GSMA

The State of Mobile Internet Connectivity 2023

GSMA

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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.

For more information, please visit
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To get in touch with the Connected Society team, please email connectedsociety@gsma.com

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Key findings

- **Mobile internet adoption continues to increase, with 57% of the global population (4.6 billion people) now using mobile internet – but the growth rate at which people are adopting mobile internet slowed in 2022.** Only 200 million people started using mobile internet in 2022, compared to 300 million in 2021 and in 2020. Just over three quarters of the growth in mobile internet adoption in 2022 came from low- and middle-income countries (LMICs), where 95% of the unconnected population live. In least developed countries (LDCs), almost 30 million additional people started using mobile internet in 2022, meaning one in four people in LDCs are using mobile internet.

- **Mobile broadband coverage has remained relatively unchanged, with 95% of the global population living within the footprint of a mobile broadband network.** With only marginal growth in coverage in 2022, the coverage gap – those living in areas without mobile broadband coverage – stands at almost 400 million people (5% of the global population). The remaining uncovered communities, which are predominantly rural, poor and sparsely populated, are the most challenging to reach.

- **Most of those not using mobile internet live in areas covered by mobile broadband.** In 2022, 3 billion people (38% of the global population) lived in areas covered by mobile internet but did not use it. With mobile internet adoption outpacing network expansion, this usage gap has been shrinking slowly in recent years, from 40% in 2021 to 38% in 2022. However, the usage gap remains almost eight times the size of the coverage gap. Considering only adults aged 18 and above, 23% are still not using mobile internet despite being covered by a mobile broadband network. The majority of those living within mobile broadband coverage but not using it do not yet own a mobile phone.

- **Connectivity varies significantly between and within regions and countries, with 95% of the unconnected living in LMICs.** Sub-Saharan Africa remains the region with the largest coverage and usage gaps. In LMICs, adults in rural areas are still 29% less likely to use mobile internet than those in urban areas, while women are 19% less likely to use mobile internet than men. In LDCs, only 25% of the population use mobile internet, compared to 52% across LMICs overall and 85% in high-income countries (HICs).

- **The majority of the global population now own a smartphone, which is how most people are accessing mobile internet.** At the end of 2022, 54% of the global population (4.3 billion people) owned a smartphone. Of the 4.6 billion people using mobile internet, almost 4 billion do so using a smartphone (49% of the global population) and around 600 million people do so using a feature phone (8% of the global population). There are also 350 million people who own a smartphone but do not use mobile internet.

- **4G and 5G continue to expand, but 2G and 3G remain important sources of coverage in LMICs.** While the overall broadband coverage gap has remained broadly unchanged since 2021, the deployment of 4G and 5G continues to expand. Globally, 90% of the population is now covered by 4G, and 32% by 5G (up from 25% in 2021). Almost three quarters of the 5G network expansion in 2022 was in Asia-Pacific, and there was particularly strong growth in 4G network expansion in Sub-Saharan Africa. However, most mobile operators will continue to maintain 2G and 3G networks for the foreseeable future, with a significant portion of users continuing to use these networks, particularly in LMICs.

- **Data usage and network quality continue to increase but significant differences remain between HICs and LMICs.** Monthly global mobile data traffic per user increased from 8.4 GB in 2021 to 11.3 GB in 2022 – the largest absolute increase since it was first tracked in 2015. Network quality improved across all regions, driven by improved networks and consumers migrating to 4G or 5G. For the first time, all regions now have average download speeds of at least 10 Mbps, while the global average download speed increased from 27 Mbps to 34 Mbps. HICs record download speeds four times greater than those in LMICs.

- **Awareness of mobile internet continues to grow but has slowed significantly since 2019.** In nine of the 12 countries surveyed, more than 80% of the population was aware of mobile internet in 2022. However, women and those living in rural areas remain less likely to be aware of mobile internet, and lack of awareness remains a critical initial barrier to mobile internet adoption in some countries.

- **Affordability and skills remain the two greatest barriers to mobile internet adoption and use.** Across the countries surveyed, for mobile users who are aware of mobile internet but don't use it, the top reported barriers to adopting it remain affordability (particularly of handsets) and literacy/digital skills. Safety & security concerns and lack of perceived relevance were reported less often but are also important barriers. For example, among smartphone owners, lack of perceived relevance is often cited as a top barrier to mobile internet adoption in several countries.

- **Affordability of devices and data continues to disproportionately impact the underserved.** Across LMICs, affordability of an entry-level, internet-enabled handset remained relatively unchanged, while affordability of data continues to improve across most regions. However, while the affordability of an entry-level device across all LMICs is equivalent to 16% of average monthly income, this increases to 40% for the poorest 40% of the population and 55% for the poorest 20%. Across LMICs, it is equivalent to 24% of average monthly income for women, compared to 13% for men.

KEY FINDINGS

CONNECTED:

57% of the world's population are now **using mobile internet**

4.6bn people

But the rate of mobile internet adoption slowed over the past year

COVERAGE GAP:

5% of the world's population are still not covered by mobile broadband

almost **400m** PEOPLE

USAGE GAP:

38% of the world's population live within the footprint of a mobile broadband network but are not using it

3bn people

2/3 of these do not own a phone

JUST OVER

3/4 of the growth in mobile internet adoption in **2022** came from LMICs

WHERE **95%** OF THE UNCONNECTED POPULATION LIVE

In LDCs, only

25% of the population use mobile internet

compared to

52% across LMICs overall

and

85% across HICs

54% of the world's population (**4.3bn people**) own a smartphone

But **350m** people who own a smartphone don't use mobile internet

4G/5G coverage is expanding

But **2G/3G** networks remain important in many LMICs

GLOBAL NETWORK COVERAGE

2018				2022			
2G: 96%	3G: 92%	4G: 80%	5G: 0%	2G: 98%	3G: 95%	4G: 90%	5G: 32%

IN LOW- AND MIDDLE-INCOME COUNTRIES

Adults living in rural areas are **29%** less likely than those living in urban areas to use mobile internet...

WOMEN ARE **19%** LESS LIKELY THAN MEN TO USE MOBILE INTERNET

IN MOST SURVEYED COUNTRIES

>80% of the population are aware of mobile internet

but awareness is lower for women and those living in rural areas

The top barriers to mobile internet adoption and use:

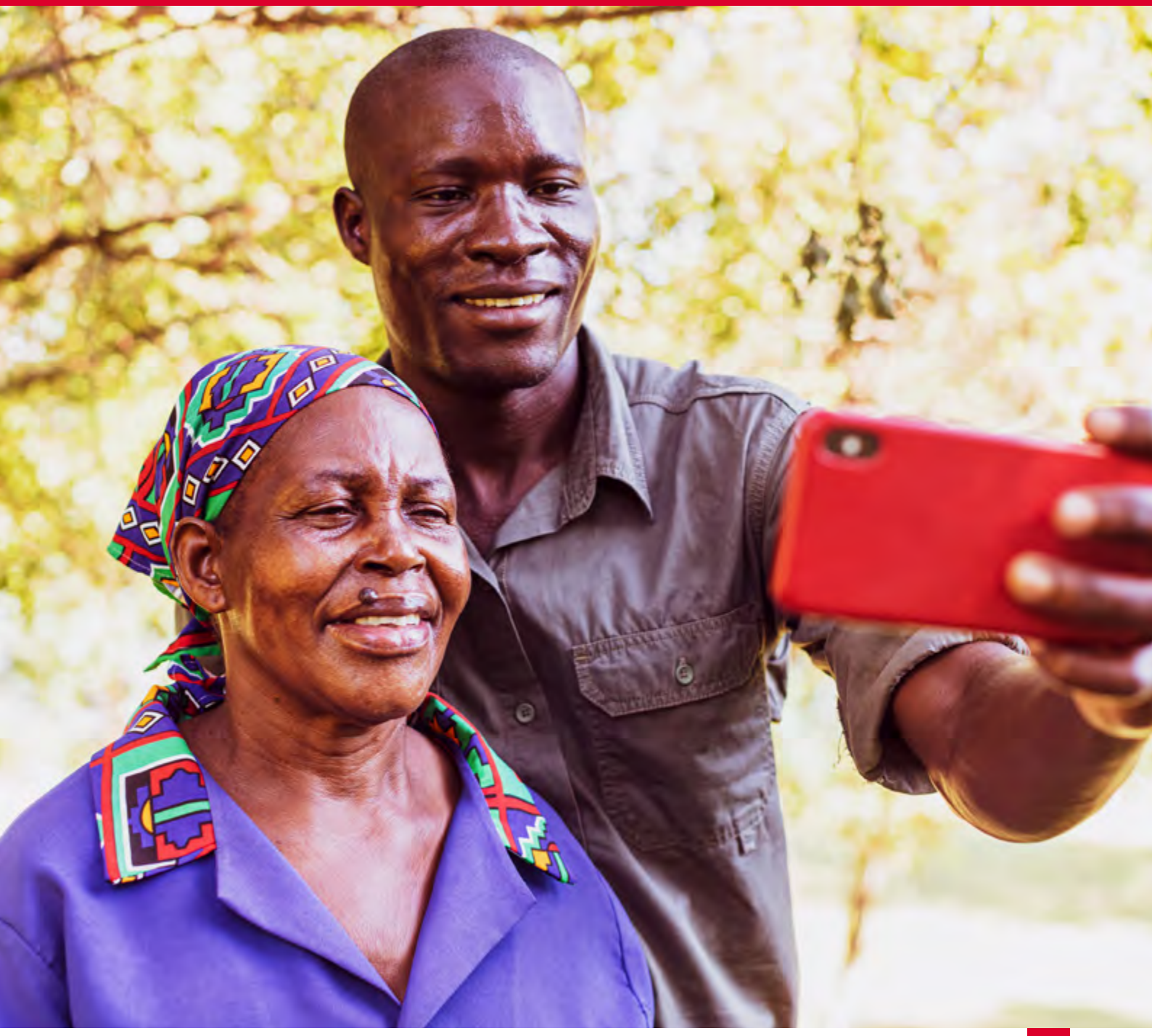
- Affordability, particularly of handsets
- A lack of literacy
- and digital skills

AFFORDABILITY of entry-level handsets has remained generally unchanged at **16%** of monthly income

AFFORDABILITY of entry-level data plans continues to improve across most regions

AFFORDABILITY of devices and data continues to disproportionately impact the underserved

Introduction



Why mobile connectivity matters

Mobile internet is connecting more people to the internet than ever before. By the end of 2022, the number of people using mobile internet increased to 4.6 billion people (57% of the global population). Mobile is the primary – in some cases, only – way most people access the internet in low- and middle-income countries (LMICs). Across the surveyed countries, on average, 73% of respondents who had used the internet in the last three months did so solely via a mobile.

However, the growth rate at which people are adopting mobile internet has slowed in the last year, and significant digital divides persist. Those who are digitally excluded are more likely to be poorer, less educated, rural and women – groups typically most affected by the ongoing cost-of-living crisis, conflicts and climate change. While the slowdown is perhaps not surprising in the wake of the pandemic and the ongoing economic crisis, it highlights more needs to be done to accelerate digital inclusion and stop the digital divide widening.

Addressing the digital divide provides significant socioeconomic benefits and has never been more important. Mobile internet is connecting more people than ever before to critical services, such as healthcare, education, e-commerce and financial services, and providing income-generating opportunities. Across all countries surveyed, the majority of users reported it had a positive overall impact on their lives. Despite the benefits of connectivity, 38% of the global population are living within mobile broadband coverage but are not using it, while 5% are still not covered by mobile broadband.

About this report

The State of Mobile Internet Connectivity 2023 analyses trends since 2015. The report considers the importance of not just mobile broadband coverage but 'meaningful connectivity' – users having a safe, satisfying, enriching and productive online experience that is affordable.[1] This requires an understanding of the key barriers and enablers for meaningful connectivity, including infrastructure, affordability, skills, safety and security, and relevant content and services. Each of these is considered in this report.

This analysis presents the latest updates on mobile internet connectivity globally and by region, highlighting the size of the coverage and usage gaps, including a focus on LMICs (Chapter 1). For the first time, it also presents data on the device type people are using to connect. The report then explores mobile broadband coverage and infrastructure (Chapter 2). Chapters 3 and 4 focus on adults in LMICs, providing insights into how they are using mobile internet and the barriers to mobile internet adoption and use. Chapter 5 outlines the key challenges to address to ensure everyone can connect to the internet.

The findings of this report are based on the GSMA Consumer Survey, the GSMA Mobile Connectivity Index[2] (MCI) and a range of other industry reports. The GSMA Consumer Survey has been carried out each year since 2017 to understand access to – and use of – mobile and mobile internet in LMICs. In 2022, it was conducted in 12 LMICs.[3] The MCI measures the key enablers of mobile internet connectivity across 170 countries (representing 99% of the global population) against 32 indicators for the period 2014–2022. The indicators are grouped into four overarching enablers: infrastructure, affordability, consumer readiness, and content and services. Together, these provide objective, quantitative metrics to track the key enablers of mobile internet adoption and usage, as well as insights into what consumers use mobile internet for or what prevents them from using it.[4]

1. Achieving universal and meaningful digital connectivity Setting a baseline and targets for 2030. United Nations Secretary-General's Roadmap for Digital Cooperation and ITU, 2021
2. The web tool is available at www.mobileconnectivityindex.com
3. Bangladesh, Egypt, Ethiopia, Ghana, Guatemala, India, Indonesia, Kenya, Mexico, Nigeria, Pakistan and Senegal.
4. For further details on the methodology for the MCI, see Mobile Connectivity Index Methodology. For further details on the methodology of the GSMA Consumer Survey, see Appendix 1.

1. Trends in mobile internet connectivity

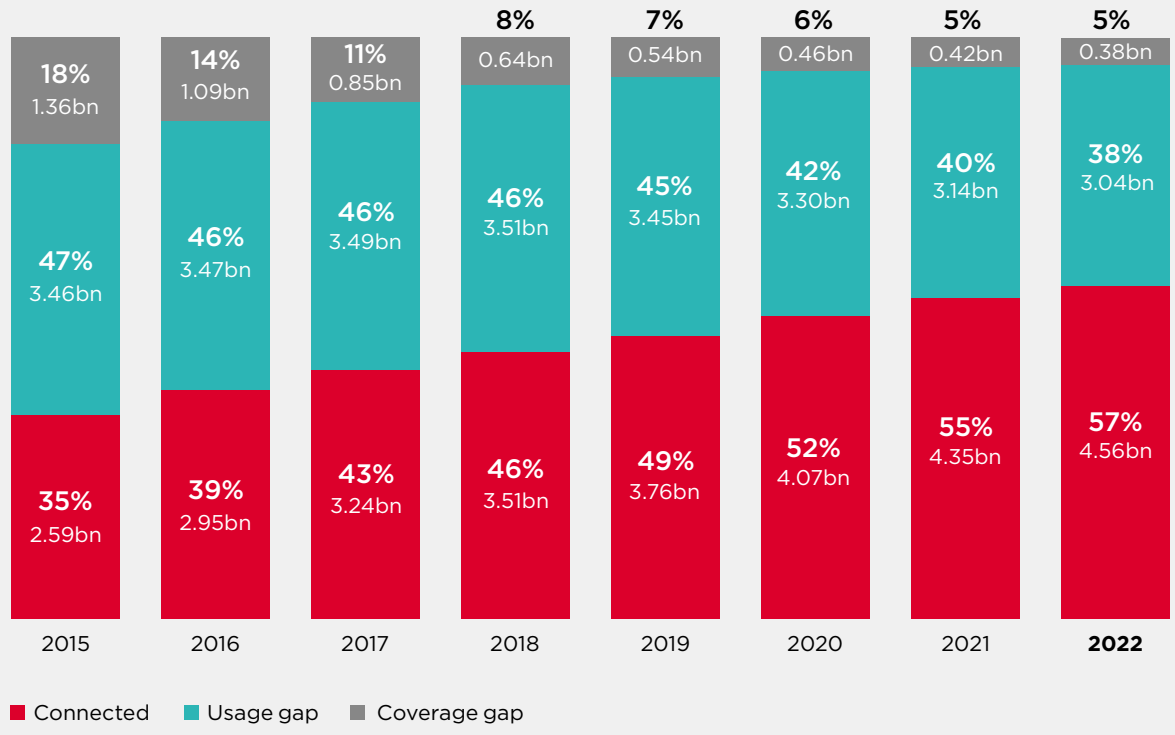
More people than ever before are connecting to the internet via mobile, but the rate of growth has slowed. In 2022, while an additional 200 million people started using mobile internet, this was lower than in the previous two years. With 95% of the global population now living within the footprint of a mobile broadband network, further growth in coverage has been marginal. The vast majority of those not connected live in areas with mobile broadband coverage but are not using it.

