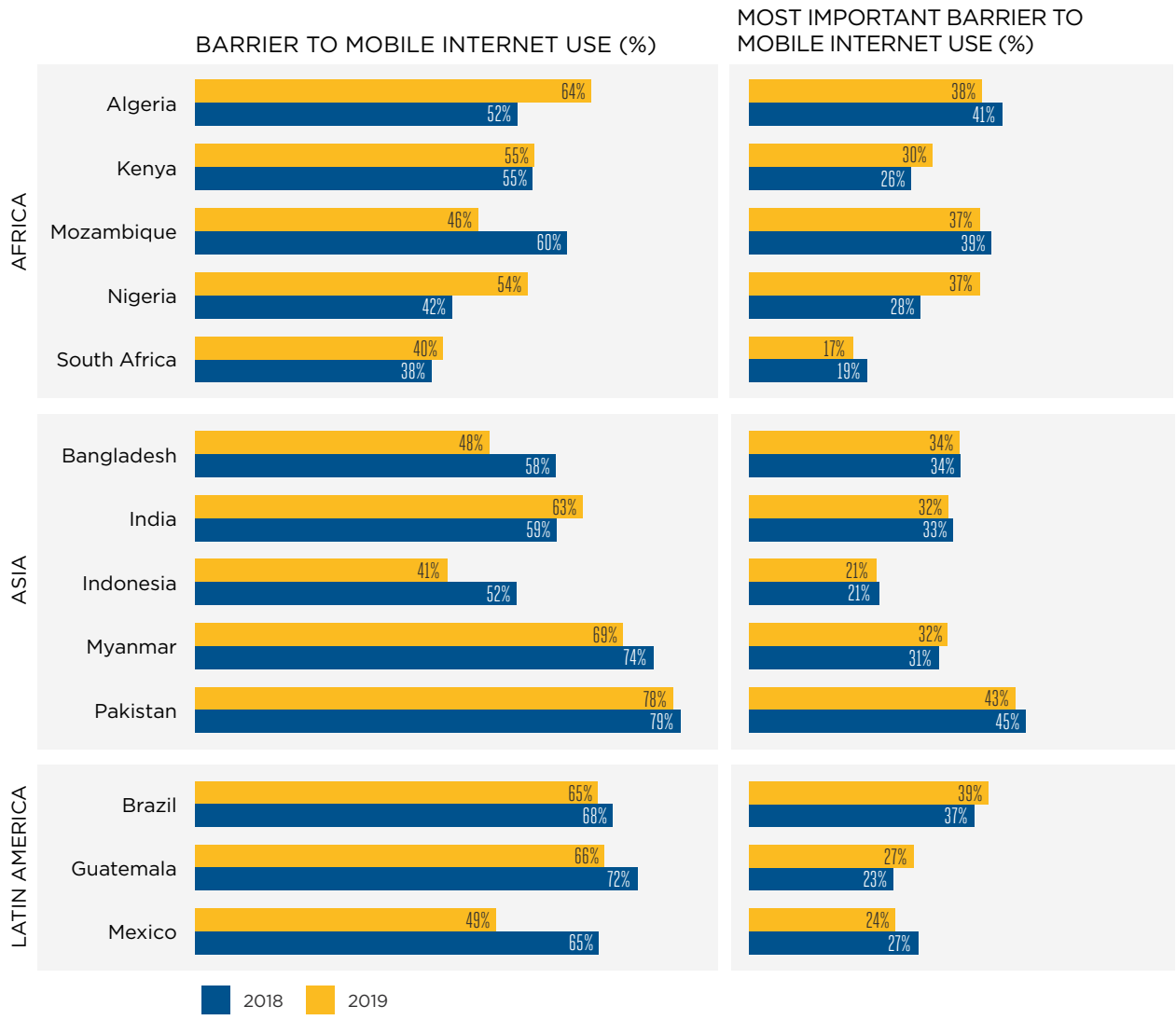
A lack of literacy and digital skills is the biggest perceived barrier to mobile internet adoption among mobile users aware of mobile internet across all regions.[39] In 2019, it was reported as the top barrier by a third of respondents across the surveyed countries. However, literacy and digital skills are becoming less of a barrier in many countries and in some cases significantly so (e.g. Indonesia, Bangladesh, Mexico and Mozambique). (see Figure 11)

Rural populations are more likely to cite literacy and skills as the most important barrier to adoption than urban populations (see Appendix 3). Similarly, women are more likely to perceive skills as the most important barrier to mobile internet adoption than men, especially in Africa.[40] This is consistent with the Mobile Connectivity Index's gender equality dimension, which shows that gender inequality in education is much higher in Africa than in other regions.

39. Based on results from the Consumers in Focus Surveys in 2018 and 2019.
40. For further data and analysis on barriers to mobile internet adoption for women, see The Mobile Gender Gap Report 2020, GSMA, 2020.

Figure 11

Proportion of mobile users aware of mobile internet who report barriers related to literacy and digital skills in LMICs, 2018–2019



Base: Adults aged 18+ who have used a mobile phone in the last three months but not used mobile internet in the last three months, despite being aware of mobile internet.

'Barrier' percentages indicate the proportion of respondents who answered, "Yes – this is a something that stops me" to the question, "Please indicate whether this is something that stops you at all from using the internet on a mobile phone" Eighteen different response options have been grouped into categories for this analysis. 'Most important barrier' percentages indicate the proportion of respondents who answered, "This is the most important reason stopping me" to the question, "Which one of those factors would you say is the single most important reason stopping you from using the internet on a mobile phone?" Eighteen different response options have been grouped into categories for this analysis. Further details on response options are provided in Appendix 2.

N = from 103 to 403

Source: GSMA Intelligence Consumers in Focus Surveys 2018 and 2019

Strengthening the evidence base on mobile digital skills

Digital skills will be essential to take part in the digital society of the future. The lack of robust and comparable measures of digital skills (as opposed to more generic skills and education metrics) masks the true extent of the literacy and skills barrier. It is therefore important that accurate and reliable measures of digital skills become available over time in order to better target policies and interventions. Existing indicators for ICT skills are often based on outdated methods of access that do not reflect how most users – especially in LMICs – access the internet, i.e. on a mobile platform. It is therefore recognised that more relevant and up-to-date assessments of digital skills are needed. Encouragingly, these are now being developed – for example, the ITU's recent Digital Skills Assessment Guidebook,[41] Unesco's Framework of Reference on Digital Literacy Skills,[42] the Coalition for Digital Intelligence[43] and the EU's Digital Competence Framework.[44]

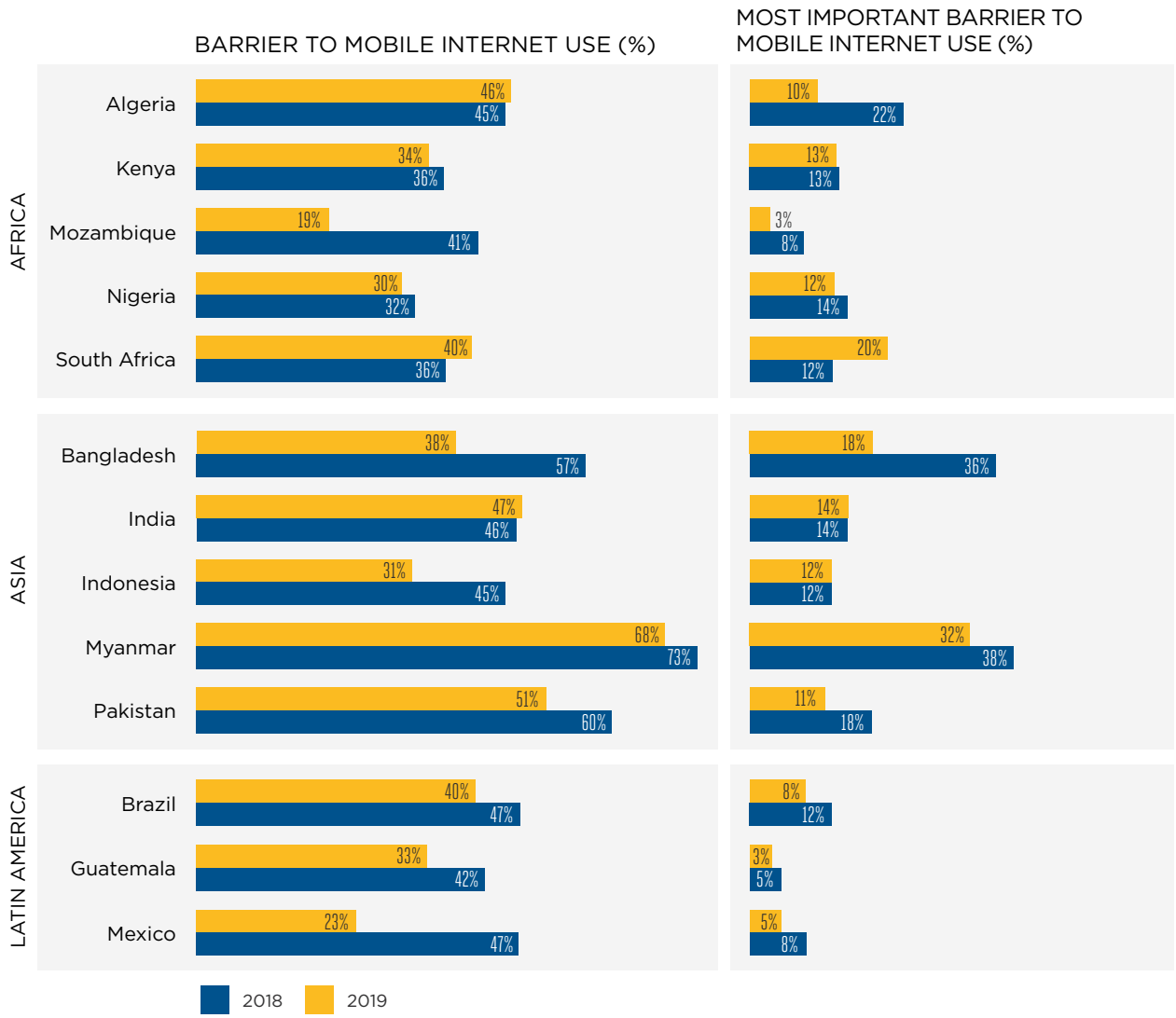
More mobile users are increasingly seeing the relevance of mobile internet and benefiting from locally relevant content

Perceived relevance remains an important barrier in many LMICs surveyed but is declining both as a general barrier and a top barrier relative to other barriers to mobile internet adoption in most countries, especially in Asia and Latin America (see Figure 12). Fewer mobile users state that the internet is not relevant to them or there is not enough content in local languages, suggesting that they are not only increasingly aware of mobile internet but are seeing it as more relevant to their lives.