At the end of 2022, some 57% of the global population (4.6 billion people) were using mobile internet – up from 35% in 2015 (see Figure 1). Although 200 million people started using mobile internet over the year, this represents a slowdown in the growth of mobile internet users compared to 2021 and 2020, when 300 million new users started using mobile internet each year. Just over three quarters of the growth in mobile internet users in 2022 came from low- and middle-income countries (LMICs), where 95% of the unconnected population lives.

By the end of 2022, the share of the global population living in areas without mobile broadband coverage stood at 5%. This coverage gap has seen little change in recent years and means almost 400 million people are still not covered by a mobile broadband network. The remaining uncovered communities, which are predominantly rural, poor and sparsely populated, are the most challenging to reach.

Of the 3.4 billion people who remain unconnected to mobile internet, almost 90% (3 billion) live in an area already covered by mobile broadband but do not use mobile internet services. With mobile internet adoption outpacing network expansion, this usage gap has been shrinking slowly, from 40% in 2021 to 38% in 2022. However, the usage gap remains almost eight times the size of the coverage gap.

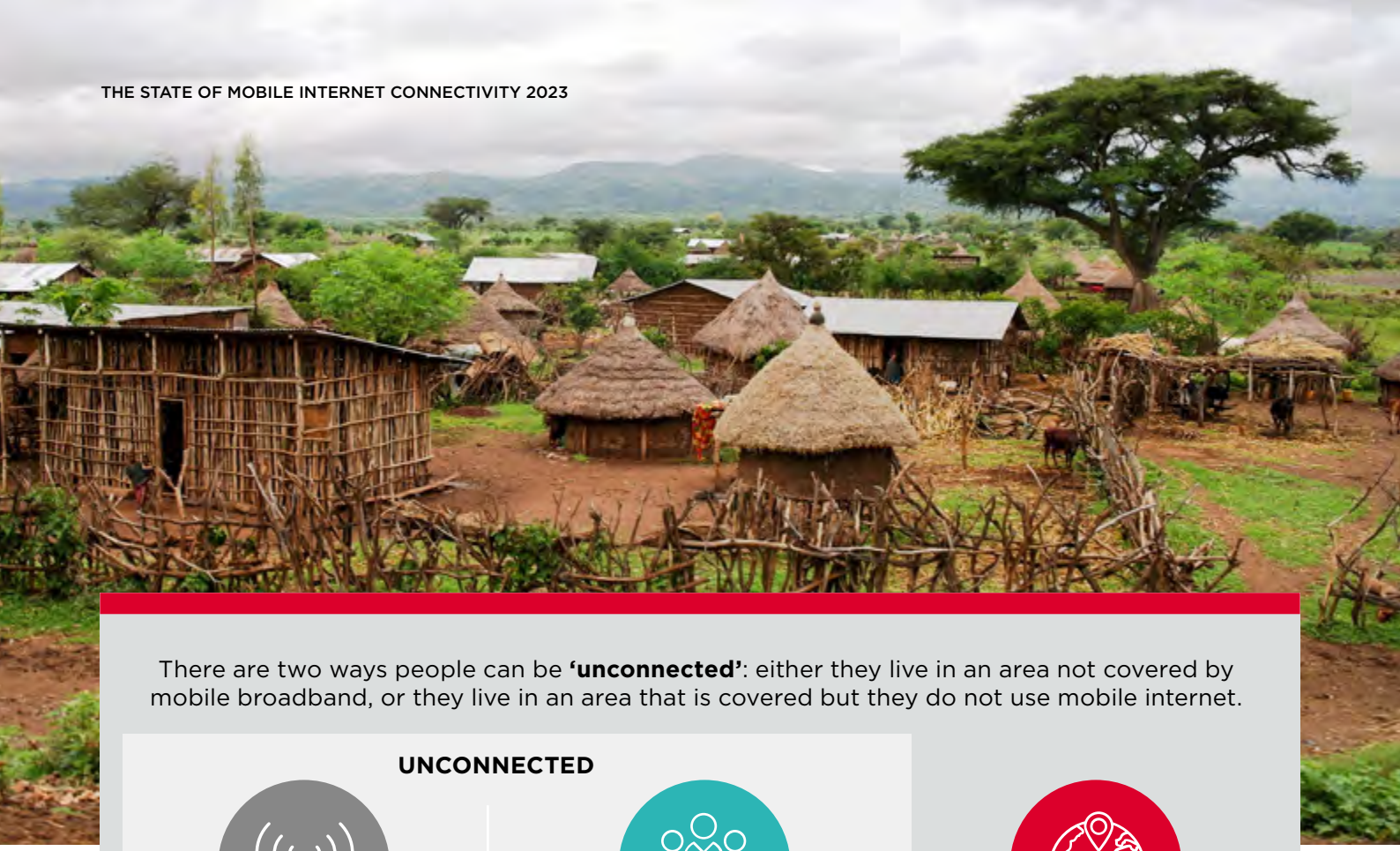
Figure 1
Global mobile internet connectivity, 2015–2022



Base: Total population, 198 countries

Note: Totals may not add up due to rounding. Every year, GSMA Intelligence updates its estimates of the number of mobile internet subscribers in each country, incorporating new (and/or updated) data from operators, regulators, national statistics agencies and consumer surveys where available. In some countries and regions, estimates of mobile internet adoption may therefore differ from what was presented in previous editions of The State of Mobile Internet Connectivity.

Source: Unique subscriber data among adults is sourced from GSMA Intelligence. Coverage data is sourced from GSMA Intelligence, combining data reported by mobile operators and national regulatory authorities. Population data is sourced from the UN.



There are two ways people can be **'unconnected'**: either they live in an area not covered by mobile broadband, or they live in an area that is covered but they do not use mobile internet.

UNCONNECTED

Coverage gap:
Those who live in an area not covered by a mobile broadband network.

Usage gap:
Those who live within the footprint of a mobile broadband network but do not use mobile internet services.

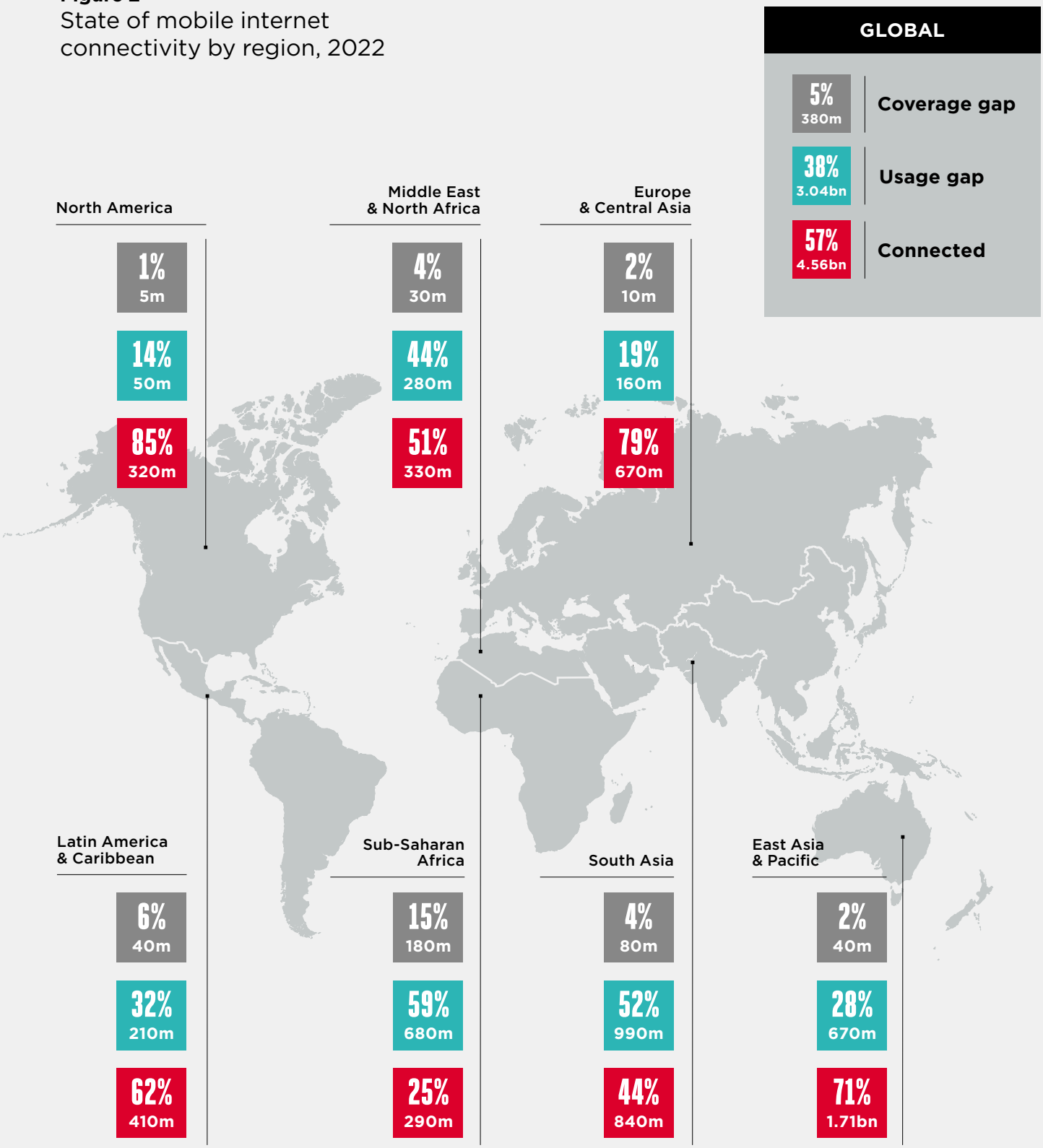
Connected:
Those who use mobile internet.

Connectivity varies substantially between and within regions

Sub-Saharan Africa remains the region with the largest coverage and usage gaps (see Figure 2). However, there is variation within the region. The coverage gap remains much higher in Central Africa (36%) than in Western, Eastern and Southern Africa (where it ranges from 11% to 14%). Meanwhile, mobile internet adoption is higher in Southern Africa (33%) than in other sub-regions (ranging from 17% in Central Africa to 27% in Western Africa).

There was a slowdown in the growth rate of mobile internet connectivity in most regions – with the exception of Middle East & North Africa and Sub-Saharan Africa, which both saw almost 30 million new mobile internet users in 2022. The slowdown in mobile internet adoption was most stark in South Asia, where almost 60 million people started using mobile internet in 2022, compared to an additional 90 million in 2021. As a result, the percentage of the population using mobile internet in South Asia increased by only 2 percentage points (pp), compared to 4 pp in 2021 and 5 pp in 2020. This may have been driven by higher device costs and the broader cost-of-living crisis, as well as persistent barriers around lack of digital skills among the poorest population segments (see Chapter 4).

Figure 2
State of mobile internet connectivity by region, 2022



Base: Total population

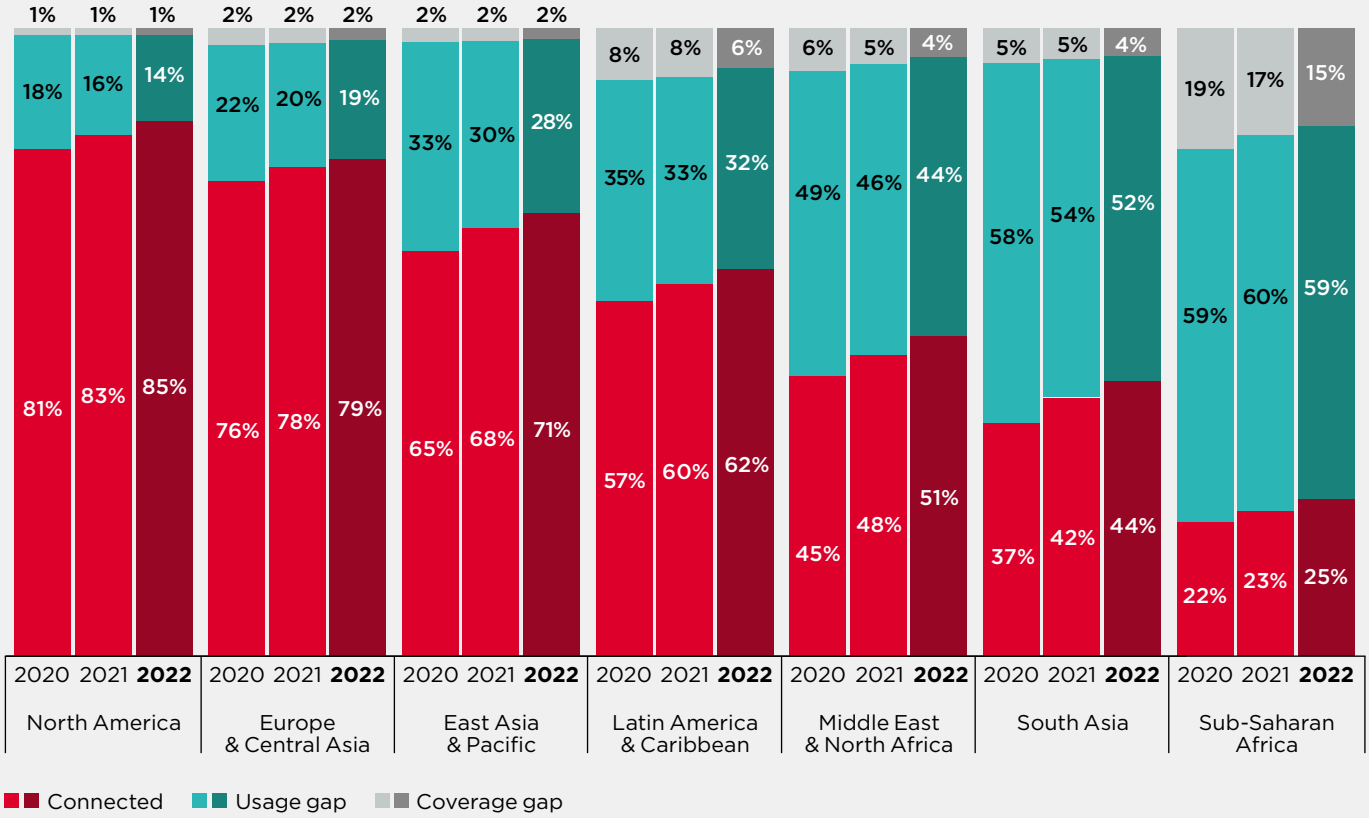
Note: Totals may not add up to 100% due to rounding. Every year, GSMA Intelligence updates its estimates of the number of mobile internet subscribers in each country, incorporating new (and/or updated) data from operators, regulators, national statistics agencies and consumer surveys where available. In some countries and regions, estimates of mobile internet adoption may therefore differ from what was presented in previous editions of The State of Mobile Internet Connectivity.

Source: GSMA Intelligence

East Asia and Pacific has the third highest levels of connectivity after North America and Europe & Central Asia, with 71% of the region's population using mobile internet (see Figure 3). However, this masks significant variation within the region. In high-income countries (HICs), including Japan, South Korea and Australia, 87% of the population used mobile internet as of the end of 2022, compared to 69% for LMICs in the region. If China is excluded, only 48% of the population in LMICs in the region used mobile internet. In the Pacific Islands, mobile internet adoption is much lower (27%) and more than one in five people remain uncovered (a larger coverage gap than in Sub-Saharan Africa).[5] Similarly, in the Middle East and North Africa, mobile internet adoption is much higher at 75% in HICs, compared to 48% in LMICs in the region.

While the reduction in the coverage gap was not significant from a global perspective, there was a 2 pp reduction in the gap in Latin America and the Caribbean as well as in Sub-Saharan Africa. In Latin America and the Caribbean, the reduction in the coverage gap was mostly driven by Brazil, the region's largest country, which accounts for 40% of the uncovered population in Latin America. In Sub-Saharan Africa, there were notable coverage gains of almost 10 pp in Mozambique, Madagascar and Liberia.

Figure 3
Mobile internet connectivity by region, 2020–2022



Base: Total population, 198 countries

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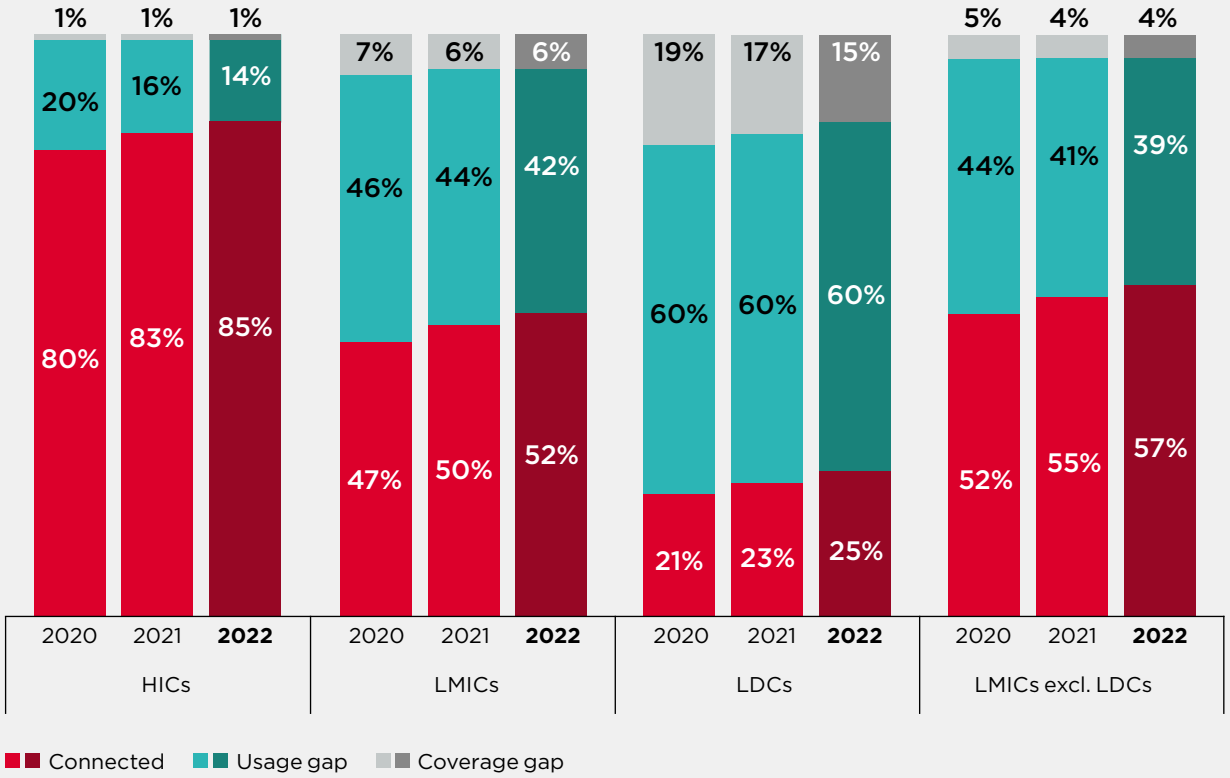
Source: GSMA Intelligence

5. Further discussion on the coverage gap challenges in the Pacific Islands can be found in The State of Mobile Internet Connectivity Report 2020.

Connectivity in LDCs continues to lag behind other LMICs

Least developed countries (LDCs)[6] remain highly vulnerable to economic and environmental shocks and have low levels of human assets compared to other countries, including other LMICs. Almost 30 million additional people connected to mobile internet in LDCs in 2022, meaning one in four people in LDCs are now using mobile internet (25% of the population). However, this remains significantly below levels of adoption in not just HICs, where it increased to 85% of the population, but also other LMICs (excluding LDCs), where mobile internet adoption stood at 57% at the end of 2022. See Figure 4.

Figure 4
Mobile connectivity in LDCs, LMICs and HICs, 2020–2022



Base: Total population, 198 countries

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Source: GSMA Intelligence

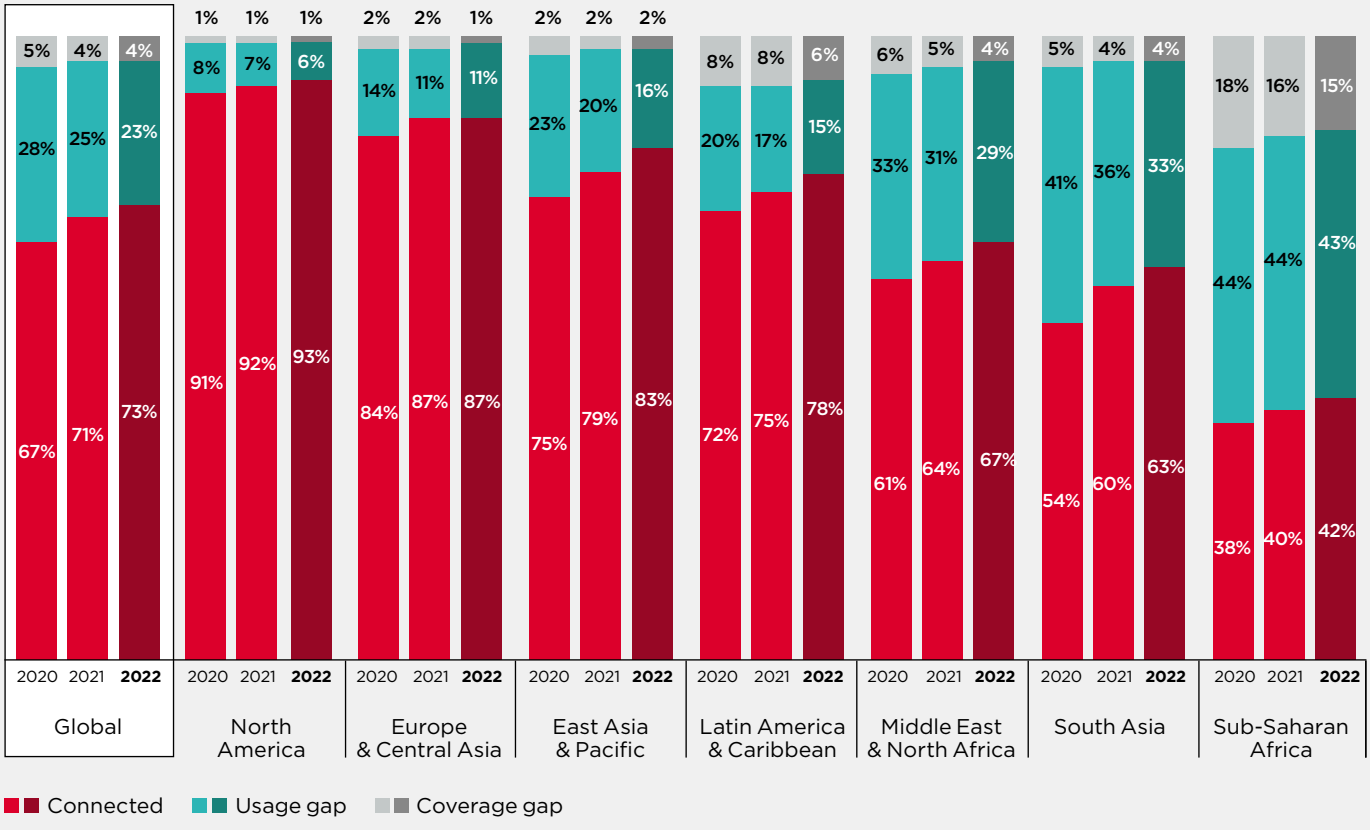
6. UN definition. For more information on the indices, see https://www.un.org/development/desa/dpad/least-developed-country-category.html

Almost three in four adults worldwide are now using mobile internet

In *The State of Mobile Internet Connectivity 2022*, we showed for the first time the level of internet adoption among adults aged 18 and above for the 2019–2021 period. This addresses some of the bias against countries in South Asia and Sub-Saharan Africa, which have much younger populations that are unlikely to have a mobile internet subscription (including young infants and babies).

Figure 5 shows that, in 2022, 73% of adults globally were using mobile internet (compared to 57% of the total population). When looking at adults aged 18 and over, levels of connectivity in Sub-Saharan Africa increase from 25% to 42%, and from 44% to 63% in South Asia. However, more than half of adults aged 18 and above were still unconnected in Sub-Saharan Africa, while more than a third were unconnected in South Asia and in the Middle East and North Africa. Crucially, 23% of adults aged 18 and above globally are still not using mobile internet despite being covered by a mobile broadband network.

Figure 5
Mobile internet connectivity among adults aged 18 and above, 2020–2022



Base: Adult population aged 18 and above, 198 countries

Note: Totals may not add up to 100% due to rounding. Every year, GSMA Intelligence updates its estimates of the number of mobile internet subscribers in each country, incorporating new (and/or updated) data from operators, regulators, national statistics agencies and consumer surveys where available. In some countries and regions, estimates of mobile internet adoption may therefore differ from what was presented in previous editions of The State of Mobile Internet Connectivity.

Source: GSMA Intelligence

More than half the world's population are using smartphones, but not all are using mobile internet

For the first time, we are now able to report on the number of unique smartphone users globally and by region. Evidence from the GSMA Consumer Survey shows access to smartphones enables a richer and broader connectivity experience, as smartphone owners are much more likely to be aware of and adopt mobile internet, as well as use it more frequently and for a wider variety of tasks.[7]

At the end of 2022, there were 4.3 billion people using a smartphone, equivalent to 54% of the global population. However, not all are using mobile internet. Figure 6 shows that 49% of the population are using mobile internet on a smartphone, while 5% have a smartphone but are not using it for the internet (around 350 million smartphone users). These individuals should in theory face fewer barriers to accessing the internet, given they already have a device and being able to afford a smartphone is often a main barrier to using the internet. However, evidence from the GSMA Consumer Survey highlights that these individuals are still not using the internet due to a number of barriers, including a lack of awareness of mobile internet, lack of perceived relevance, lack of basic literacy and digital skills, safety and security concerns, and no network coverage (see Chapter 4).

Figure 6 also shows that 8% of the global population (or 14% of the total connected population) are accessing internet using a feature phone, which equates to around 600 million mobile internet users.

7. For in-depth analysis, see Figure 9 in The Mobile Gender Gap Report 2022.

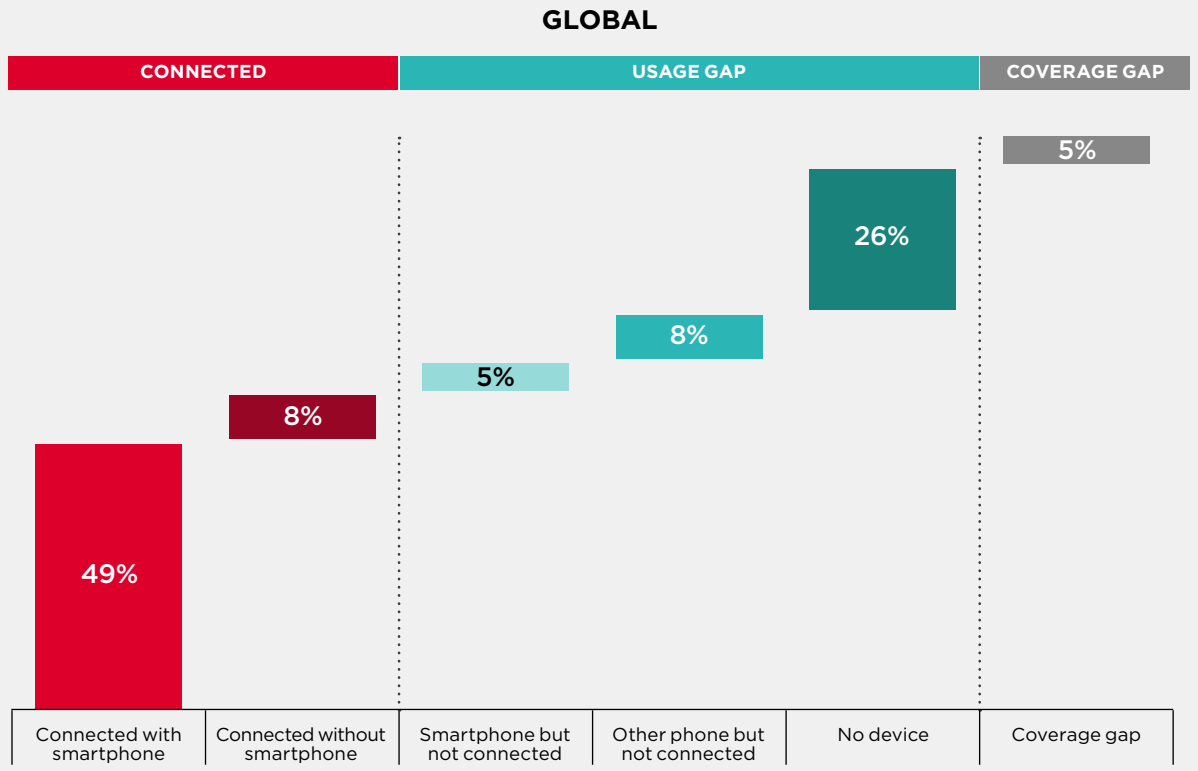
The majority of the usage gap comprises those without a mobile of any type

To better understand and address the usage gap, Figure 6 breaks down (into three groups) those who live within the footprint of a mobile broadband network but don't use mobile internet:

- Those who own a smartphone but are not connected
- Those who own a different type of mobile
- Those who have no mobile

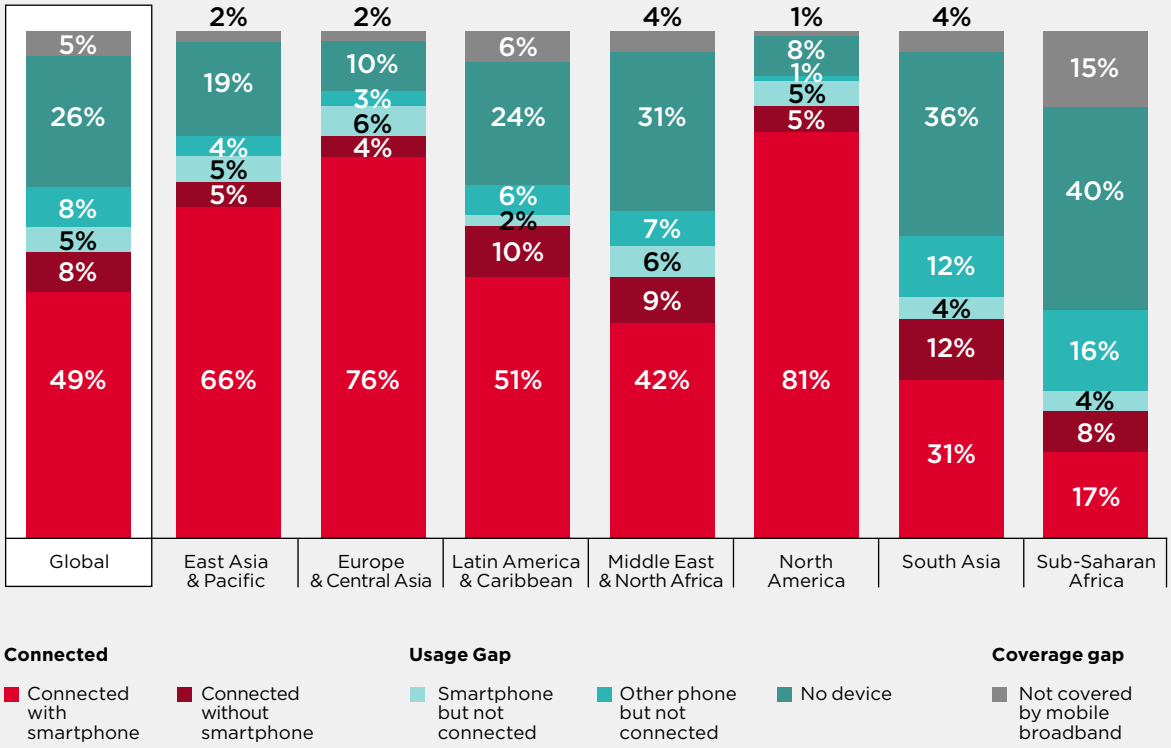
Of the 3 billion people who are covered by mobile broadband networks but are not using mobile internet, around a third are at least using mobile voice or SMS on a device they own or have primary use of. This includes 350 million smartphone owners using mobile services but not mobile internet, and more than 600 million people (8% of the global population) who have a basic or feature phone, are using mobile services but are not connected to mobile internet. The remaining two thirds of the usage gap do not own a mobile.