41. Digital Skills Assessment Guidebook, ITU, 2020
42. A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2, Unesco, 2018
43. https://www.coalitionfordigitalintelligence.org/
44. The Digital Competence Framework 2.0, European Commission

Figure 12

Proportion of mobile users aware of mobile internet who report barriers related to relevance in LMICs, 2018–2019



Base: Adults aged 18+ who have used a mobile phone in the last three months but have not used mobile internet in the last three months, despite being aware of mobile internet.

N = from 103 to 403

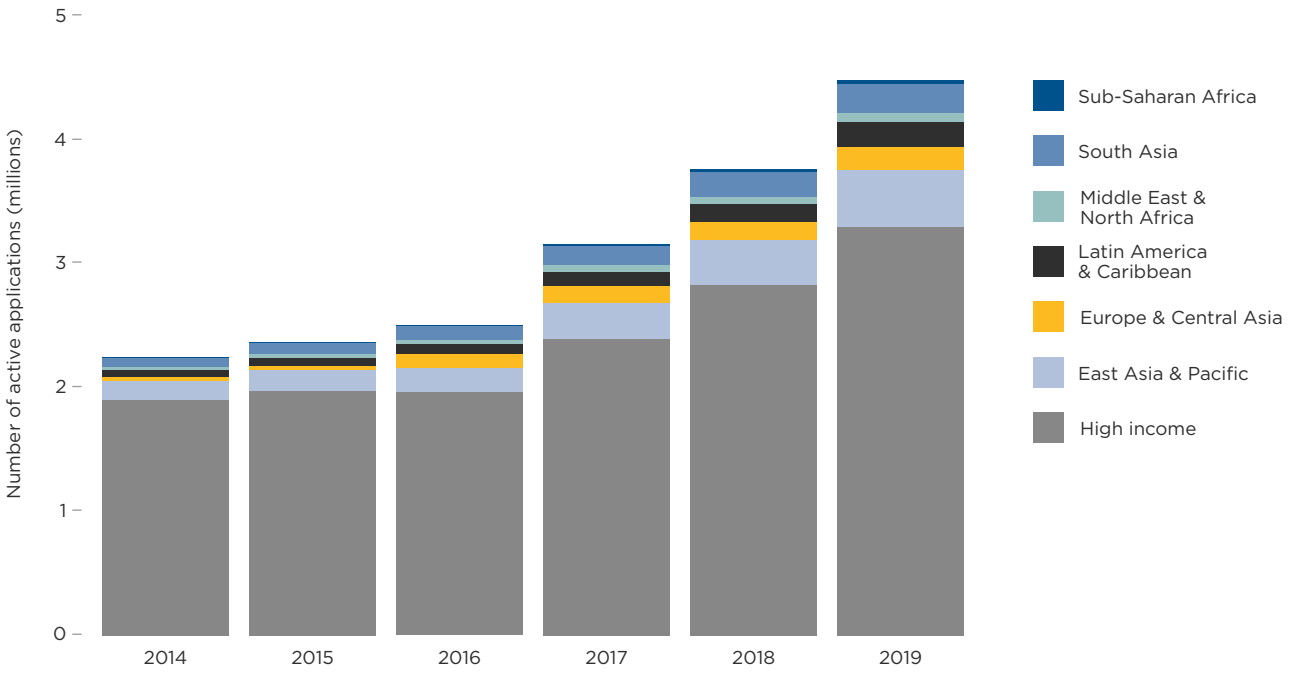
Source: GSMA Intelligence Consumers in Focus Surveys 2018 and 2019

This trend of increasing perceived relevance of the internet is also reflected in several of the indicators used to inform the Content and Services enabler[45] of the Mobile Connectivity Index. For example, the number of active apps available to users globally more than doubled (from 2.2 million to 4.5 million) between 2014 and 2019. Figure 13 shows that while the majority are still developed in high-income countries, an increasing amount of content has been developed in LMICs – especially in Asia, which has seen some of the biggest gains in Content and Services scores. This is driven by the development of digital ecosystems that have increased the amount of mobile applications in local languages (e.g. in Myanmar, Philippines, Indonesia and Vietnam) as well as other content such as e-government services and the growing use of social media.

However, many other countries perform less well on the development of locally relevant content, particularly those in Sub-Saharan Africa and the Pacific, which have a high degree of linguistic diversity, making it challenging for content providers to develop sufficient scale for their services.

Figure 13

Number of active mobile applications developed by high-income countries and LMICs, by region, 2014–2019



App stores include Google Play, Apple App Store, Amazon Appstore and Microsoft Windows.

Source: GSMA Intelligence analysis of data provided by AppFigures

45. The Content and Services enabler includes metrics for local relevance (e.g. the number of mobile applications and web domains generated within countries), availability (number of mobile applications available in local languages) and online security (which uses the ITU Global Cybersecurity Index as a proxy for wider online security).

Mobile internet use is becoming more diverse and, in the COVID-19 context, more intense

Mobile internet delivers substantial benefits for those who use it. It helps them in their day-to-day work, study or household chores; makes them feel safer; and gives them access to useful information that they would not otherwise be able to easily access.[46] The nature of what people use their phone for is also evolving significantly.

Instant messaging and social media remain the most popular mobile internet activities but consumers are starting to engage more with other services

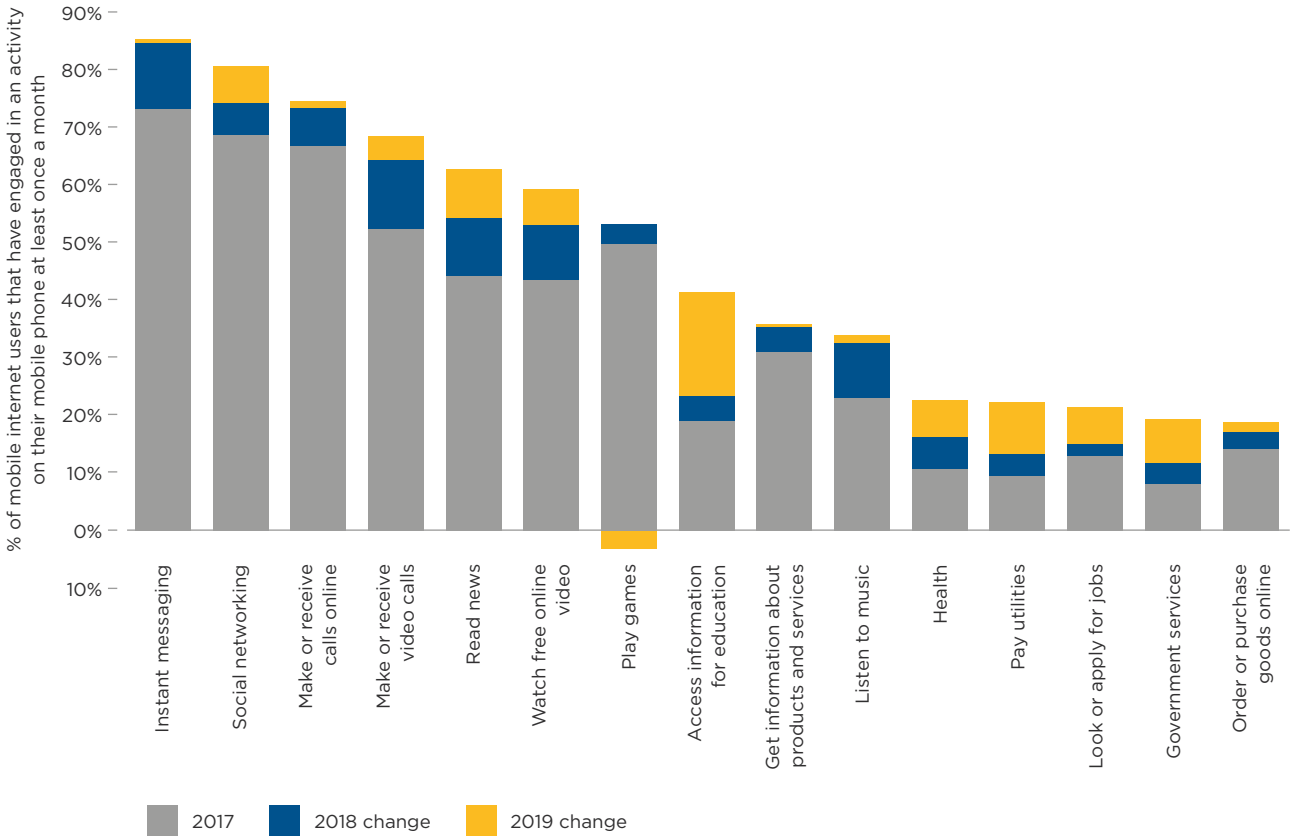
Since 2017, respondents to the Consumers in Focus Survey have been asked how frequently they engage with certain use cases, ranging from basic communications, such as sending SMS and making voice calls, to more complex use cases, such as watching video content and accessing online learning.