Figure 6
State of connectivity, with connectivity and usage gap broken down by device type, 2022



Base: Total population, 198 countries
Note: Totals may not add up to 100% due to rounding
Source: GSMA Intelligence

Figure 7
State of connectivity by region, with connectivity and usage gap by device type, 2022



Base: Total population, 198 countries
Note: Totals may not add up to 100% due to rounding
Source: GSMA Intelligence

Smartphone usage varies significantly by region

Connectivity by device also varies significantly by region, as shown in Figure 7. In South Asia and Sub-Saharan Africa, 28% and 32% of mobile internet users respectively do not connect with a smartphone.[8] However, this has declined considerably over the past five years; in 2018, half of mobile internet users in both regions did not have a smartphone. The increase in smartphone adoption has likely been driven by improved affordability and the expansion of mobile broadband coverage. In Latin America and the Middle East & North Africa, around one in six mobile internet users do not connect with a smartphone.

When looking at the usage gap, a significant proportion of the population in South Asia (12%) and Sub-Saharan Africa (16%) have a basic or feature phone, are using mobile services but are not connected to mobile internet. In all regions except Europe & Central Asia and North America, at least two thirds of those covered by mobile broadband but not using it do not own a mobile.

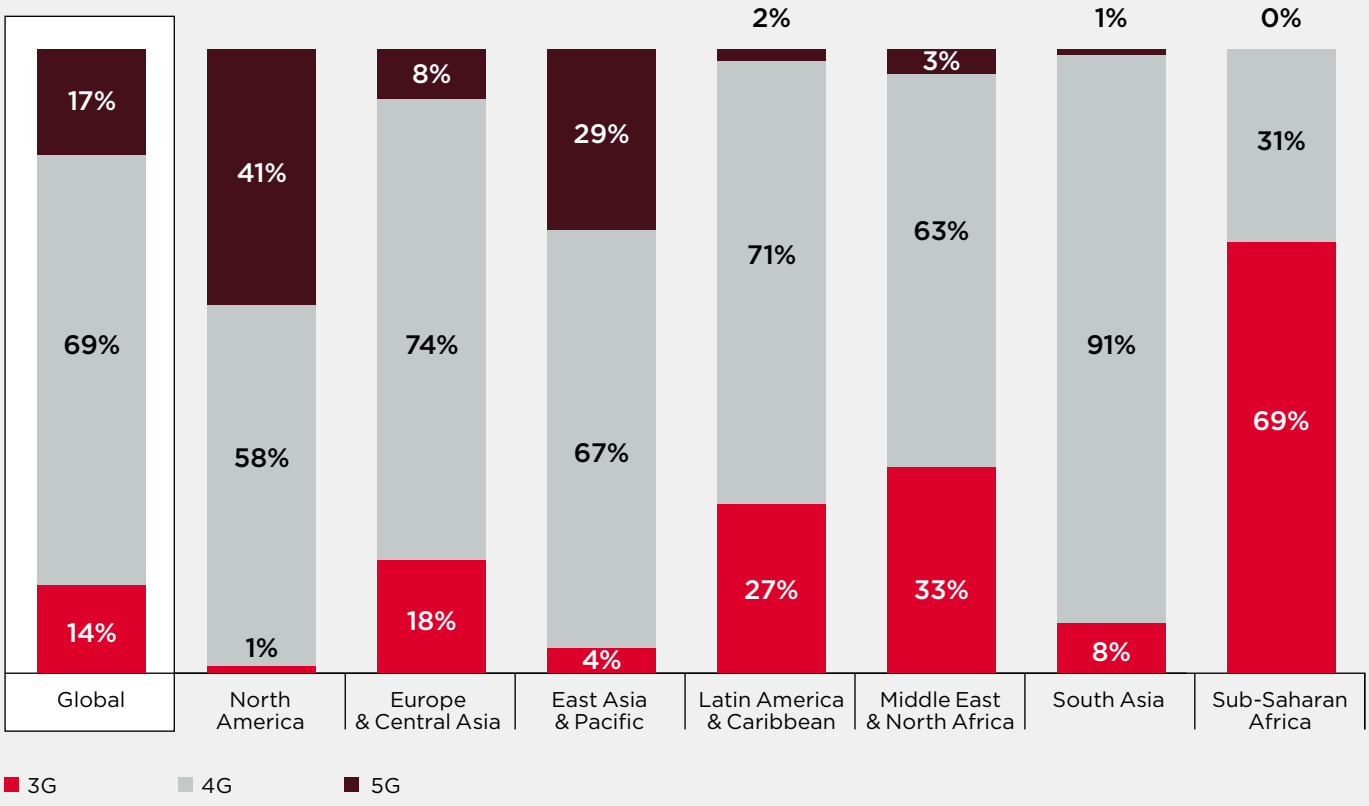
8. Taking the example of Sub-Saharan Africa, 8% of the population use the mobile internet but not on a smartphone, while 25% of the population use mobile internet. The proportion of mobile internet subscribers not using a smartphone is therefore equal to 8/25 = 32%.

Most smartphone owners have a 4G device, but a significant proportion still use 3G

At the end of 2022, 69% of the smartphones being used by mobile internet users were 4G-enabled, while 17% were 5G-enabled. It is also worth noting that 14% can only access 3G, down from 31% in 2018. Figure 8 shows there is significant variation by region. In Sub-Saharan Africa, the majority of smartphones used to access mobile internet are still only 3G-capable (69%). The proportion is also relatively high in Latin America and the Caribbean (27%) and in the Middle East and North Africa (33%). This large, albeit declining, user base is an important factor to bear in mind as mobile operators consider the merits of shutting down legacy 3G networks. Shutting down is conditional on being able to migrate existing 3G users to 4G or 5G (discussed further in Chapter 2).

By contrast, the vast majority of smartphones being used in South Asia are 4G-enabled, while North America and East Asia & Pacific have the largest base of 5G smartphones.

Figure 8
Smartphone ownership of mobile internet users, by technology, 2022



Base: Mobile internet users with a smartphone, 198 countries
Note: Totals may not add up to 100% due to rounding
Source: GSMA Intelligence

The rural-urban gap in mobile internet use remains significant but has reduced slightly

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 follows:

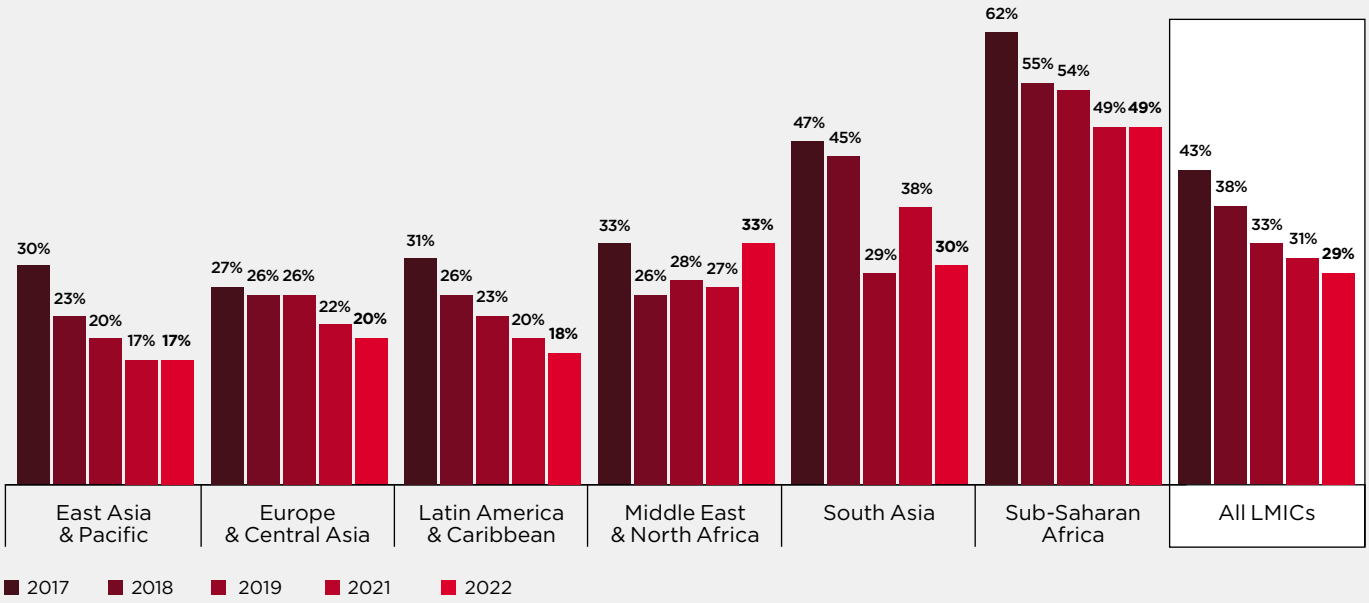
$$\textbf{Rural-urban gap} = \frac{\text{\% of urban users} - \text{\% of rural users}}{\text{\% of urban users}}$$

In 2022, 57% of adults living in rural areas in LMICs were using mobile internet, compared to 80% of those in urban areas. Rural populations are 29% less likely than their urban counterparts to use mobile internet. Across LMICs, the rural-urban gap reduced significantly between 2017 and 2019, shrinking from 43% to 33%. Since then, there has been a small overall reduction each year, though different trends can be seen at the regional level (see Figure 9).

The rural-urban gap in South Asia has returned to its 2019 level of around 30%, having increased in 2021. This was primarily driven by India, which saw a greater increase in the number of rural users compared to urban residents (the opposite to what occurred in 2020–2021). By contrast, there was an increase in the rural-urban gap in the Middle East and North Africa, driven by faster mobile internet growth among urban residents. The rural-urban gaps in LMICs in the other regions were broadly unchanged in 2022, including in Sub-Saharan Africa, which has the highest gap at 49%.

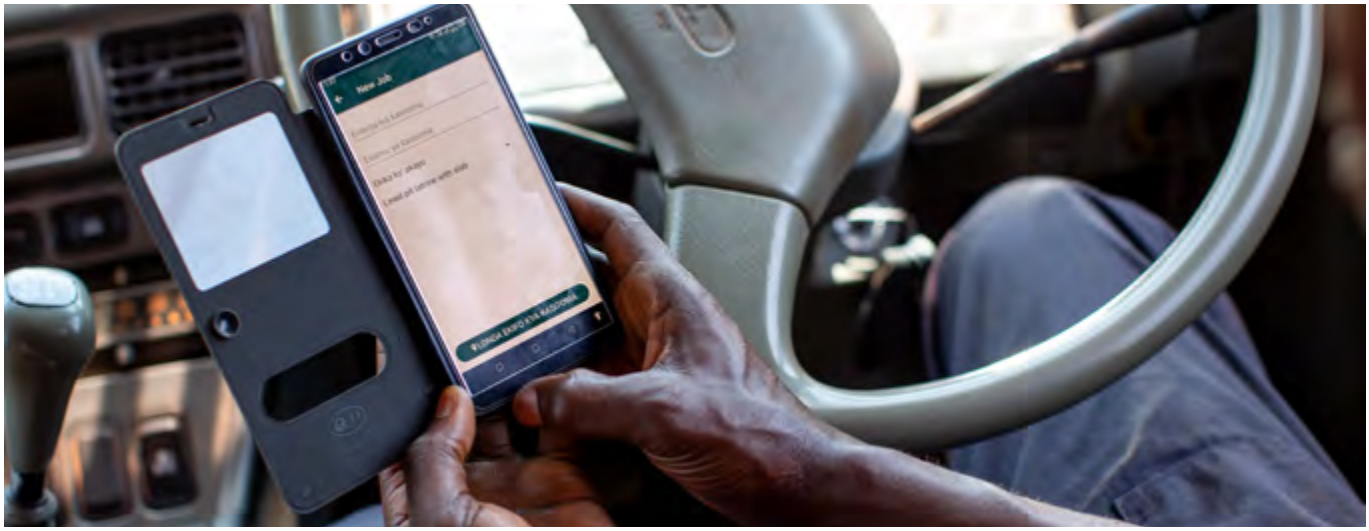
Although more than half of rural adults in LMICs are using mobile internet, the adoption rate among rural adults is much lower in LDCs, at 31%. Not only is overall connectivity much lower in LDCs; the digital divide is greater as well, as LDCs have a much larger rural-urban gap (45%) than other LMICs (24%).

Figure 9
Rural-urban gap in mobile internet use in LMICs, by region, 2017–2022



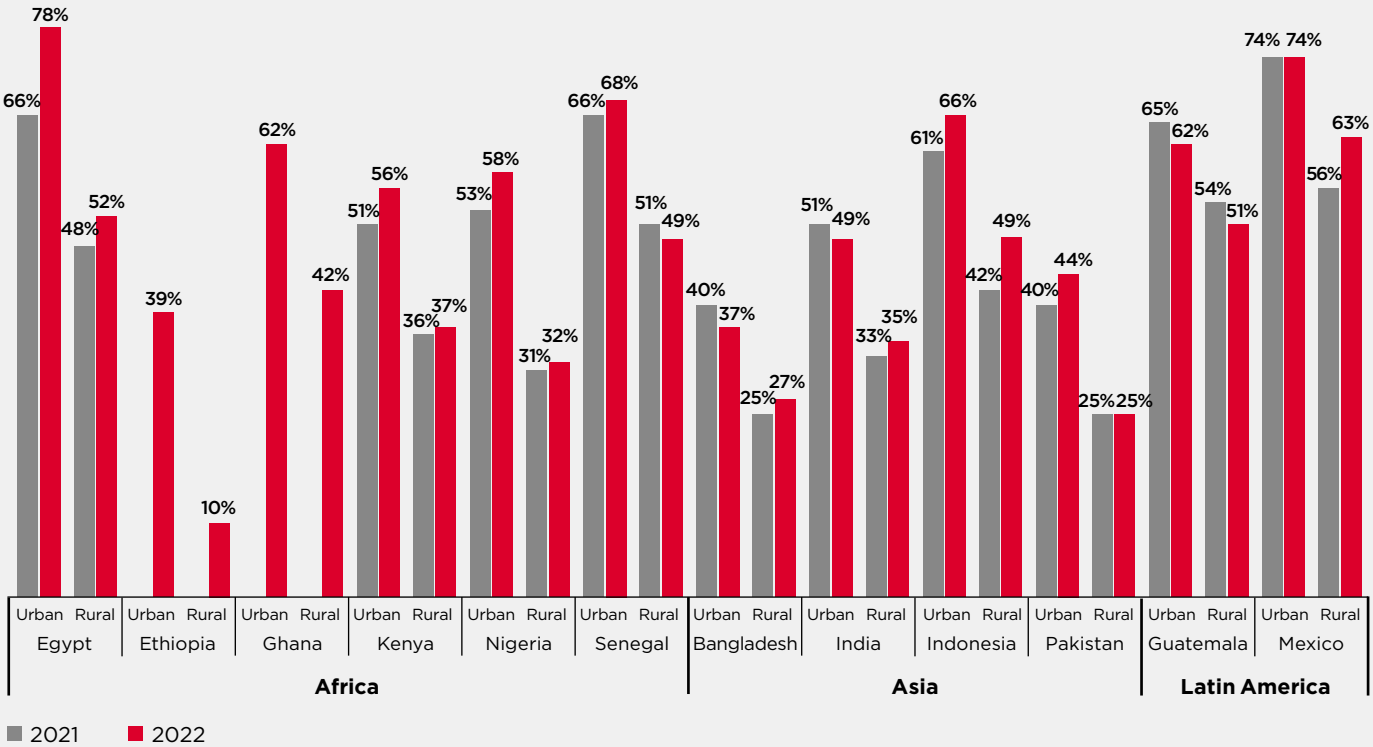
Base: Adults aged 18 and above

Source: GSMA Intelligence calculations based on data sourced from the GSMA Consumer Survey 2017–2022 and Gallup World Poll (for countries not included in the former)



Smartphone ownership is a key driver of mobile internet use. Across the countries surveyed, from 2021 to 2022, smartphone ownership in rural areas largely remained flat – with the exception of Egypt, Indonesia and Mexico, where some growth was seen (see Figure 10). Meanwhile, in five of the 10 countries surveyed, year on year, there has been greater growth in smartphone ownership in urban areas. Across the markets surveyed, people living in rural areas remain significantly less likely to own a smartphone than those in urban areas.

Figure 10
Smartphone ownership, 2021–2022



Base: Adults aged 18 and above. N = from 327 to 864 for urban and from 221 to 1,482 for rural.
For further details on the questions asked, see Appendix 1.

Source: GSMA Consumer Survey 2021 and 2022

The gender gap in mobile internet use remains relatively unchanged

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

It is calculated as follows:

$$\text{Gender gap} = \frac{\text{\% of male users} - \text{\% of female users}}{\text{\% of male users}}$$

More women in LMICs are using mobile internet than ever before, but their rate of adoption has slowed for the second year in a row. While 61% of women across LMICs now use mobile internet, only 60 million women started using mobile internet in 2022, compared to 75 million in 2021.[9] Men's rate of adoption also slowed in 2022, highlighting that progress on digital inclusion for all has stalled. The gender gap in mobile internet remains relatively unchanged; women in LMICs are 19% less likely than men to use it (see Figure 11), which equates to around 310 million fewer women than men. In 2022 there have been no significant changes in the mobile internet gender gap in any region, including South Asia where there have been notable changes over the past few years.

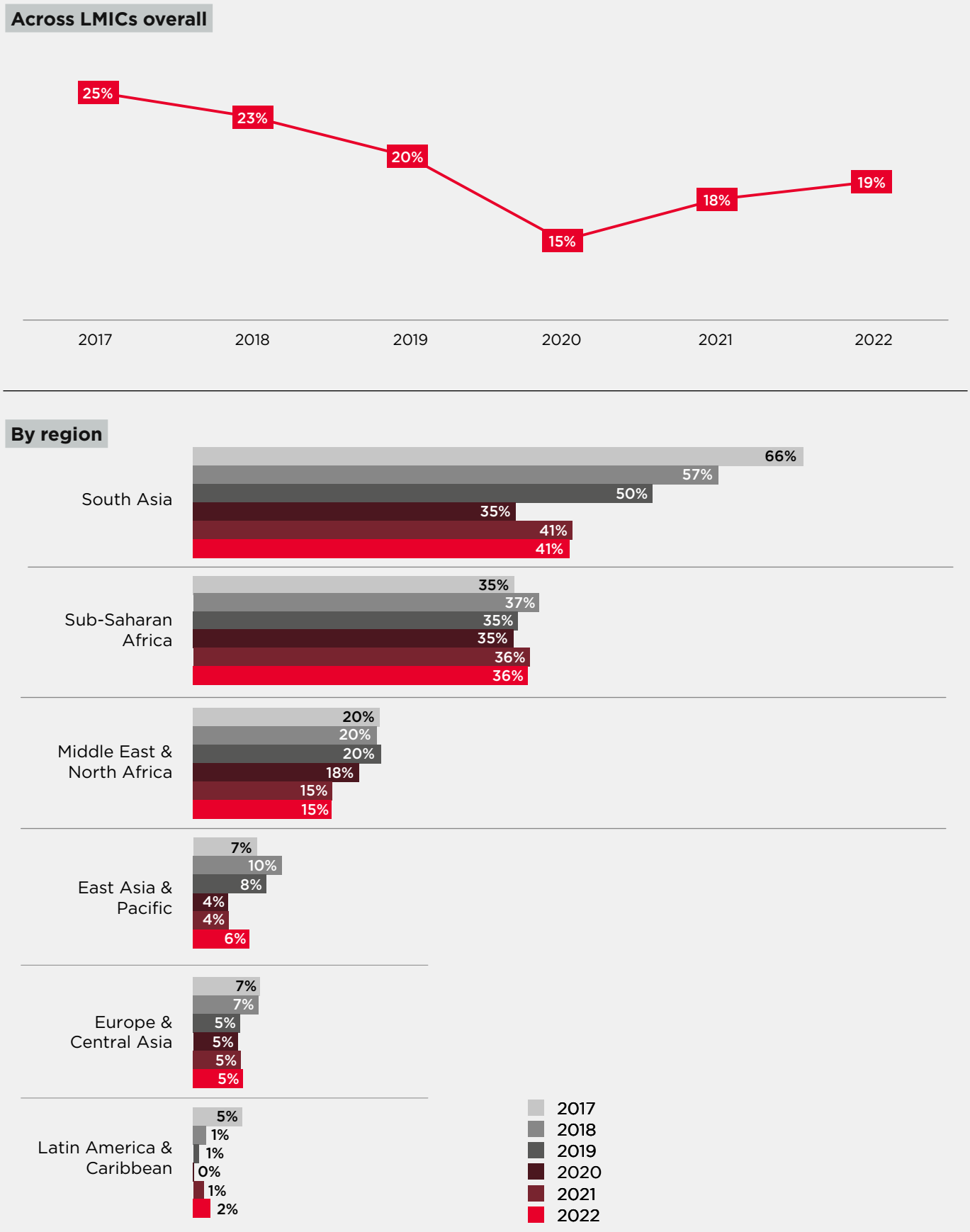
There are 900 million women in LMICs who are still not using mobile internet. Almost two thirds of these live in South Asia and Sub-Saharan Africa. Women in these regions remain the least likely to use mobile internet compared to men, with gender gaps of 41% and 36%, respectively.

To close the mobile internet gender gap by 2030 across LMICs, an estimated 810 million women need to adopt mobile internet. This is equivalent to an additional 100 million women per year, on average. However, if the gender gap remains unchanged, forecasts indicate only 360 million more women will adopt mobile internet by 2030.

The gender gap in smartphone ownership has stalled for the second year in a row. Women in LMICs are 17% less likely than men to own a smartphone. This equates to around 250 million fewer women than men. While more men and women own a smartphone than ever before, the rate of adoption for both has slowed slightly. 55% of women now own a smartphone, compared to 67% of men. However, once women own a smartphone, their awareness and use of mobile internet are almost on a par with men.

9. The Mobile Gender Gap Report 2022, GSMA, 2023

Figure 11
Gender gap in mobile internet use across LMICs and by region, 2017-2022



Source: The Mobile Gender Gap Report 2023, GSMA, 2023

2. Network coverage and infrastructure

Globally, almost 400 million people live in areas not yet covered by mobile broadband networks. Reaching this uncovered population remains a significant challenge. While 4G and 5G coverage continue to expand, 2G and 3G networks remain important sources of coverage in many LMICs.

The coverage gap remains relatively unchanged; reaching the remaining populations is still a challenge

Before the COVID-19 pandemic in 2019, 7% of the world's population lived in an area not covered by a mobile broadband network. Over the following two years, the coverage gap marginally declined to 5%, but there was little change in 2022 (see Figure 1). By the end of 2022, the number of people who remained without broadband coverage was almost 400 million – similar to the number for 2021. The coverage gap is still equally divided into two groups: around 200 million people covered by 2G networks only, and 200 million people with no pre-existing mobile infrastructure (i.e. no coverage from any technology).

This flat trend underlines the economic and financial challenge of deploying mobile broadband networks to the world's remaining uncovered areas. While the mobile industry and governments continue to seek new and innovative means to finance and deploy broadband technologies in rural and remote areas,[10] it seems unlikely that significant gains will be achieved in the near future without a major technological shift. One solution that is receiving renewed attention is new satellite technologies. From a technological perspective, these have the potential to achieve widespread global coverage. However, in the short to medium term there are likely to be technical, economic and regulatory challenges to achieving this. See *Spotlight: Can LEO satellite close the coverage gap?*

Similar to 2021, there are 24 countries where the coverage gap is persistently high, with at least 20% of the population uncovered. The majority are in Africa.[11] It is notable that 12 of these countries are experiencing a protracted humanitarian crisis,[12] such as acute hunger or active conflict,[13] and 19 have a high level of vulnerability to climate change but a low level of readiness, indicating a heightened risk to extreme natural hazards.[14] This potentially means that crisis-affected people disproportionately lack access to mobile broadband coverage, despite arguably being among the groups with the most to gain from it. See *Spotlight: Connectivity has profound implications in times of crisis*.

10. See for example Closing the Coverage Gap, GSMA, 2019, and Using Geospatial Analysis to Overhaul Connectivity Policies: How to Expand Mobile Internet Coverage and Adoption in Sub-Saharan Africa, World Bank, 2022
11. See The State of Mobile Internet Connectivity Report 2022, GSMA, 2022
12. 'Protracted crisis' refers to countries that have had UN-coordinated country response plans or country components of regional response plans for at least five consecutive years in 2022.
13. Global Humanitarian Assistance Report 2023, Development Initiatives, 2023
14. ND-GAIN Matrix, Notre Dame Global Adaptation Initiative, 2023

Spotlight

Can LEO satellites close the coverage gap?

The persistent 5% global coverage gap over the past two years represents a significant challenge. In least developed countries, where almost 1 in 6 people live outside an area with mobile broadband coverage, deploying 3G, 4G or 5G coverage is extremely challenging, especially in areas that lack 2G coverage. The costs needed to expand coverage in sparsely populated areas, to the final percentiles of the population, increase exponentially to the point where it is unsustainable for either an operator or government to fund the high capital cost and ongoing opex.[15]

During the past decade, a number of innovations have been proposed and tested to extend coverage to these areas, including wide-area cell sites and high-altitude solutions – for example, Google's Project Loon and Meta's Aquila. Unfortunately, none of these were able to scale or operate in a commercial setting.[16] However, there is renewed promise in the new generation of satellites. In particular, the entry of Amazon, OneWeb and especially SpaceX has seen the number of low Earth orbit (LEO) satellites[17] increase from 1,000 to almost 5,000 between 2017 and 2022.[18] Over the next five years, the number is expected to double to more than 10,000, in theory enabling near-complete global coverage of the Earth's landmass.

This new generation of satellite connectivity could potentially close the coverage gap in three ways:

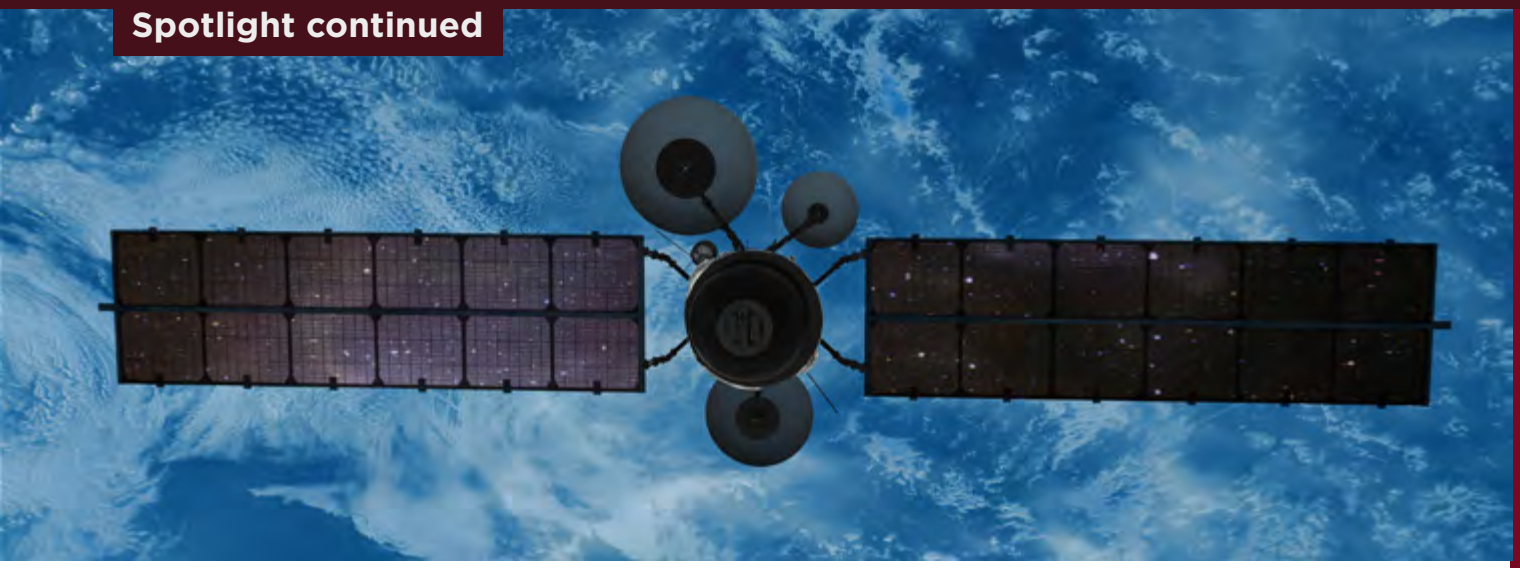
- Providing direct fixed satellite broadband connectivity to consumers
- Supporting mobile connectivity with satellite backhaul solutions
- Direct-to-device (D2D) connectivity, with satellites acting as 'base stations in space'.

In terms of direct fixed satellite broadband service, one of the largest LEO providers is SpaceX's Starlink service, which served more than 1 million users at the end of 2022.[19] As of June 2023, it was available in more than 50 countries and is expected to launch in many more in the coming years, including in Africa and Asia.[20] While the quality of service for satellite internet has improved and is now comparable to fixed broadband in some markets,[21] it remains unavailable in the majority of LMICs. Furthermore, where the service has been launched, the cost of access is likely to be prohibitive to those currently living in uncovered areas in LMICs, with a one-off hardware cost of up to $700 and a monthly cost of $50–100 (prices vary by country).[22]

The second way satellite can extend coverage is to support mobile backhaul – one of the biggest deployment costs of mobile networks in remote

15. For further analysis on this, see Using Geospatial Analysis to Overhaul Connectivity Policies: How to Expand Mobile Internet Coverage and Adoption in Sub-Saharan Africa, World Bank, 2022
16. See for example The end of Project Loon: money talks, GSMA Intelligence, 2021
17. LEO satellites operate 300–2,000 km above Earth's surface. By contrast, medium Earth orbits (MEOs) range from 2,000 to 35,000 km above Earth's surface (though most orbit between 18,000 and 24,000 km) and geosynchronous orbits (GEOs) operate at 35,786 km. This means LEO satellites can offer higher data throughput and lower latencies compared to MEOs and GEOs. For further details on satellite communication services, see Connectivity from the Sky, GSMA Intelligence, 2021
18. Global Mobile Trends, GSMA Intelligence, 2023
19. "Starlink Resurgence? Speeds Increase in Europe and Oceania", GSMA, March 2023
20. https://www.starlink.com/map
21. "Starlink Resurgence? Speeds Increase in Europe and Oceania", Ookla, February 2023
22. https://starlinkinsider.com/starlink-price/

Spotlight continued



areas. Historically, the cost of satellite backhaul has been prohibitive for operators. A World Bank and GSMA study in 2022 showed that the annual opex of providing satellite backhaul for a 3G site in Sub-Saharan Africa was four times higher than for 2G, while for 4G it was eight times higher.[23] Although deployment of larger LEO constellations could reduce the cost of satellite backhaul solutions, it remains to be seen whether it can sustainably close the coverage gap in low-income countries, especially as network deployments in rural areas can still be prohibitive due to high base station and energy costs.

Lastly, there is the possibility of providing connectivity to a mobile device directly from a satellite, which avoids the deployment of terrestrial base stations. The solution would effectively enable a consumer to connect to the internet using their smartphone, without purchasing a dish or large receiving equipment. While this D2D technology is not new, a key recent development is that the new 5G new radio (NR) standard from 3GPP[24] incorporates integration of non-terrestrial networks (NTNs). This means that standard mobile devices will be able to connect seamlessly with both traditional base stations as well as satellite systems when out of terrestrial connectivity. However, devices connecting to satellites will require a new chipset, so it will take time for D2D to grow, even when the technology is in place, as it will be partly driven by handset replacement cycles.

While D2D technology could help close the coverage gap in rural and remote areas, there remain two key challenges. The first is technical; D2D requires larger antennas on satellites to send and receive signals to/from a mobile phone. While the next generation of satellites will have bigger antennas, in the short term most D2D services are likely to consist of SMS. In the medium to longer term, they could offer 3G-like speeds of 3–5 Mbps.[25]

The second challenge is regulatory, particularly in the use of spectrum. Some D2D solutions intend to use mobile operator spectrum frequencies, while others intend to use spectrum assigned for satellite use. The first approach faces a question around whether terrestrial frequencies can be used from space, given it is not currently permitted in the Radio Regulations, and whether spectrum interference across borders can be effectively managed. The second approach poses questions around the regulatory conditions for satellite and mobile spectrum, and whether or not they should be licensed in a similar manner, as well as potential co-existence and interference challenges.[26]

It is encouraging that the latest developments in the satellite market are commercially led, with demand increasing for satellite broadband in higher-income countries and mobile operators willing to work with satellite operators to deliver more cost-effective connectivity solutions. However, in the context of extending broadband networks to the most remote and poor areas of low-income countries, and given that D2D remains in the early stages of development, satellite technology is unlikely to be able to close this coverage gap in the short term.