While instant messaging and social networks remain the most popular online activities in LMICs for users of mobile internet, since 2017 there has been a notable increase across a range of services, including accessing educational and health information and applying for jobs online (see Figure 14). This suggests usage is becoming more diverse and beneficial, as consumers engage in a wider array of activities on their phones.

46. Based on data from the Consumers in Focus Survey 2019. For more details, see The Mobile Gender Gap Report 2020, GSMA, 2020. Further evidence of the perceived benefits of mobile technology and internet access can be found in Mobile Connectivity in Emerging Economies, Pew Research Center, 2019 and The Impact of Mobile on People's Happiness and Well-Being, GSMA and Gallup, 2018.

Figure 14

Activities undertaken on mobile internet based on usage in surveyed LMICs, 2017–2019



12 countries included that were surveyed across all three years.

Base: Adults aged 18+ who have used mobile internet the last three months

Percentages indicate the proportion of respondents who answered that they engaged in the relevant activity on their mobile phone at least once per month.

N = from 183 to 732

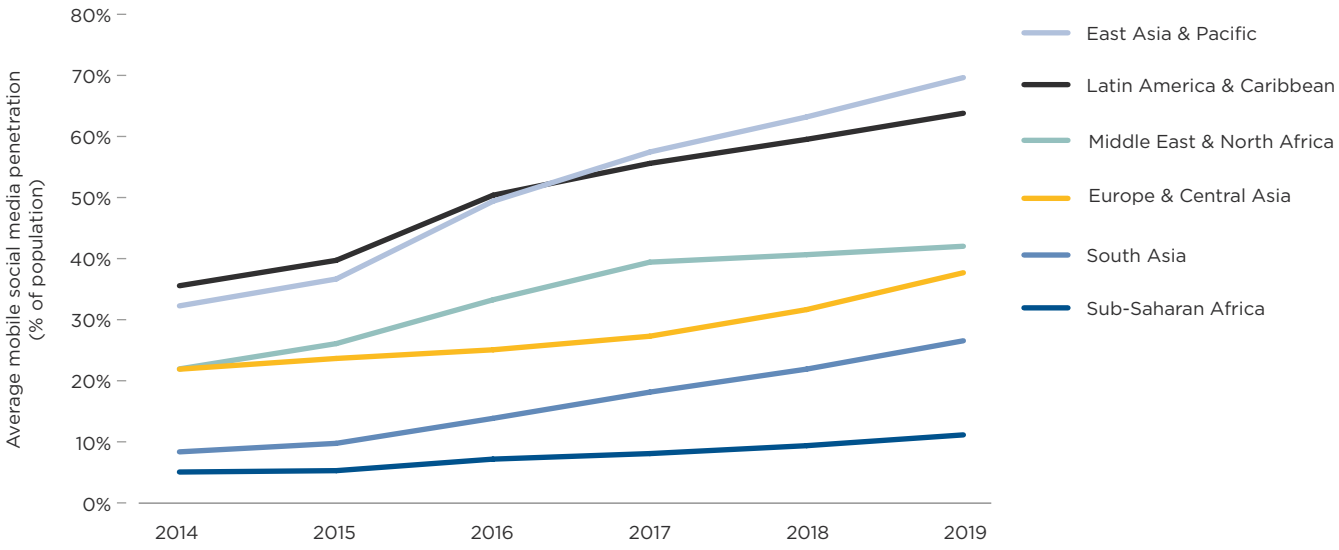
Source: GSMA Intelligence Consumers in Focus Surveys 2017, 2018 and 2019.

The increase in social media use over the last several years across LMICs is likely to be one of the key drivers of increased mobile internet adoption, given that it is one of the predominant activities that users engage with on their phones (see Figure 15). It is likely to be a factor explaining some of the positive trends in awareness and relevance, especially in Asia.

The growing popularity of social media applications that facilitate sharing of user-generated video content, such as YouTube and TikTok, is also reflected in the substantial growth in consumption of video content over mobile. This has increased by more than 50% in two years across half the surveyed countries.

Figure 15

Average social media penetration in LMICs, by region, 2014–2019



Source: GSMA Intelligence analysis of data sourced from DataReportal

The intensity of mobile internet activities is likely to increase significantly in a post-COVID-19 world

During the COVID-19 pandemic, individuals have become increasingly reliant on digital services to adhere to lockdown and physical distancing rules and lower the virus transmission rate. Analysis carried out by Ericsson of the net changes in app usage and new user growth reveals that apps for COVID-19 information and symptom tracking, e-learning, remote working and wellness have all experienced increases in usage.[47] In a survey of 11 markets,[48] it also found that 87% of respondents had increased their use of online services during the pandemic, particularly web browsing, instant messaging, video streaming, social media and video calls.[49]

While some of the increased demand may be temporary (for example, the use of video and conferencing calls during lockdown), the pandemic could drive a broader shift in consumer behaviour, as individuals make greater use of digital technology in their lives (e.g. e-commerce, reading the news, and accessing health and educational services).

47. Ericsson Mobility Report, 2020
48. The survey includes both high-income countries and LMICs (including Brazil, China and India).
49. Ericsson Mobility Report, 2020

Spotlight: The virtuous circle of connectivity in Nigeria

Nigeria was the most improved country in Sub-Saharan Africa in the Mobile Connectivity Index in 2019 and the seventh most improved globally, increasing its score from 45 to 49 in just one year. Progress was driven by a range of improvements across the Infrastructure, Affordability and Content and Services enablers.

- **Infrastructure:** 3G coverage reached 78% in 2019, with 20 million people covered during the year. Since the first 4G network rollout in 2016, operators have now achieved 45% 4G coverage. These improvements in coverage, particularly 3G, are partly driven by the deployment of UMTS-900 (operators reusing part of their 2G spectrum in 900 MHz to deploy 3G).This has allowed operators to roll out 3G in a more cost-efficient manner. The licences retained by operators are technology neutral, highlighting the importance of an enabling regulatory framework. Increased 4G coverage has gone hand in hand with improved network download and upload speeds and lower latencies.

- **Affordability:** Nigeria now has one of the most affordable handset costs in the world. In 2017, the cheapest internet-enabled phone cost 42% of monthly GDP per capita but this fell to 12% in 2019, as MTN launched its MTN 3G Smart Feature Phone for $20. Mobile tariffs have become more affordable too, with the cost of a 1 GB monthly plan decreasing from 3.3% to 1.5% of monthly GDP per capita between 2016 and 2019 (below the international affordability threshold of 2%). This has helped drive smartphone adoption among adults in the country, which increased from 28% in 2017 to 44% of total connections in 2019.

- **Content and Services:** The country's Online Service Index score for E-Government increased from 31% in 2014 to 52% in 2019, while the number of active mobile apps developed per person increased fivefold over the same period. As of 2019, Nigeria was home to almost 2,000 mobile apps developers. The country has a score of 53 in both the accessibility of apps in local language and the accessibility of top ranked apps, compared to a regional average of 32.

As a result of the above progress, mobile internet penetration has doubled in six years, from 16% in 2014 to 32% in 2019, while mobile ownership has reached 50%. In 2019, there were more than 7.5 million new mobile internet subscribers in the country. Notably, there has also been an improvement in the rural-urban gap in mobile internet use, which fell from 66% in 2017 to 47% in 2019.

Nigeria shows how a country can create a virtuous circle of achieving more coverage and at the same time offering more affordable devices and mobile plans that in turn enable operators to roll out more coverage, as usage increases. This has also been shown to have wider economic and social implications. A recent study by the GSMA and World Bank found that the rollout of mobile broadband networks in Nigeria between 2010 and 2016 increased labour force participation – especially among women – and reduced extreme poverty by around 7 percentage points.[50] Furthermore, the impacts were greater in rural areas. This highlights the transformative impact that mobile technology, and mobile broadband specifically, can achieve for the poorest individuals in the world.

Despite the progress, several areas of improvement remain in Nigeria – notably, expanding coverage to the 20% of population currently uncovered and reducing the still-large rural-urban gap in internet use and 30% gender gap. The skills barrier also needs to be addressed: with more than a third of adults in the country not literate, skills and literacy are identified by consumers as the most important barrier to using mobile internet.

50. The Welfare Effects of Mobile Broadband Internet: Evidence from Nigeria, GSMA and World Bank, 2020

4. Expanding mobile broadband coverage

4G coverage is catching up with 3G coverage but challenges remain to reach rural and remote areas

Since 2015, when 3G coverage in LMICs stood at 77% and 4G coverage was 46%, operators in LMICs have invested around $270 billion in expanding and upgrading networks.[51] In 2019, 3G and 4G networks covered 90% and 82% of the population in LMICs, respectively. It has taken LMICs around seven years to reach more than 80% coverage for 4G, compared to 10 years for 3G. The majority of those who do not have mobile broadband coverage are now likely to be found in rural, remote and sparsely populated areas. In 2019, GSMA Intelligence estimates that 3G population coverage in rural areas of low-income countries (the majority of which are in Sub-Saharan Africa) was just over 50%.

The most significant expansion in mobile broadband coverage in 2019 occurred in India, as Reliance Jio covered almost 99% of the population with its 4G network[52] (with Airtel not far behind[53]), surpassing both 2G and 3G coverage. Since its entry into the Indian market in 2016, Jio has engaged in an accelerated LTE rollout in partnership with Samsung, deploying small cells in large volume to expand its network in urban and rural areas.[54]

51. Source: GSMA Intelligence. Total mobile operator capex in LMICs during 2015–2019 was $415 billion. To estimate the proportion of this spent on networks, a network proportion of 65% is applied based on a review of financial statements reported by operators.
52. Reliance Jio Quarterly Report, December 2019
53. Bharti Airtel Quarterly Report, December 2019
54. "Samsung deploying small cells in large volumes for Jio's indoor coverage: Networks head", ETTelecom, November 2018

In Sub-Saharan Africa, operators have continued to upgrade 2G sites to 3G, driven in part by increased demand and smartphone adoption, as well as regulation in several countries that allows operators to re-farm their 900 MHz spectrum from 2G to 3G.[55] While 4G coverage is lagging behind that in other regions, with just less than 50% of the population within reach of a 4G network in 2019, it still represents almost double the level of 4G coverage compared to 2017, suggesting operators are upgrading at an accelerated pace (see Figure 16).

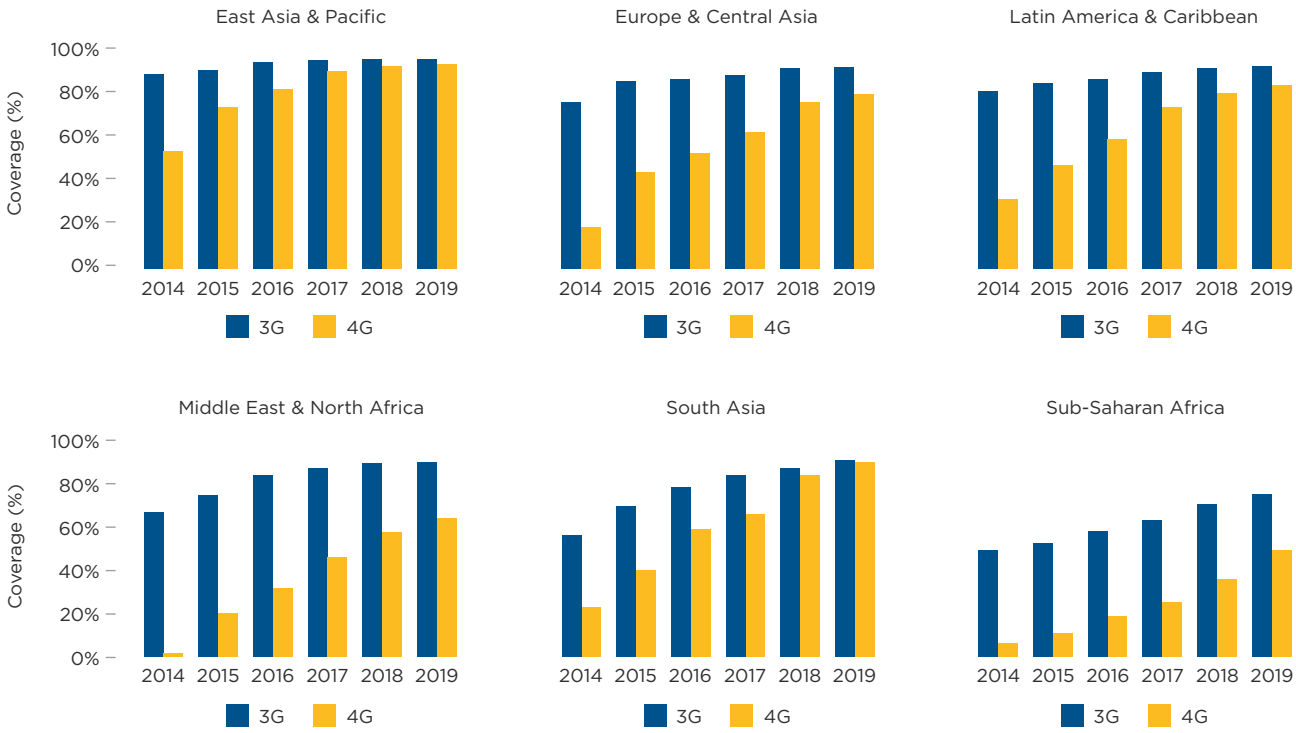
With 2G coverage currently standing at just over 95% in LMICs, there is still room to expand mobile broadband networks by upgrading existing 2G sites to 3G or 4G, especially in Sub-Saharan Africa. Upgrading sites requires a smaller incremental cost than building new sites. However, the investment is not sustainable in the absence of sufficient demand for 3G/4G data services and is more likely to occur when technology-neutrality policies allow operators to re-farm their spectrum to provide mobile broadband services. Simultaneously addressing the demand-side barriers such as affordability, lack of skills, perceived relevance and safety and security will be important in helping to close the coverage gap (see Spotlights on the Pacific Islands and Nigeria).

Furthermore, as the 2G-3G gap narrows, many countries will soon approach the point where expanding networks to populations not covered by any mobile network becomes a significant economic challenge. For example, in Africa, an estimated additional $100 billion would be needed to achieve universal, affordable and good quality broadband internet access by 2030, according to the Broadband Commission.[56] However, the business case for connectivity, particularly in rural, remote areas is proving difficult, resulting in low population coverage numbers. For example, in Liberia 2G coverage stands at only 75.6%, but GSMA research shows that this level of coverage is close to the maximum sustainable coverage due to the high deployment costs and low expected revenues.[57] In this context, innovation and appropriate policy frameworks will play a key role in increasing the commercial viability of rolling out mobile internet networks. Innovation in RAN technologies, backhaul and energy, as well as new business models, can improve the cost of deploying and operating networks,[58] while investment-friendly policy frameworks are needed to increase the sustainability of investment and promote further private-public collaboration.[59]

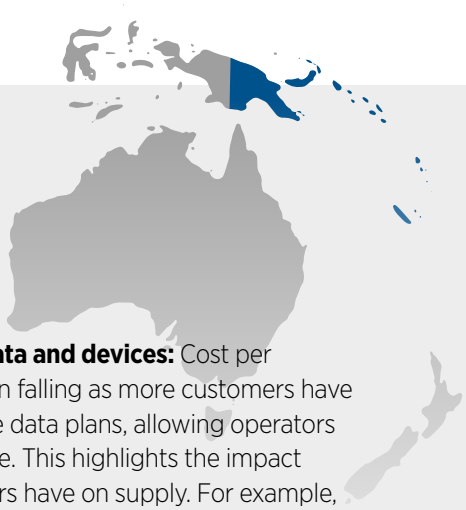
55. The 900 MHz spectrum band is better suited to providing coverage than the usual 2100 MHz band used to deploy 3G.
56. Connecting Africa through Broadband – A strategy for doubling connectivity by 2020 and reaching universal access by 2030, Broadband Commission, 2019
57. Are mobile operators under-investing in rural coverage in emerging markets? GSMA, 2019
58. Closing the Coverage Gap: How Innovation can Drive Rural Connectivity GSMA, 2019
59. See, for example, the Rural Star initiative in Ghana where lightweight rural sites were deployed to expand 3G/4G coverage and other examples of innovations in infrastructure in Closing the Coverage Gap: How Innovation can Drive Rural Connectivity, GSMA, 2019.

Figure 16

3G and 4G coverage in LMICs, by region, 2014–2019



Source: GSMA Intelligence



Spotlight: Achieving greater coverage in the Pacific Islands

Mobile broadband coverage has expanded significantly in the Pacific Islands (excluding Australia and New Zealand), from 40% in 2014 to 70% in 2019. Many of the smaller islands (e.g. Tonga, Samoa and Nauru) have achieved near-universal 3G coverage. In Papua New Guinea, which accounts for about three quarters of the population of the Islands, 3G networks currently reach around two thirds of the population. Fiji, another of the most populous islands, has achieved 3G and 4G coverage of more than 95%.

The improvements in coverage have been driven by a combination of supply- and demand-side factors, which are reflected in the Mobile Connectivity Index indicators, including the following:

- **Access to electricity:** The proportion of the population with access to electricity increased from 47% to 64% between 2014 and 2019, making it less costly for operators to deploy networks and easier for consumers to use mobile phones (e.g. for recharging).

- **International bandwidth per user:** Average international bandwidth per user increased by more than 220% between 2014 and 2019,[60] enabled by the deployment of new submarine cables. In 2007, only four Pacific Islands were connected to an international submarine cable, with the remainder reliant on expensive satellite links to connect to the rest of the world due to the geography of the region. Over the following 10 years, submarine cables reached eight more islands.[61] Currently, all population centres in the Pacific, with the exception of Tuvalu, either have or are funded to have a cable connection. This has improved operators' access to low-cost, high-bandwidth international connectivity in their networks.

- **Affordability of data and devices:** Cost per megabyte has been falling as more customers have migrated to mobile data plans, allowing operators to expand coverage. This highlights the impact that demand factors have on supply. For example, the average cost of 1 GB of data in the region fell from 11.0% to 5.5% of monthly GDP per capita between 2014 and 2019. The cost of internet-enabled devices has also fallen, partly driven by the growing range of devices available from Asian manufacturers such as Gionee and Tecno.[62] In 2019, around 40% of connections in the region were smartphones, compared to 17% in 2015.

Despite these improvements, mobile internet adoption in the region stood at around 20% in 2019 – the lowest in the world. With the exception of Nauru and Fiji, where more than 60% of the population uses mobile internet, countries in the region have mobile internet adoption rates of less than 30%. Looking ahead, to expand mobile internet adoption, it will be important to continue to address some of the unique barriers to coverage faced by the region (e.g. large rural populations spread across many small islands, limited grid access and rugged terrain) through innovative solutions, as well as address demand-side barriers around skills, affordability and developing locally relevant content. This particularly applies to remote islands in the Pacific that are far away from the main population centres.[63] The former generally have lower levels of coverage and mobile internet use, risking the development of a new digital divide in the region.

60. GSMA analysis of data sourced from ITU World Telecommunication/ICT Indicators Database 2020.
61. Maximising availability of international connectivity in the Pacific, ITU, 2017
62. The Mobile Economy Pacific Islands, GSMA, 2019
63. An example is the Cook Islands, where the main islands of Rarotonga and Aitutaki are connected to the Manatua cable, but there are more than 20 outer islands with small populations that are poorly connected both domestically and internationally.