23. Using Geospatial Analysis to Overhaul Connectivity Policies: How to Expand Mobile Internet Coverage and Adoption in Sub-Saharan Africa, World Bank, 2022
24. 3GPP is the standards body responsible for developing technical specifications that are developed into global standards for 2G, 3G, 4G and 5G.
25. Satellite 2.0: going direct to device, GSMA Intelligence, 2022
26. Challenges of Using the L-Band and S-Band for Direct-to-Cellular Satellite 5G-6G NTN Systems, Pastukh et al, 2023

Spotlight

Connectivity has profound implications in times of crisis

Increasing mobile coverage and use globally has transformed the way people in crisis communicate, find information, earn a living and even relax.[27] Increasingly, life-saving humanitarian assistance and information is delivered using mobile networks. Furthermore, mobile-enabled services are increasingly central to mitigating the impact of climate change on vulnerable populations.[28]

Despite crisis-affected people being among the groups most likely to benefit from connectivity, data suggests they are disproportionately likely to live in areas without mobile broadband coverage. In 2022, there were 36 countries with a coverage gap of 10% or more, which is twice the global average (for a list of the countries, see Appendix 3). Fifteen of these countries are experiencing a protracted humanitarian crisis, such as acute hunger or active conflict,[29] and 29 have a high level of vulnerability to climate change but a low level of readiness, indicating a heightened risk to extreme natural hazards[30] This means almost half the countries in this category of climate risk also have a coverage gap of 10% or more.

The 36 countries with a coverage gap of 10% or more are home to only 13% of the global population but 46% of internally displaced people (IDPs),[31] and 18% of refugees currently reside here.[32] Overall, it is estimated that 172 million people in need of humanitarian assistance reside in these countries, or 42% of the global total.[33]

The humanitarian coverage gap – the proportion of people in need of humanitarian assistance who live outside of network coverage – has received insufficient attention, and there has been little analysis aimed specifically at understanding this issue. A 2016 study by the United Nations Refugee Agency (UNHCR) estimated that refugees living in rural areas were twice as likely to live in uncovered areas as the global population[34] This analysis was restricted to only refugees, a group that has grown 71% since then. This suggests a refreshed analysis is needed – one that also looks at the needs of people requiring humanitarian assistance more broadly.

The GSMA is currently working on modelling to help fill this evidence gap and to identify solutions tailored to crisis-affected contexts. Initial results should be published in early 2024.

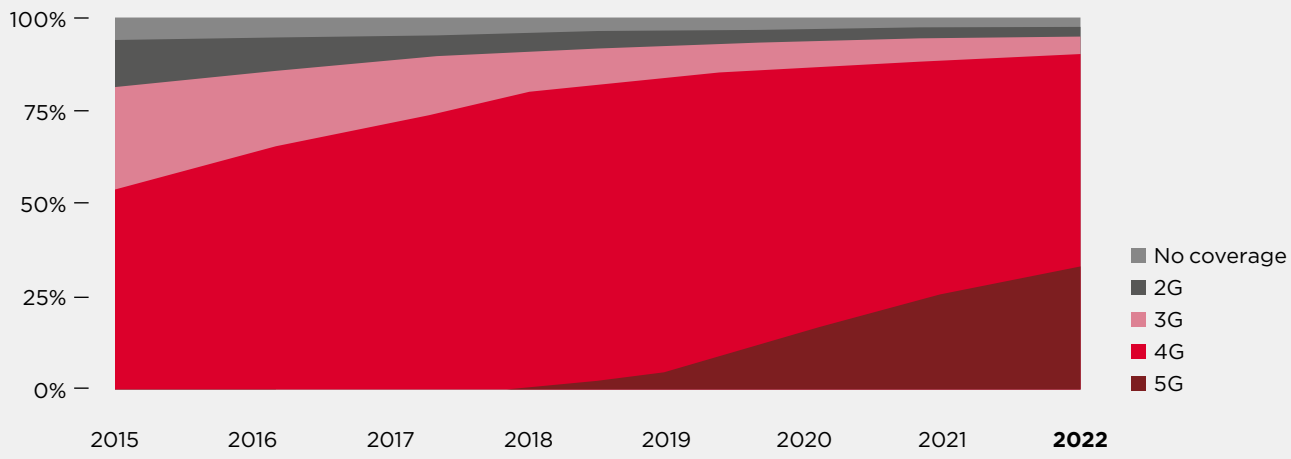
27. The Digital Worlds of Displacement-Affected Communities, GSMA, 2022
28. The Role of Digital and Mobile-Enabled Solutions in Addressing Climate Change, GSMA, 2021
29. Global Humanitarian Assistance Report 2023, Development Initiatives, 2023
30. ND-GAIN Matrix, Notre Dame Global Adaptation Initiative, 2023
31. Internal Displacement Monitoring Centre's Global Internal Displacement Database
32. UNHCR's Refugee Data Finder
33. Global Humanitarian Assistance Report 2023, Development Initiatives, 2023
34. Connecting Refugees, UNHCR, 2016

While the coverage gap remains flat, 4G and 5G networks continue to expand

Although the overall broadband coverage gap remains flat, the deployment of 4G and 5G continues to expand. 5G is now the focus in most high-income countries and large middle-income countries such as China, India and Brazil. Global 5G coverage increased from 25% in 2021 to 32% in 2022, meaning 2.6 billion people are now covered by a 5G network (see Figure 12). Of the 600 million additional people covered by 5G in 2022, almost three quarters were in Asia Pacific.

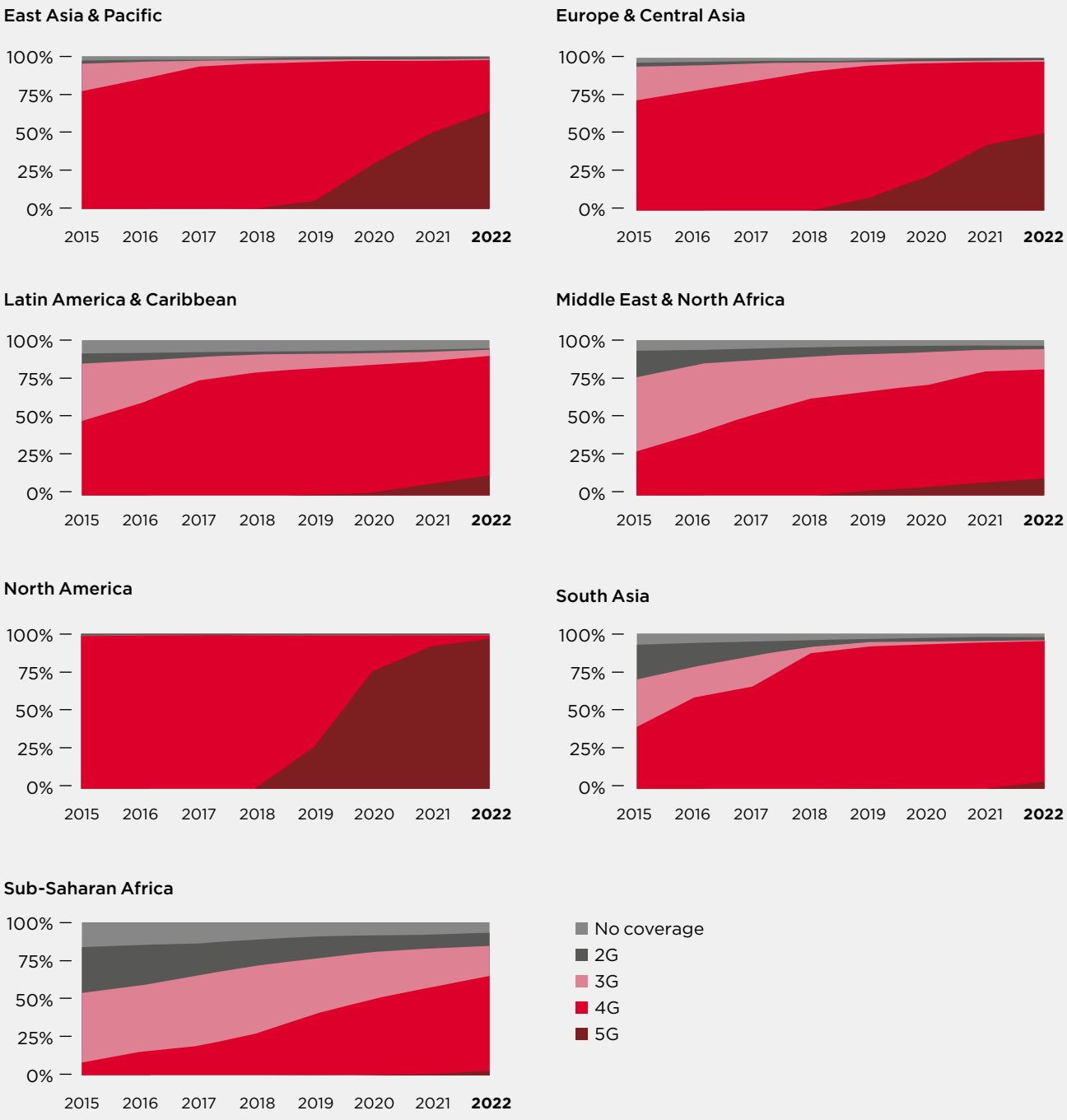
Meanwhile, 4G networks continued to expand in Sub-Saharan Africa; 65% of the region's population now has 4G coverage, compared to 27% in 2018 (see Figure 13). In 2022, Sub-Saharan Africa accounted for more than half of 4G network expansion globally, reaching an additional 100 million people. As demand increases, the gap between 4G and 3G will continue to close, and in some countries 3G networks will be shut down.

Figure 12
Global population coverage by technology, 2015–2022



Source: GSMA Intelligence

Figure 13
Population coverage by technology and region, 2015–2022



Source: GSMA Intelligence

2G and 3G network sunsets are expected to accelerate, but most operators will maintain legacy networks

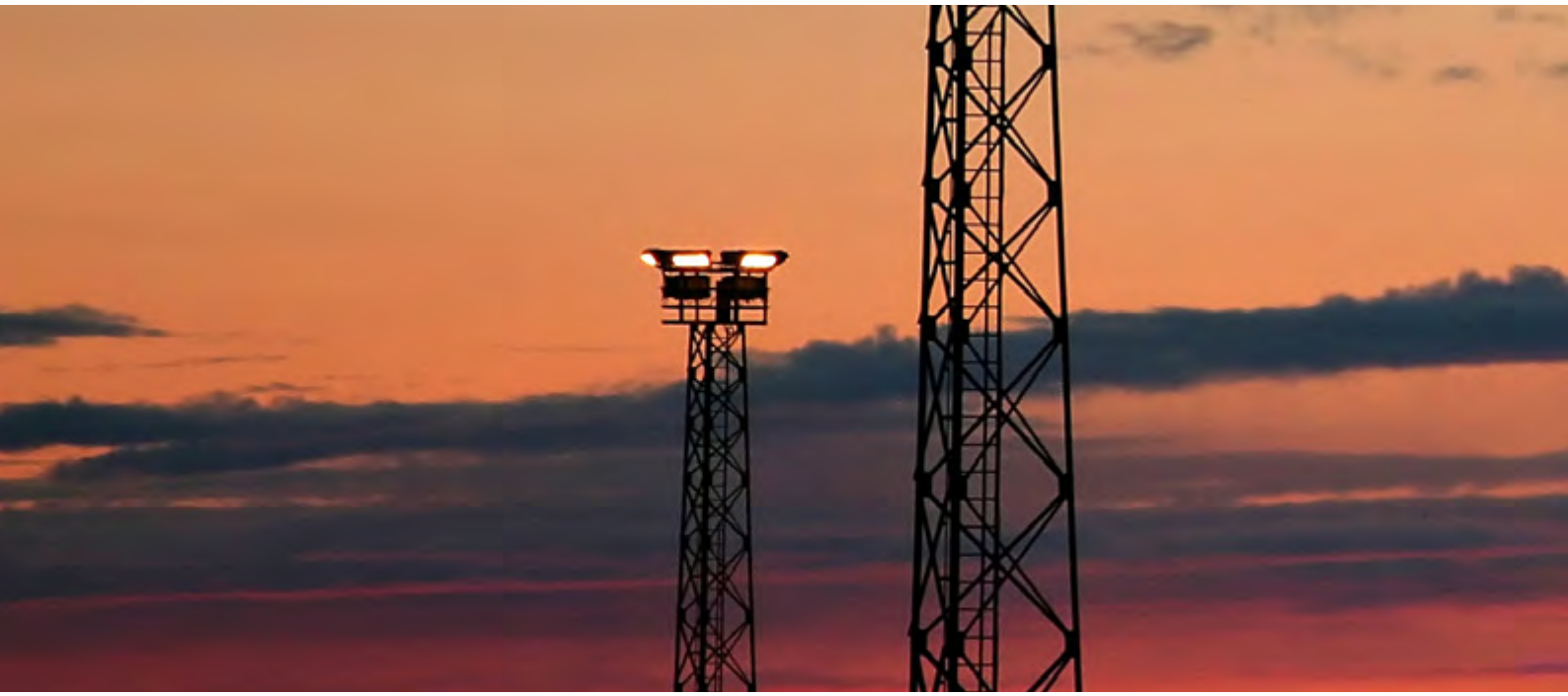
As mobile operators focus on expanding their 4G and 5G footprints, many are looking to optimise their network operations and costs, and meet greater demand for bandwidth by refarming spectrum for 4G and 5G, which have greater spectral efficiencies.

By the end of 2022, operators around the world had shut down 39 2G networks and the same number of 3G networks. Most 2G sunsets (23) have been in East Asia & Pacific, while 3G sunsets have mostly occurred in East Asia & Pacific and Europe & Central Asia (34 of the 39).[35] 2023 is expected to have the highest number of sunsets so far, with 57 operators planning 2G or 3G shutdowns. The majority will again be in Asia Pacific and Europe.[36]

An important factor influencing operators' sunset decisions is the scheduled expiry of spectrum licences. As licences expire, regulators are re-auctioning legacy spectrum bands such as 900 MHz and 2100 MHz, often with technology-neutral policies. Based on plans that have been announced, it is expected that around 90 2G networks and more than 110 3G networks will have been shut down by 2025.

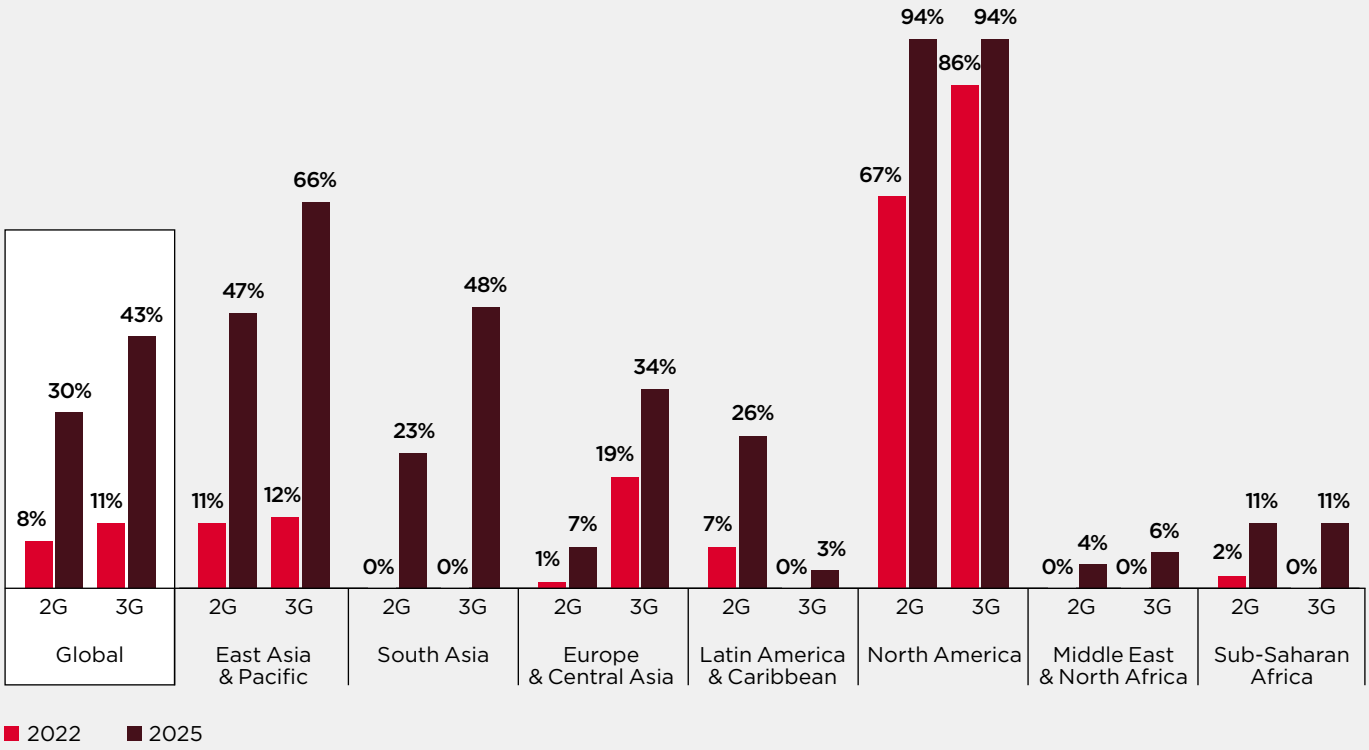
While there is an increasing trend to shut down older networks, most operators worldwide will continue to maintain 2G and 3G networks for the foreseeable future. Figure 14 shows that, by the end of 2025, operators that have shut down 2G networks (based on existing announcements) will account for around 30% of mobile connections (compared to 8% at the end of 2022). Meanwhile, operators that shut down 3G will account for just over 40% of mobile connections, compared to 11% at the end of 2022. North America and East Asia & Pacific are the only regions where more than half of mobile connections will be with operators that no longer have a 3G network. This is partly linked to re-licensing of spectrum, but the main factor is that a significant portion of mobile users will continue to use 2G and 3G, especially in LMICs, as will older IoT applications such as remote sensing and meter reading.[37]

While it may be desirable going forward to accelerate network sunsets and increase the use of more efficient technologies, this will be conditional on enabling spectrum policies (particularly the assignment of technology-neutral spectrum) and the ability of operators to migrate consumers and businesses to 4G or 5G devices.