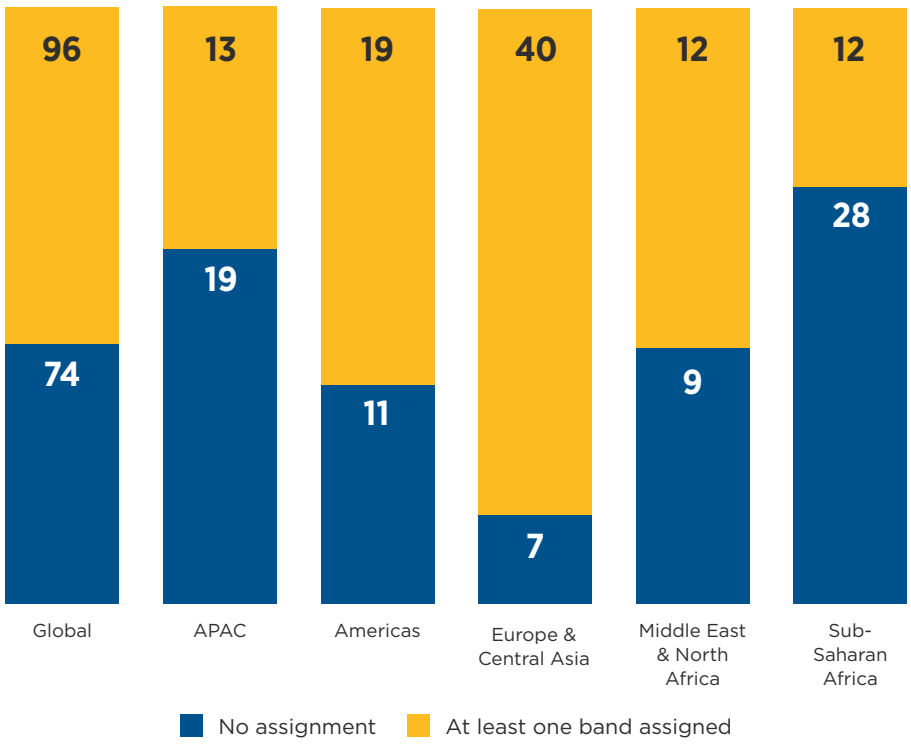
The digital dividend spectrum bands remain important to drive mobile broadband coverage

To further close the coverage gap, operators will have to expand networks in predominantly rural and remote areas, where it can cost up to twice as much to deploy base stations compared to urban areas (rural sites can also be more than three times as expensive to run).[64] Enabling policies and infrastructure that lower the cost of deployment are therefore particularly important.

Reducing the coverage gap will require affordable and sufficient amounts of technology-neutral spectrum for operators, both in coverage (below 1 GHz) and capacity (above 1 GHz) bands. It is particularly desirable for countries to allocate frequencies in the digital dividend bands[65] as these allow wider area coverage with fewer cells deployed. Globally, the share of countries in the Mobile Connectivity Index with digital dividend band assignments increased from 38% in 2014 to more than 57% in 2019 (see Figure 17). The amount of spectrum licenced to operators has a significant impact on the coverage and network quality experienced by consumers.[66] Indeed, the average 4G coverage level for LMICs that have assigned digital dividend spectrum bands for mobile use since 2014 is higher than that for countries yet to assign them (73% versus 56% respectively). More generally, the Mobile Connectivity Index shows that countries that have allocated more spectrum for mobile are more likely to have higher levels of mobile broadband coverage.

Figure 17

Number of countries with digital dividend assignments, globally and by region, 2019



Source: GSMA Intelligence.

64. Enabling Rural Coverage, GSMA, 2018
65. Digital dividend bands refer to spectrum in 600, 700 and/or 800 MHz bands that becomes available once analogue television services are delivered digitally.
66. The impact of spectrum prices on consumers, GSMA, 2019

Beyond closing the coverage gap: laying the foundations for 5G in LMICs

At the end of 2019, commercial 5G services had been launched in 22 countries across Asia, Europe, the Middle East and North America. In the first half of 2020, a further 16 countries saw 5G networks deployed, including the first 5G network in Africa, which was launched in South Africa. In the coming years, there will be more widespread deployment and adoption of the technology around the world, including in LMICs. While there is usually a lag in new technology deployments between developed and developing markets, this has been reducing over time. This is why, for the first time, the Mobile Connectivity Index incorporates 5G coverage as an indicator for network coverage, along with spectrum assignments above 3 GHz, which will be important to enable 5G services.

Early 5G deployments are expected to focus on enhanced consumer mobile broadband, but IoT and enterprise segments will become increasingly important over time as they look to benefit from low-latency services and improvements such as network slicing and edge computing. Globally, operators are expected to invest around $1.1 trillion between 2020 and 2025, around 80% of which will be in 5G networks.[67] However, there is wide variation across the globe in terms of consumer intention to upgrade to 5G (and willingness to pay more for it). In some countries, such as South Korea and China, consumers have expressed strong intentions to upgrade to 5G, while those in the US, Europe and Japan are currently still content with 4G and so may take longer to adopt.[68]

In many LMICs, mass adoption of 5G is not expected in the near future, given the lack of 3G and 4G coverage in many areas and the fact that existing technologies are capable of supporting current use cases and demand. It is expected that in Sub-Saharan Africa localised fixed-wireless access will be the primary use case for 5G, followed by connectivity for segments of the enterprise market.[69] In this respect, operators have to balance the need to expand and improve existing 3G and 4G infrastructure with the introduction of 5G networks. It is also expected that 5G will coexist with 4G well into the 2030s in order to provide high-speed mobile services.[70] However, as a natural progression from previous generations, the rollout of 5G is ultimately inevitable across all regions. To remain central for all society, it is important that 5G is planned in a way that avoids deepening the digital divide, especially between urban and rural areas.

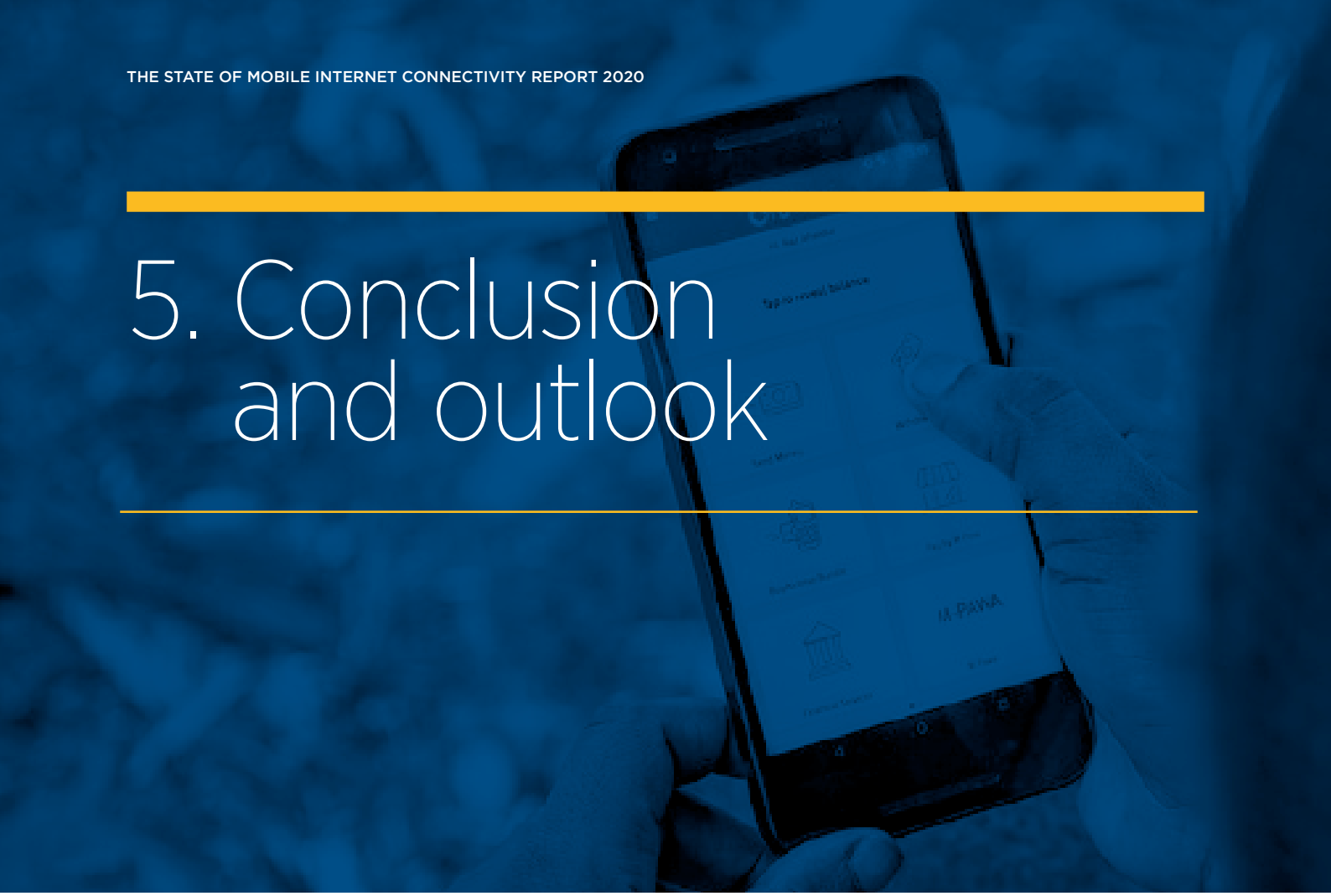
Maintaining and deploying networks during a pandemic and economic crisis requires agile and effective regulatory action

Operators have focused on increasing capacity in existing networks to mitigate the impacts of the COVID-19 pandemic. Along with postponed spectrum auctions (for example in India, Mexico, Brazil and Russia), this has also delayed many 5G network launches. However, in several markets, supportive regulatory action has enabled operators to maintain sufficient quality and resilience in 2G, 3G and 4G networks and roll out commercial 5G services. Examples include:[71]

- allowing temporary access to spectrum (e.g. in Ghana and Jordan) and extending deadlines for licence renewals
- expediting the issue of short-term/trial licences to operators where new technologies may enable them to deploy vital services (e.g. in Malaysia)
- allowing spectrum bands to be technology neutral (e.g. in Tunisia)
- supporting additional investments by delaying or reducing annual spectrum fee payments (e.g. in Romania and South Africa) or other regulatory fees (e.g. in Honduras and Colombia)
- directly assigning new spectrum to operators, enabling them to use it quickly to deploy new services (e.g. in New Zealand[72]).

Such measures offer lessons on how regulators and policymakers can support operators to continue expanding 3G and 4G networks (in addition to launching 5G networks), especially given the continued economic uncertainty and the potential for lockdowns to be re-introduced. Beyond the immediate measures taken to deal with the COVID-19 crisis, regulators could consider making some measures permanent, supporting the mobile industry in maintaining the current levels of capacity and facilitating the deployment of mobile broadband to rural areas.

67. The Mobile Economy 2020, GSMA, 2020
68. *Ibid.*
69. 5G in Sub-Saharan Africa: laying the foundations, GSMA Intelligence, 2019
70. The 5G Guide, GSMA, 2019
71. For further examples, see "Keeping everyone and everything connected: How temporary access to spectrum can ease congestion during the COVID-19 crisis", GSMA, March 2020 and "COVID-19: We're tracking digital responses worldwide. Here's what we see", World Bank, May 2020
72. "New Zealand leads the way with direct approach to 5G spectrum access", GSMA, June 2020



5. Conclusion and outlook

Over the period 2014–2019, mobile operators invested around $320 billion in expanding and upgrading networks, bringing mobile broadband coverage to a billion additional people. Over the same period, mobile internet adoption increased at a constant pace but did not outpace coverage, which explains why the usage gap is not reducing and even widening in some regions. This has profound implications for governments, the mobile industry and the 4 billion people that remain excluded from the mobile internet worldwide.

Proactive, targeted policies are required to support infrastructure investment

The rapid upgrade of 2G sites to 3G and 4G over the last two years is clear evidence that the mobile industry continues to invest to satisfy ever-greater demand for data. However, bringing coverage to the remaining 600 million mostly living in remote areas will require deployment of a large number of new sites in areas where expected revenues are low. While technology innovation is improving the technical and commercial feasibility of rural deployments, a significant impact can only be expected when policies are in place to support such investments. The policies are well known and have been quickly adopted by governments to enable the mobile industry to deal with the surge in traffic during the COVID-19 crisis: making spectrum available in greater quantities and expediting permits for new deployments are two examples.

A strong, collective effort is needed to address the barriers

Connecting the 3.4 billion people that live within reach of a mobile broadband network but remain offline is a challenge that requires a collective effort. It will include improving levels of literacy and digital skills, increasing disposable incomes, creating vibrant, local digital ecosystems and lowering the cost of smartphones. The measures required to effect these changes go far beyond the mobile industry and need action from all parts of government, the local digital sector, global internet companies, civil society and the international development community.

COVID-19 has demonstrated how fundamental telecommunications and digital technologies are to societies and economies. The challenges of the pandemic and the collective reliance on the

internet have led to a sense of urgency and goodwill, inspiring a unique spirit of collaboration between governments, mobile operators, tech companies and the international community. There is now an opportunity to build on this, by implementing innovative and targeted initiatives that help to bridge the digital divide, empowering more people to adopt mobile internet services and enabling further expansion of robust networks.

Accelerating mobile broadband use

Strategies to address the barriers preventing people using mobile internet need to be grounded in an understanding of the local context. They also need to factor in the structural issues underpinning disparities in use, such as differences in income and education as well as restrictive social norms. It is important to consider the range of barriers that different segments face. This includes the following:

- Improving the affordability of internet-enabled devices and data services requires innovative pricing models for diverse customer segments from mobile operators and industry partners, supported by enabling government policies. Reducing or removing unnecessary tax and regulatory burdens on internet-enabled devices and data services is key to enabling further digital inclusion of excluded, disadvantaged and vulnerable groups.

- In markets where they exist, reviewing the impact of Universal Service Funds (USFs) on the affordability of mobile and mobile internet services. When administered ineffectively, USFs can be counterproductive in that, by effectively taxing customers, they actually serve to raise the affordability barrier. The funds should be targeted, time-bound and managed transparently. They should be allocated in a competitive and technically neutral way, in consultation with the industry, with a view to target projects with the highest possible impact. Where appropriate, this could include projects focusing on the adoption of mobile and mobile internet among vulnerable populations.

- Increasing levels of literacy and digital skills across all segments of the population requires building this into school curricula and life-long learning programmes. Using agent networks to provide training and increase awareness of the benefits of mobile internet can be an effective strategy as well. Digital skills programmes should aim to strengthen confidence in digital technologies and help protect against potential online harms.

- Investments and facilitating the creation of local digital ecosystems should be pursued to further accelerate the growth in relevant content, applications and services that meet the needs, preferences and capabilities of new users and unconnected individuals.

Expanding mobile broadband coverage

Expanding mobile internet coverage is typically a fundamental economic challenge. Addressing it will require careful collaboration between the mobile industry and policymakers:

- Mobile operators should explore the use of innovative technologies that reduce the cost of deploying and operating networks in remote areas. Supported by policies that enable rationalisation of resources, such as spectrum technology neutrality, these innovations have the potential to extend coverage in a commercially viable manner.

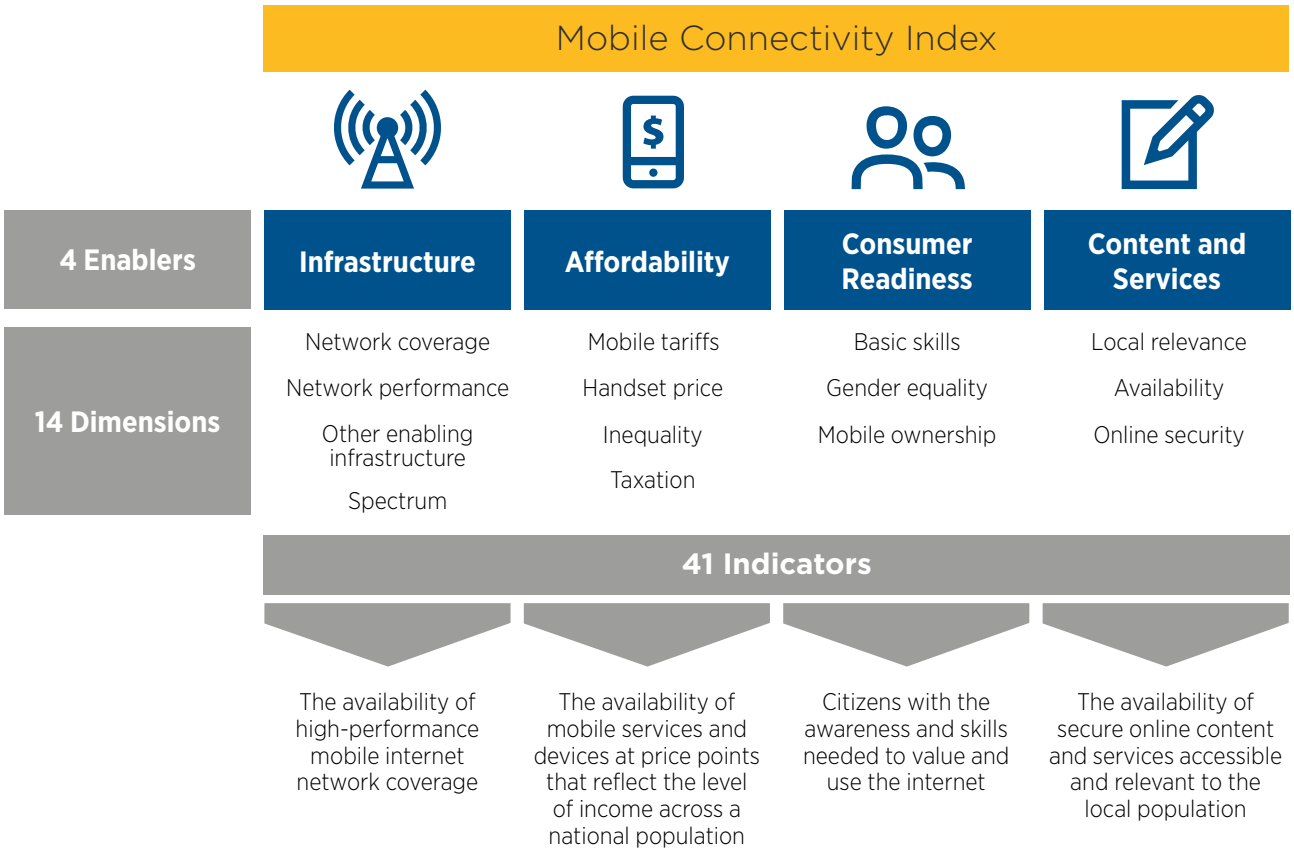
- Industry collaboration, in the form of infrastructure sharing and public-private partnerships, can increase the efficiency of private and public capital and extend the reach and capacity of mobile broadband networks.

- Proactive policies that target rural areas – such as the use of USFs to subsidise infrastructure, providing timely access to public infrastructure, or the exemption of import duties on network equipment for rural areas – are effective mechanisms to increase levels of investment in rural connectivity.

The benefits of the mobile internet are available to more people each day. However, in a world increasingly dependent on digital technologies, we cannot afford to leave anyone behind. The responsibility for building an inclusive digital society reaches beyond a single sector. Only by recognising and acting on our shared responsibility to advance mobile broadband coverage and use can we ensure that the internet will benefit everyone.