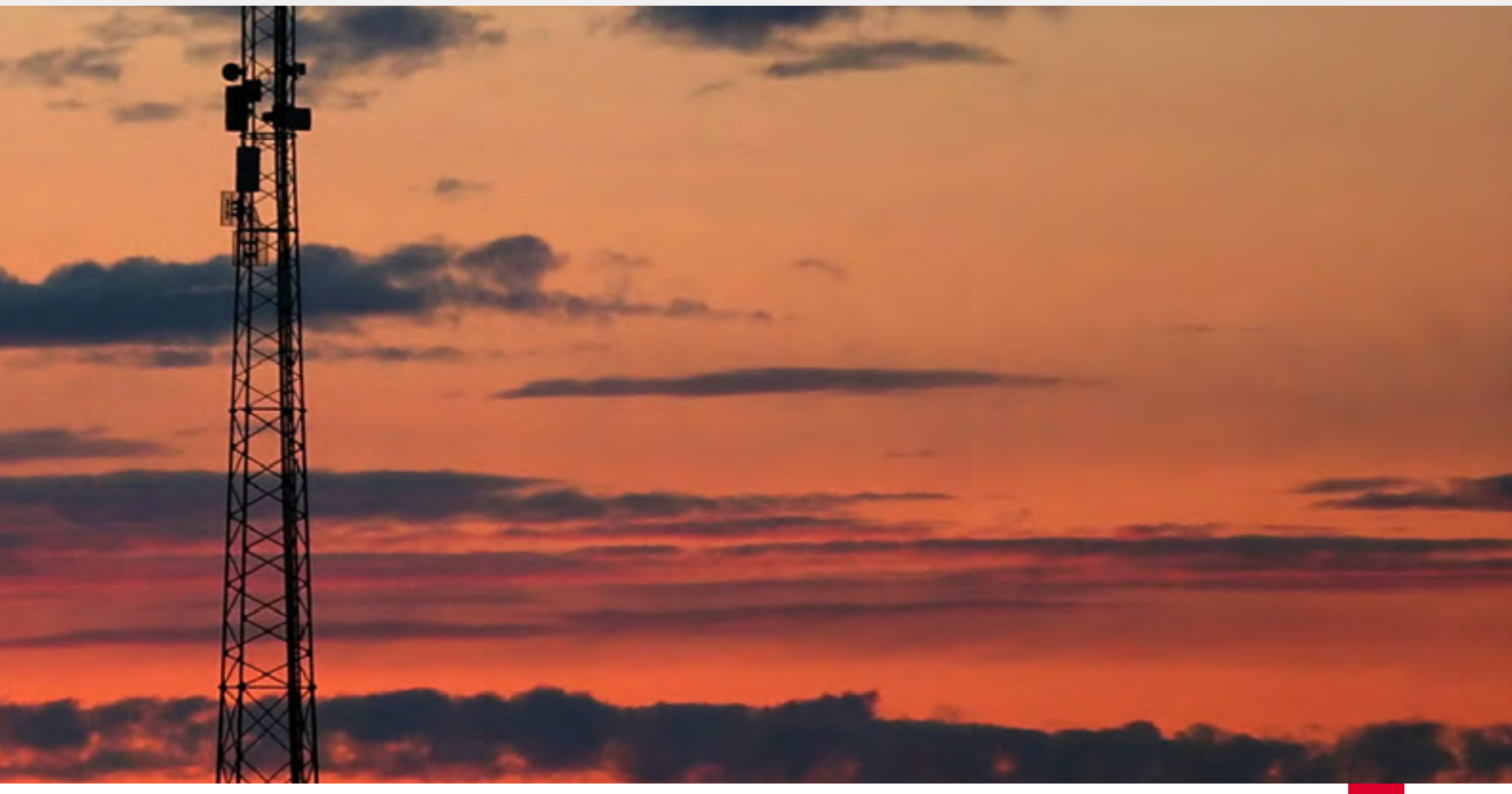


35. Source: GSMA Intelligence, based on operators' announced plans for shutdowns
36. Spectrum Navigator, Q1 2023, GSMA Intelligence, 2023
37. Mobile network sunset: trends, regional variations and implications for IoT, GSMA Intelligence, 2022

Figure 14
Share of mobile connections with operators that have or are expected to shut down 2G and 3G networks



Source: GSMA Intelligence



Data usage and network quality increase, but gaps persist

Based on the latest traffic data published by Ericsson, monthly global mobile data traffic per user increased from 8.4 GB in 2021 to 11.3 GB in 2022 – the largest absolute increase since the data was first tracked in 2015.[38] As in previous years, there remains a significant gap between high-income regions and LMICs (with the exception of India, where average data usage of 16 GB per month is among the highest worldwide). However, as noted in *The State of Mobile Internet Connectivity 2022*, the average amount of data consumption significantly overstates the level of usage for most consumers, since the average is skewed by a minority of very intense data users.[39] This is further highlighted in network analysis by Sandvine, which shows that across several networks in Asia Pacific, around 8% of mobile subscribers are responsible for 55% of the traffic volume. At the other end of the scale, light users account for more than half of subscribers but are responsible for less than 10% of traffic.[40]

Network quality continues to improve across all regions, driven by improved networks and consumers migrating to 4G or 5G. For the first time, all regions now have average download speeds of at least 10 Mbps (see Figure 15), and the average download speed globally increased from 27 Mbps to 34 Mbps. There was a notably large improvement in network quality in South Asia, with download and upload speeds increasing by 30% and 25% respectively. This was likely driven in part by the assignment of additional mid-band spectrum (above 1 GHz) in India and Bangladesh, allowing operators to expand capacity.

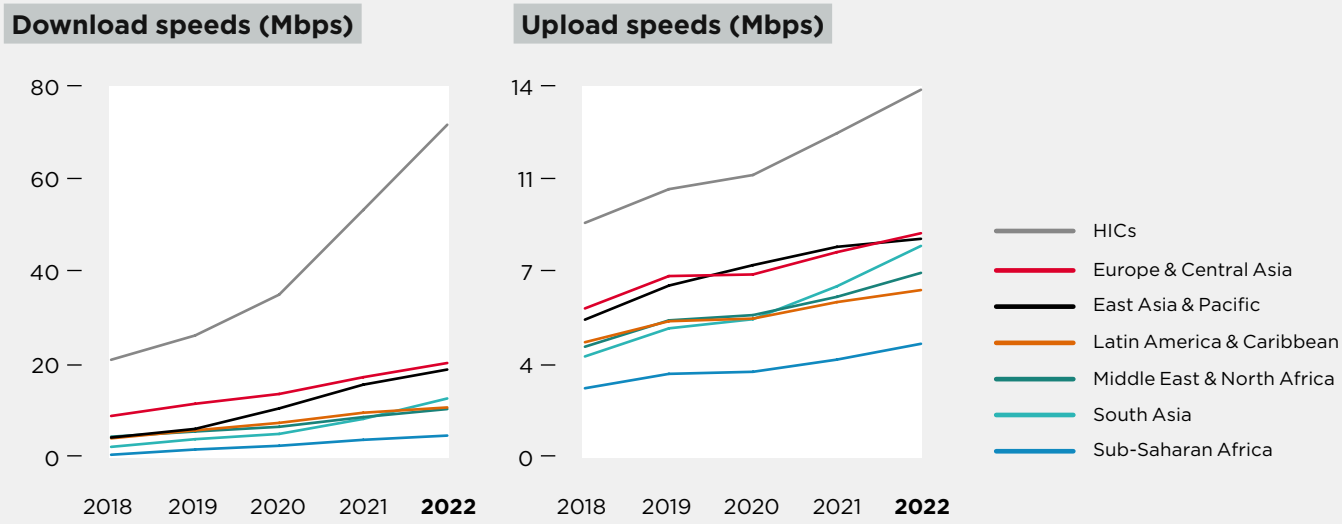
The deployment and adoption of 5G in HICs continues to increase the gap in network quality with LMICs in terms of download speeds, with HICs achieving speeds four times greater than those in LMICs. The gap in upload speeds has remained constant over the past five years, with HICs recording speeds twice those of LMICs.

The gap between the two is not just driven by 5G. Considering only 4G technologies, HICs have consistently achieved download speeds that are twice as high as LMICs, while 4G upload speeds have also been 20–30% higher over the past three years. While there are a number of reasons for this, including investment and network deployment decisions, one likely factor is the amount of spectrum assigned to mobile operators. For a given number of cell sites, a greater amount of spectrum allows operators to provide higher capacity and therefore download speeds, especially in spectrum bands above 1 GHz. The latest Mobile Connectivity Index shows that HICs score an average of 70 for the Spectrum dimension,[41] compared to 36 for LMICs.

38. Source: Ericsson Mobility Report, 2023
39. See The State of Mobile Internet Connectivity Report 2022, GSMA, 2022
40. 2023 Global Internet Phenomena Report, Sandvine, 2023
41. In the Mobile Connectivity Index, the Spectrum dimension consists of four indicators that measure the amount of spectrum assigned to mobile operators in the following bands: below 1 GHz, 1–3 GHz, 3–6 GHz and millimetre wave bands (above 24 GHz).

Figure 15

Average download and upload speeds in HICs and LMICs, 2018-2022



Source: GSMA Intelligence analysis, based on Speedtest Intelligence® data provided by Ookla®

3. How people are using mobile internet

Over the last few years, mobile internet use has become more frequent and across a wider range of activities. Communication remains the main activity people do on a mobile. During the pandemic lockdowns, there was a significant increase in the use of mobile to access educational services, healthcare information and government services, and to apply for jobs. In 2022, we saw contractions in these activities, likely reflecting the end of pandemic restrictions and a return to face-to-face interaction.

People use mobile internet to meet a range of needs, from communication and entertainment to work and education.[42] Use of mobile to perform activities varies by country, gender and geography. To better understand mobile internet usage in LMICs, the GSMA Consumer Survey asks mobile internet users what they do online and how frequently they do it.[43]

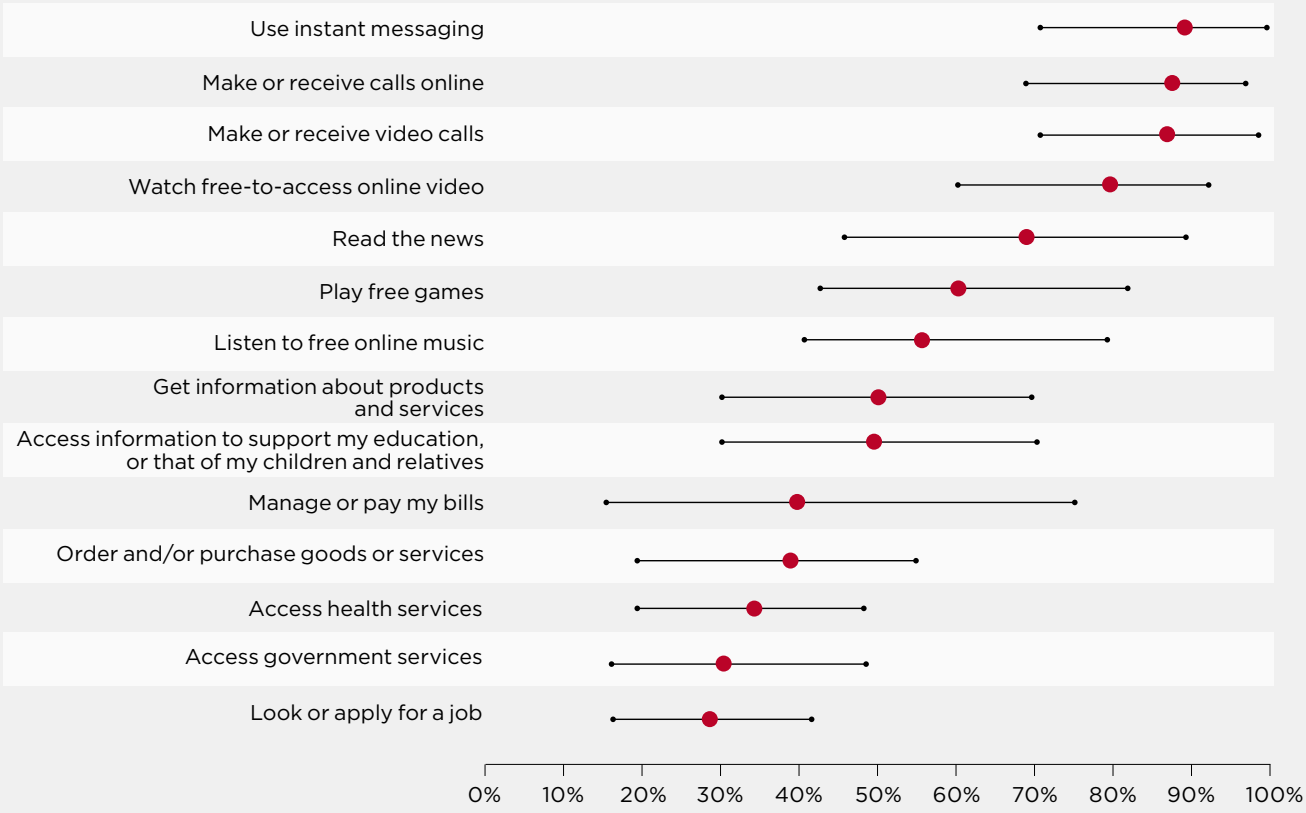
The vast majority of mobile internet users are using it on a daily basis, showing that once people adopt the technology, it tends to become integral to daily life. Across the countries surveyed, on average, 82% of mobile internet users were using it daily, ranging from 65% in Ethiopia to 93% in Egypt. However, this varies by location, with urban mobile internet users more likely to use it on a daily basis than their rural counterparts. Across the countries surveyed, between 71% and 96% of urban mobile internet users report accessing it daily, while between 49% and 92% of rural mobile internet users report doing so.

42. For further details on the different needs internet can fulfil, see Understanding people's mobile digital skills needs, GSMA, 2021
43. Mobile internet users were asked how frequently they did any of a list of activities on a mobile phone. This list is not exhaustive and has changed over the years. For further details, see Appendix 1. Trends are presented for six markets for which we have data across the four years. In 2022, 12 markets were surveyed. While some of these activities can be done exclusively using mobile internet, others (such as playing games, using a mobile money account or managing and paying bills) could be done using standard GSM.