Appendix 1: About the Mobile Connectivity Index

To support the mobile industry's efforts to drive mobile internet connectivity and accelerate digital inclusion, the GSMA Connected Society programme developed the global Mobile Connectivity Index to measure the key enablers of mobile internet connectivity across different countries. Now in its fifth year, the Index reviews the performance of 170 countries (representing 99% of the global population) against 41 indicators over the 2014–2019 period. The indicators are grouped into four over-arching enablers: infrastructure, affordability, consumer readiness, and content and services. To ensure consistent units of measurement, all indicators have been normalised to have a value within a range of 0 to 100, with a higher score representing stronger performance.



Source: GSMA

The Index has several characteristics that together distinguish it from other ICT indices. In particular, it focuses specifically on mobile internet connectivity (which is expected to address the internet gap in many LMICs), so the majority of the indicators are unique to the Index and not available or used in other indices. The Mobile Connectivity Index scores are highly correlated with mobile internet adoption, while countries that achieve significant improvements in the Index are also more likely to have seen increases in mobile internet adoption over time.[73] This means the Index is an effective tool to identify priorities to drive mobile internet adoption.

This year, the Index incorporates five new countries (Comoros, Maldives, South Sudan, Suriname and St Vincent and Grenadines) and three additional indicators compared to the previous Index:

- 5G network coverage (in the Infrastructure enabler), as countries are now beginning to roll out the latest technology
- spectrum assignments in bands above 3 GHz[74] (in the Infrastructure enabler), which will be important in the rollout of 5G
- affordability of the cheapest mobile tariff that allows users to consume 5 GB of data per month (in the Affordability enabler), to reflect increasing levels of data usage globally.

Since its launch five years ago, policymakers, operators, NGOs and international organisations have used the Index to better understand which elements need to be in place to promote greater adoption of mobile internet adoption and use in each country and help them effectively prioritise their efforts. The Index is also one of the primary ICT Development Indicators identified in Unesco's framework for assessing internet development.[75]

Further details on the Mobile Connectivity Index can be found in the Methodology document.

73. See State of Mobile Internet Connectivity 2018, GSMA, 2018
74. This does not include millimetre wave spectrum.
75. Internet Universality Indicators: A Framework for Assessing Internet Development, Unesco, 2019

Appendix 2: GSMA Intelligence Consumers in Focus Survey

This report uses the results of the GSMA Intelligence Consumers in Focus Survey. As part of the survey, GSMA Intelligence conducted face-to-face interviews in 15 LMICs in 2019, 18 LMICs in 2018 and 24 LMICs in 2017.

Survey methodology

In all countries surveyed, a nationally representative sample of around 1,000 male and female adults aged 18+ was surveyed, with the exception of India and China, where the sample was around 2,000. The sampling frame was predominantly based on data from National Statistics Offices, including census data where possible, and a range of other sources. To ensure a representative geographical distribution of interview subjects, particularly urban versus rural, around 100 sampling points were used per country. However, very remote areas or areas with security concerns were excluded. Interviews were conducted with individuals in their local language, and typically within the home. All surveys were interviewer-administered using handheld devices. Both female and male interviewers conducted the surveys. Data was weighted to known population profiles to correct any imbalances in the distributions achieved during fieldwork.

Question on barriers to mobile ownership

For mobile ownership, respondents without a phone or an active SIM card were asked what stops them from having a phone, in three stages.

1. *For each of the possible reasons, please indicate whether this is something that stops you at all from having a mobile phone or SIM card, connected to a mobile operator's network*

2. *Which, if any, of those factors would you say are the most important reasons stopping you from having a mobile phone or SIM card, connected to a mobile operator's network?*

3. *And which ONE of those factors would you say is the single most important reason stopping you from having a mobile phone or SIM card, connected to a mobile operator's network?*

For the purposes of analysis in this report, we grouped some of the responses into similar categories. Below are the barriers listed in the survey along with the relevant categorisation.

Literacy and digital skills

- I don't know how to use a mobile phone
- I have difficulties with reading and writing (i.e. literacy)

Relevance

- A mobile phone is not relevant for me (not useful, not interesting)

Affordability

- The cost of buying mobile credit / top up / airtime is too high for me
- The cost of buying a mobile phone is too high for me

Safety and security

- I am concerned that I would receive unwanted calls or messages (e.g. harassing calls from strangers)
- Owning or using a mobile phone may put my physical safety at risk (e.g. theft, mugging, harassment)
- I am concerned that my identity or other private information will be stolen or misused

Network

- There is limited or no coverage to access the internet in my area

Other

- I do not have the necessary registration or ID documents
- My family do not approve of me using a mobile phone
- It is hard to find a mobile phone agent or representative to buy credit / top up / airtime from
- Charging the battery of a mobile is too difficult or expensive

Question on barriers to mobile internet use

For mobile internet use, respondents that were aware of mobile internet but had not used it in the previous three months were asked what stops them from using the internet on a mobile phone, in three stages.

1. *For each of the possible reasons, please indicate whether this is something that stops you at all from using the internet on a mobile phone*

2. *Which, if any, of those factors would you say are the most important reasons stopping you from using the internet on a mobile phone?*

3. *And which ONE of those factors would you say is the single most important reason stopping you from using the internet on a mobile phone?*

For the purposes of analysis in this report, we grouped some of the responses into similar categories. Below are the barriers listed in the survey along with the relevant categorisation.

Literacy and digital skills

- I do not know how to access the internet on a mobile phone
- I have difficulties with reading and writing
- I find it difficult to use a mobile in general (calling, texting or mobile internet)
- I do not have time to learn how to use the internet on a mobile phone
- There is nobody to teach or help me to use mobile internet

Safety and security

- I am concerned that I would receive unwanted contact from people online (e.g. scam emails or unwanted messages)
- I am concerned that it might expose myself or my family to harmful content
- I am concerned that my identity or other private information will be stolen or misused

Relevance

- There is not enough in my own language on the internet
- I do not find the internet relevant enough for me (not useful or not interesting)

Network

- There is limited or no coverage to access the internet in my area
- Using the internet on my mobile phone is too slow (e.g. connection speeds)

Affordability

- The cost of buying a mobile phone that can access the internet is too high for me
- The cost of buying data to use the internet on my mobile is too high for me

Other

- My family does not approve of me using the internet on a mobile phone
- It is hard to find a mobile phone agent or representative to buy mobile internet data from
- Using the internet on my mobile phone uses too much battery
- I cannot borrow or pay to use internet on another person's phone

Appendix 3: Additional figures

THE STATE OF MOBILE INTERNET CONNECTIVITY REPORT 2020

In both the 2018 and 2019 Consumers in Focus surveys, respondents that did not own a mobile phone were asked to identify the barriers preventing them from owning a mobile phone. Respondents were first asked to identify all relevant barriers, then to identify those that were most important and, finally, to identify the single most important barrier. Strongly related or thematically overlapping barriers were grouped into composites (see Appendix 2). Figure A3.1 shows the top barrier reported by consumers in surveyed markets in 2018 and 2019.

Figure A3.1

Top barrier to owning a mobile phone in surveyed LMICs, 2018 and 2019

			AFFORDABILITY		SKILLS		RELEVANCE		SAFETY AND SECURITY	
			2018	2019	2018	2019	2018	2019	2018	2019
AFRICA	Algeria		19%	14%	50%	47%	9%	10%	6%	10%
	Ivory Coast		32%		24%		5%		18%	
	Kenya		49%	48%	28%	22%	3%	7%	10%	7%
	Mozambique		36%	40%	27%	23%	1%	3%	8%	8%
	Nigeria		48%	48%	27%	34%	10%	1%	3%	3%
	Senegal			35%		26%		2%		15%
	South Africa		45%	48%	18%	17%	4%	4%	19%	21%
	Tanzania		64%		20%		7%		4%	
	Uganda			48%		23%		3%		4%
ASIA	Bangladesh		20%	8%	32%	52%	22%	16%	2%	6%
	China		26%		22%		6%		31%	
	India		26%	37%	31%	22%	10%	11%	16%	10%
	Indonesia		32%	33%	31%	31%	12%	6%	12%	16%
	Myanmar		25%	26%	36%	25%	29%	35%	6%	6%
	Pakistan		19%	16%	40%	39%	7%	4%	5%	9%
LATIN AMERICA	Argentina		38%		17%		24%		17%	
	Brazil		37%	35%	20%	36%	13%	7%	23%	18%
	Dominican Republic		49%		17%		8%		18%	
	Guatemala		29%	26%	23%	18%	5%	3%	33%	42%
	Mexico		25%	35%	16%	17%	15%	4%	35%	31%

		ACCESSIBILITY									
		BATTERY CHARGING		NETWORK COVERAGE		FAMILY DOES NOT APPROVE		ACCESS TO AGENT SUPPORT		NO REGISTRATION OR ID DOCUMENTS	
		2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
AFRICA	Algeria	2%	0%	5%	3%	7%	16%	0%	1%	2%	0%
	Ivory Coast	1%		11%		5%		0%		3%	
	Kenya	1%	0%	2%	3%	4%	1%	0%	1%	1%	10%
	Mozambique	8%	6%	9%	6%	2%	3%	5%	3%	3%	7%
	Nigeria	0%	2%	9%	2%	3%	7%	1%	1%	0%	1%
	Senegal		1%		10%		4%		5%		2%
	South Africa	2%	1%	5%	6%	2%	2%	2%	0%	2%	0%
	Tanzania	0%		2%		3%		0%		0%	
	Uganda		1%		2%		6%		2%		8%
ASIA	Bangladesh	0%	1%	2%	4%	19%	9%	0%	1%	2%	3%
	China	2%		7%		2%		0%		2%	
	India	3%	3%	4%	9%	4%	3%	2%	3%	1%	0%
	Indonesia	1%	0%	8%	12%	2%	1%	1%	1%	1%	0%
	Myanmar	0%	1%	1%	1%	3%	3%	0%	0%	1%	2%
	Pakistan	2%	1%	5%	2%	20%	27%	2%	0%	1%	1%
LATIN AMERICA	Argentina	0%		2%		1%		0%		0%	
	Brazil	0%	0%	2%	2%	0%	2%	1%	1%	1%	0%
	Dominican Republic	1%		4%		2%		0%		0%	
	Guatemala	1%	3%	3%	2%	2%	2%	2%	1%	1%	2%
	Mexico	2%	1%	3%	6%	0%	2%	3%	2%	1%	2%

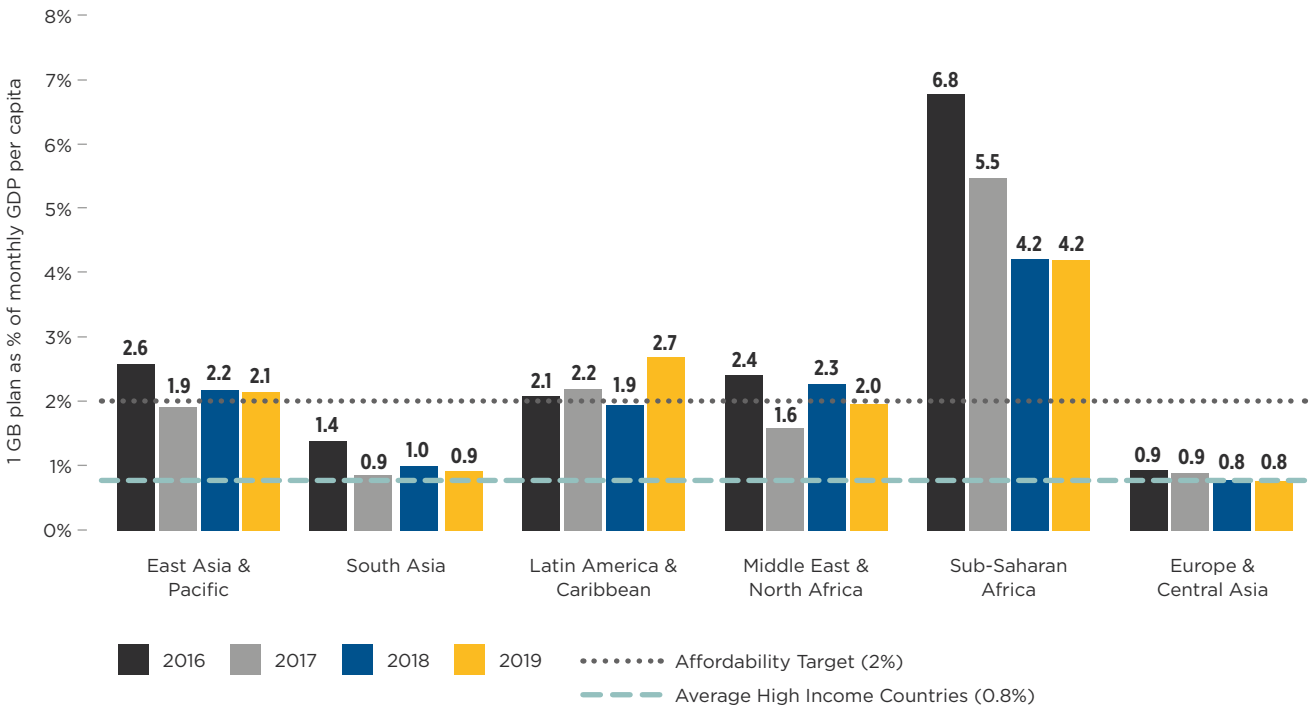
Lowest barrier cited in that country — Highest barrier cited in that country

Blank entries refer to countries not surveyed in a given year.
Base: Non-mobile phone owners aged 18+. Mobile ownership is defined as having sole or main use of a SIM card (or a mobile phone that does not require a SIM),and using it at least once per month.
Percentages indicate the proportion of respondents who answered, "This is the most important reason stopping me" to the question, "Which one of those factors would you say is the single most important reason stopping you from having a mobile phone or SIM card, connected to a mobile operator's network?"
Thirteen different response options were grouped into categories.
Further details on response options are provided in Appendix 2.
N = from 55 to 442
Source: GSMA Intelligence Consumers in Focus Surveys 2018 and 2019

Figure A3.2 shows the median affordability of 1 GB of data in LMICs during the 2016–2019 period for each region.

Figure A3.2

Affordability of 1 GB of data in LMICs, by region, 2016–2019



For each region, the median average is taken based on the countries for which we have available data.

Source: GSMA Intelligence calculations based on pricing data from Tarifica and ITU


NIDO
PRINCE

THE STATE OF MOBILE INTERNET CONNECTIVITY REPORT 2020

In both the 2018 and 2019 Consumers in Focus surveys, respondents who were aware of mobile internet were asked to identify the barriers preventing them from using mobile internet. Respondents were first asked to identify all relevant barriers, then to identify those that were most important and, finally, to identify the single most important barrier. Strongly related or thematically overlapping barriers were grouped into composites (see Appendix 2). Figure A3.3 shows the top barrier reported by consumers in surveyed markets in 2018 and 2019.

Figure A3.3

Top barrier to mobile internet use in LMICs 2019, by location (urban and rural)

		AFFORDABILITY		SKILLS		RELEVANCE		SAFETY AND SECURITY		ACCESSIBILITY											
										BATTERY CHARGING		NETWORK COVERAGE		FAMILY DOES NOT APPROVE		ACCESS TO AGENT SUPPORT		NO REGISTRATION OR ID DOCUMENTS	
		URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN	RURAL
AFRICA	Algeria	27%	16%	32%	51%	12%	4%	11%	12%	3%	0%	7%	9%	5%	3%	1%	0%	3%	5%
	Kenya	41%	32%	22%	33%	11%	13%	13%	9%	4%	3%	6%	6%	1%	1%	0%	2%	1%	2%
	Mozambique	35%	25%	35%	39%	3%	3%	5%	11%	6%	9%	11%	4%	0%	0%	2%	2%	2%	5%
	Nigeria	28%	30%	29%	44%	11%	13%	14%	7%	4%	1%	8%	2%	1%	2%	0%	0%	4%	1%
	Senegal	21%	25%	54%	39%	2%	4%	12%	13%	2%	2%	2%	12%	1%	0%	0%	1%	6%	5%
	South Africa	38%	29%	16%	19%	20%	20%	15%	15%	4%	4%	3%	8%	4%	2%	0%	0%	0%	4%
	Uganda	48%	39%	20%	34%	11%	9%	8%	5%	2%	4%	5%	6%	0%	1%	0%	2%	4%	1%
ASIA	Bangladesh	19%	18%	34%	34%	17%	18%	14%	10%	3%	1%	3%	10%	9%	6%	0%	1%	1%	2%
	India	25%	34%	39%	30%	12%	15%	10%	5%	5%	2%	5%	7%	2%	2%	1%	1%	1%	0%
	Indonesia	38%	46%	16%	23%	16%	9%	15%	5%	0%	1%	10%	10%	6%	1%	0%	5%	0%	0%
	Myanmar	11%	12%	34%	31%	32%	32%	11%	12%	2%	5%	5%	3%	3%	2%	1%	1%	2%	2%
	Pakistan	17%	18%	47%	42%	11%	11%	6%	8%	0%	1%	1%	3%	17%	17%	0%	0%	2%	0%
LATIN AMERICA	Brazil	25%	18%	40%	36%	11%	0%	15%	19%	3%	10%	5%	17%	0%	0%	0%	0%	1%	0%
	Guatemala	13%	15%	23%	29%	3%	3%	46%	41%	2%	3%	4%	3%	0%	0%	0%	0%	6%	2%
	Mexico	24%	22%	25%	22%	1%	10%	43%	24%	1%	3%	2%	14%	2%	5%	0%	0%	2%	0%

Lowest barrier cited in that country — Highest barrier cited in that country

Base: Adults aged 18+ who have not used mobile internet in the last three months, despite being aware of mobile internet (excludes mobile users who are not aware of mobile internet).
Percentages indicate the proportion of respondents who answered, "This is the most important reason stopping me" to the question, "Which one of those factors would you say is the single most important reason stopping you from using the internet on a mobile phone?" Eighteen different response options have been grouped into categories for this analysis.
N = from 22 to 227
Source: GSMA Intelligence Consumers in Focus Survey 2019

Appendix 4: Definitions of terms used in this report

Connected: 'the connected' or 'connected population' refers to people who use mobile internet. 'The unconnected' refers to those that do not use mobile internet.

Coverage: "Population coverage" is the share of the population that lives in an area where the signal provided by a mobile network is strong enough to use telecommunication services (voice, SMS, data). The coverage provided by 2G, 3G, or 4G networks[76] are independent from each other.

Coverage gap: populations that do not live within the footprint of a mobile broadband network.

Feature phone: a mobile handset that allows basic access to internet-based services but on a closed platform that does not support a broad range of applications. The handset supports additional features such as a camera and the ability to play multimedia files such as music and video.

Low- and middle-income countries (LMICs): countries classified as low income, lower middle income and upper middle income by the World Bank Country and Lending groups.

Mobile connection: a unique SIM card (or phone number, where SIM cards are not used) that has been registered on a mobile network. Connections differ from subscribers in that a unique subscriber can have multiple connections.

Mobile broadband: 3G, 4G or 5G technologies.

Mobile internet user: a person who uses internet services on a mobile device. Mobile internet services are defined as any activities that use mobile data.

Mobile (phone) owner/subscriber: a person who subscribes to a mobile service. They do not necessarily use mobile internet.

Smart feature phone: a feature phone that has an operating system that supports a range of applications created by third-party developers and that are formatted to work on a smaller screen and accessed via a nine-key layout not a touch screen.

Smartphone: a mobile handset enabling advanced access to internet-based services and other digital functions. Smartphone platforms, such as Android or iOS, support a broad range of applications created by third-party developers.

Usage gap: populations that live within the footprint of a mobile broadband network but do not use mobile internet.

76. For further details on different technologies see https://www.itu.int/en/ITU-R/Documents/ITU-R-FAQ-IMT.pdf.

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