Communications and entertainment are the most popular, but use varies between and within countries

The extent to which specific activities are performed on mobiles varies on a country-by-country basis. Internet-based communication services, such as instant messaging and video and voice calling online, are the most popular activities by mobile internet users and are commonly used across all countries surveyed. On average, more than 86% of mobile internet users report having done these activities across the countries surveyed (see Figure 16). However, for other mobile internet activities, there are large disparities between countries. For example, 89% of mobile internet users in Egypt have used mobile to read the news, compared to 46% in Pakistan.

Figure 16
Activities that mobile internet users report having done at least once on a mobile phone, 2022
Percentage of mobile internet users



Base: Mobile internet users aged 18 and above. N = from 264 to 1,008 across the 12 countries surveyed in 2022.
Source: GSMA Consumer Survey 2022

Use of online mobile activities varies by demographic within countries

While both male and female mobile internet users commonly use communication services, men were more likely than women to have used mobile internet for a wider range of (non-communication) activities. For example, among mobile internet users in nine out of 12 countries surveyed, men were more likely than women to use mobile to read the news on a daily basis.[44] This difference is greatest in Mexico, where 35% of male mobile internet users did this daily, compared to 16% of female mobile internet users. In seven of the 12 countries, men were also more likely to have used mobile to manage their bills on a monthly basis.

Across the countries surveyed, mobile internet users in urban areas are typically more likely or at least just as likely to have engaged in communications and entertainment-based activities daily compared to their rural counterparts.[45] On a monthly basis, urban mobile internet users are more likely to have also undertaken more administrative-related tasks, such as ordering goods and services and managing bills, with a few exceptions.[46] Most notably, rural mobile internet users in Egypt stand out as more likely to have engaged in eight of the 14 activities than their urban counterparts. In the remaining six activities, rural users were just as likely as urban counterparts to do so.

In general, mobile internet users aged 18–34 were more likely than those aged 35 and over to engage in communications and entertainment use cases. In fact, in Guatemala and Pakistan, there was not a single activity out of the 14 analysed where those aged 35 and above did more than those aged 18–34 years old.

Literate mobile internet users were more likely than or at least just as likely as illiterate counterparts to have used mobile for all 14 activities on a daily, weekly and monthly basis across all countries, with just two exceptions,[47] illustrating how lacking basic literacy can be a significant barrier to diverse use of mobile.

44. In the remaining three countries, male mobile internet users were equally likely as female counterparts to have done so.
45. With the exception of playing free games in Ethiopia (34% of rural mobile internet users versus 18% of urban users) and Bangladesh (27% of rural mobile internet users versus 16% of urban users) and listening to free music in Bangladesh (22% of rural mobile internet users versus 16% of urban users).
46. Exceptions are ordering goods and services in Egypt, managing bills in Senegal and Pakistan, and accessing government services in Pakistan.
47. Exceptions are playing free-to-play games on a daily basis in Pakistan and reading news on a daily basis in Bangladesh.

Use of mobile for certain activities spiked in lockdowns, with a return to pre-pandemic levels now, illustrating how mobile can help adapt to shocks

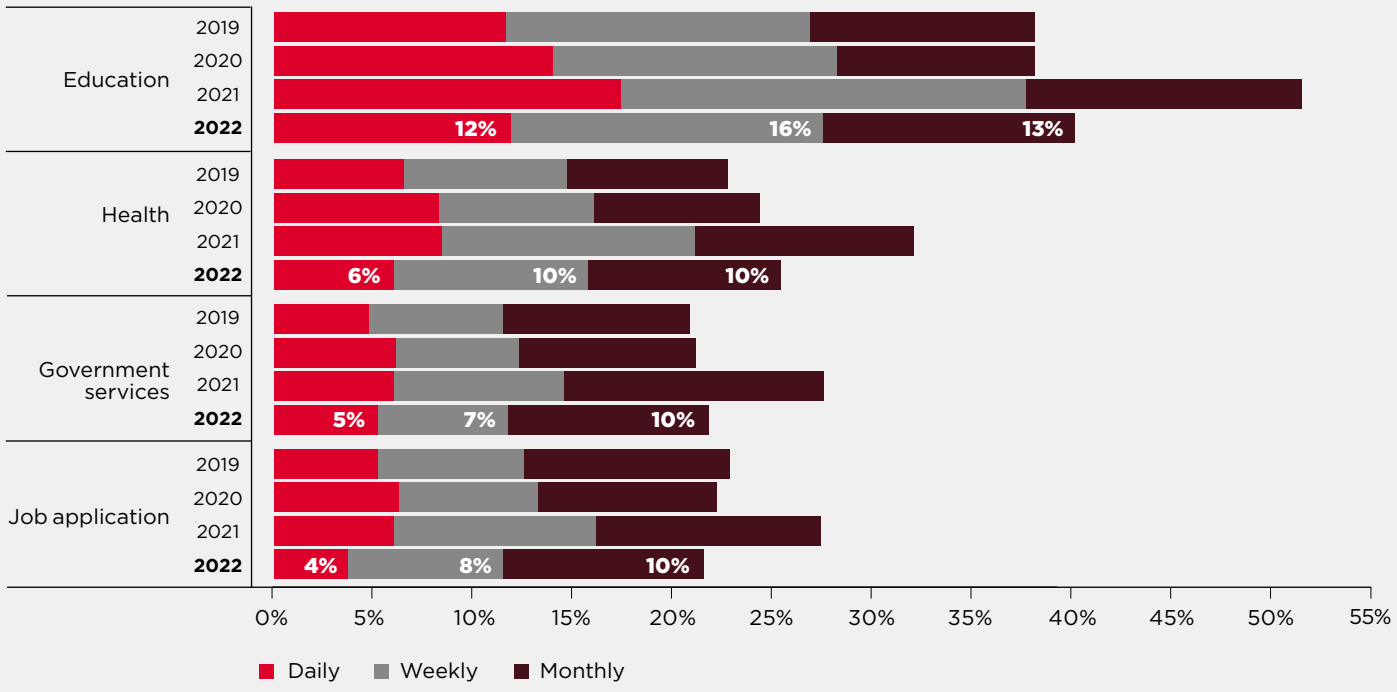
During 2017–2021, across the countries surveyed, the number of activities mobile owners reported doing was increasing, with the use of a small number of non-communications activities growing significantly during pandemic lockdowns (see Figure 17). These included accessing health services, government services and educational support, and applying for jobs. The increases illustrated how mobile served a critical role, delivering important services remotely to those in lockdowns, such as education for children when schools were closed and remote access to healthcare information, job applications and government services.

With the ending of pandemic restrictions, these services opened up again in-person. As people returned to face-to-face interactions, the use of mobile to access these services has mostly reverted back to pre-lockdown levels, in some cases dropping significantly (see Figure 17). The most notable example of this is in Bangladesh, where the proportion of mobile internet users accessing educational support via mobile on a weekly basis fell from 41% to 16%.

For a full list of activities performed by mobile internet users and how they have changed over time, see Appendix 3.

Figure 17
Frequency of activities by mobile internet users on a mobile phone in countries surveyed, 2019–2022

Percentage of mobile internet users[48]



Base: Mobile internet users aged 18 and above. N = from 285 to 1,008 across the six countries surveyed in 2019, 2020, 2021 and 2022.
Source: GSMA Consumer Survey 2019-2022

48. Note: the average use of different activities across surveyed countries in Figure 16 does not match Figure 17, as Figure 17 is based on data for six countries that were surveyed 2019–2022 (Bangladesh, Guatemala, India, Kenya, Nigeria and Pakistan). Figure 16 covers all 12 countries surveyed in 2022. Additionally, Figure 16 presents data for anyone that had ever used mobile for each activity, whereas Figure 17 shows only data up to monthly use.

Those living in rural areas are more likely than those in urban areas to have reduced their mobile internet use in the last year, particularly women

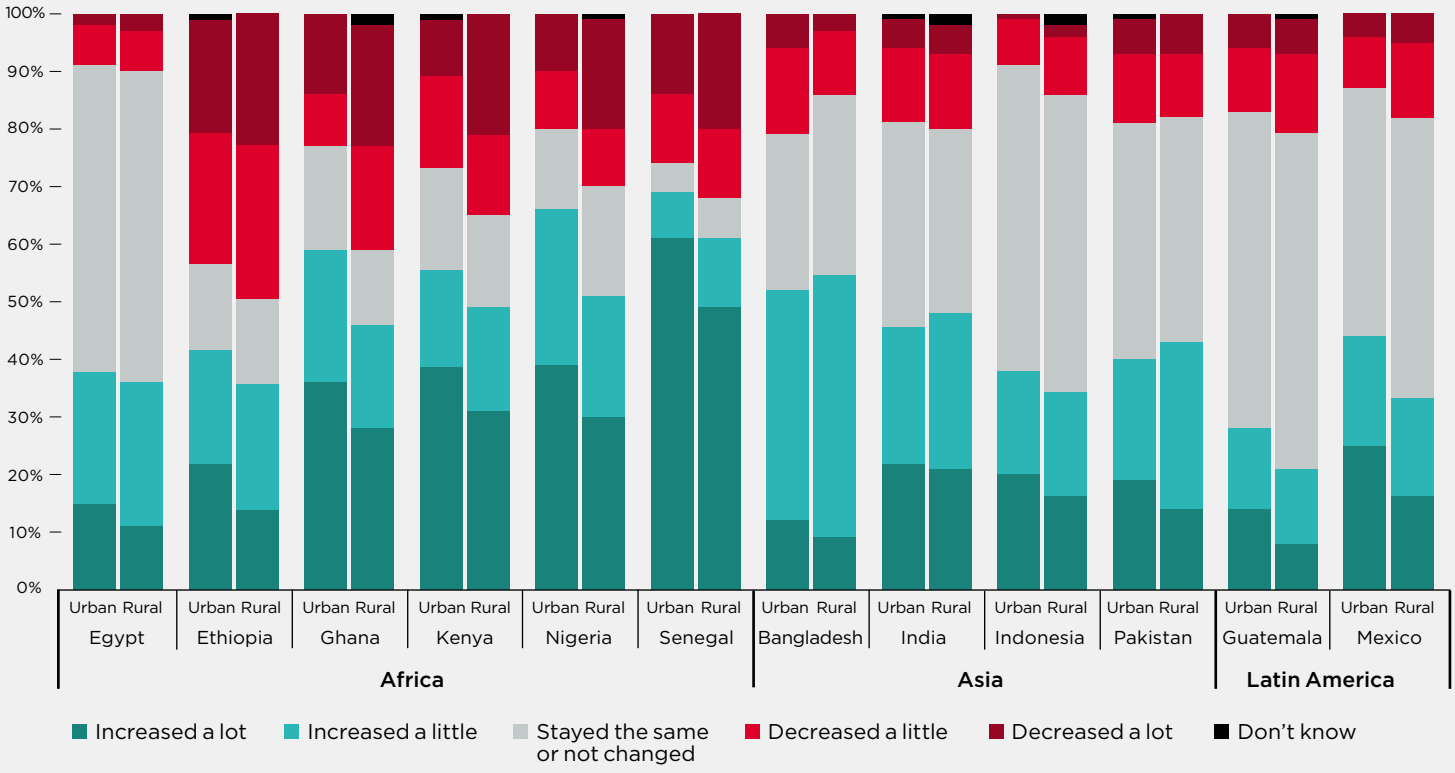
In 2022 the survey asked people who had used mobile internet in the past year whether they thought their usage had increased or decreased over that period. These changes may have been in their data use, frequency of use and/or variety of use cases.

In nine of the 12 countries surveyed, most respondents reported a change in how much they used mobile internet. However, their experiences diverged based on their demographic. For example, women were less likely than men to report increasing their mobile internet use and were more likely to report a decrease. This was especially true for women who live in rural areas, are less well educated and older.[49] More generally, rural mobile internet users were more likely than their urban counterparts report that their internet use had decreased. This is most clearly seen in the Sub-Saharan Africa countries surveyed (see Figure 18). Furthermore, across most Sub-Saharan Africa and Latin American countries surveyed, urban mobile internet users were more likely than rural counterparts to report that their internet use had increased. The differences were less pronounced in the Asian countries surveyed, while in Egypt there was no discernible difference.

The ongoing economic crisis is likely contributing to the reductions in mobile internet use as it becomes less affordable. This crisis will likely continue to affect women and rural populations disproportionately, yet these underserved groups have a lot to gain from equal access – for example, in accessing goods and services remotely and obtaining educational or healthcare information remotely. Targeted efforts are required to ensure they are not left behind.

49. The Mobile Gender Gap Report 2023, GSMA, 2023

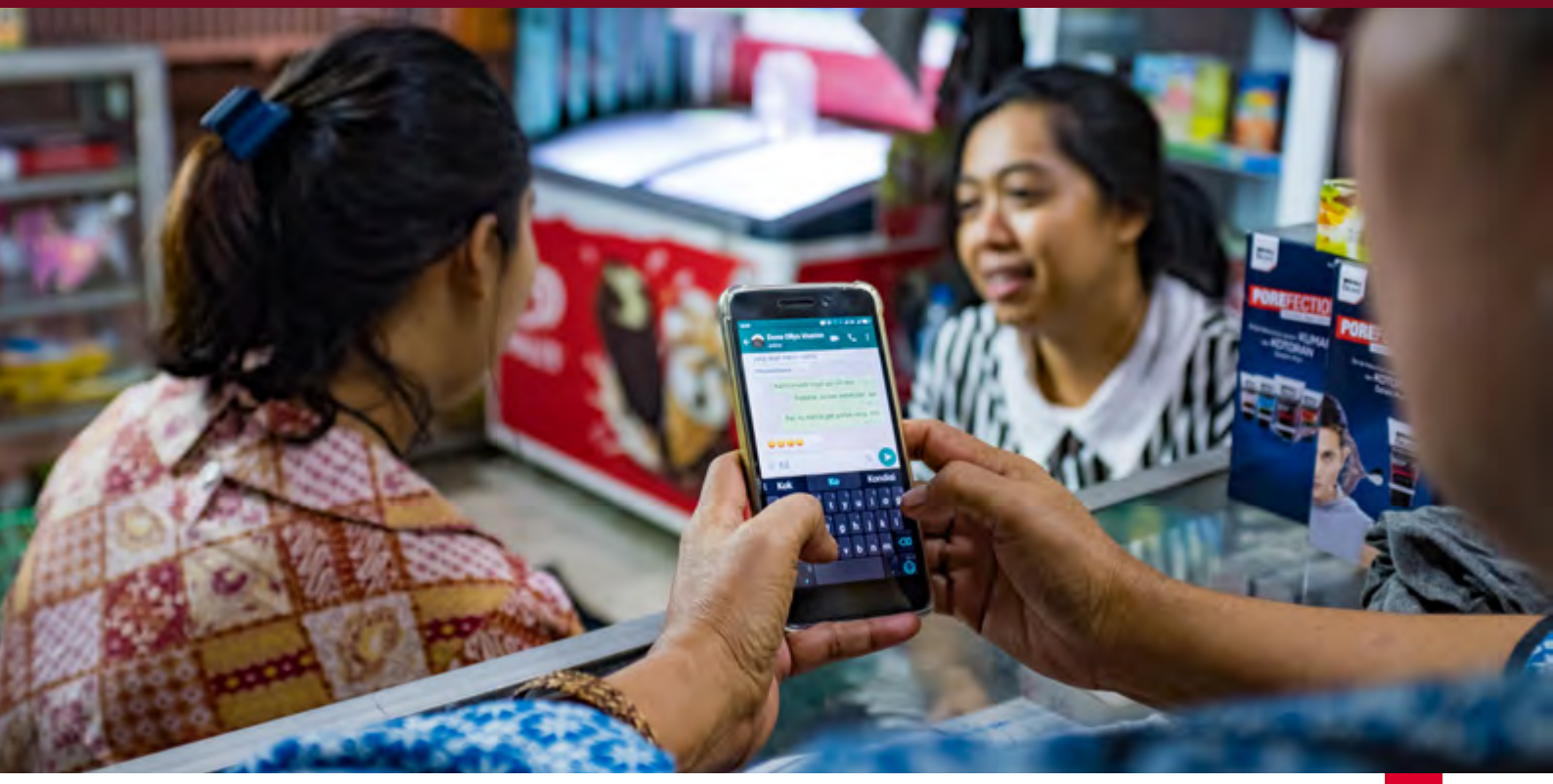
Figure 18
Change in mobile internet use among mobile internet users
Percentage of those who have used mobile internet in the past year



Base: Adults aged 18 and above who have used mobile internet in the past year. N = from 143 to 746 for urban and from 91 to 655 for rural.
Source: GSMA Consumer Survey 2021 and 2022

4. Key barriers to mobile internet adoption and use

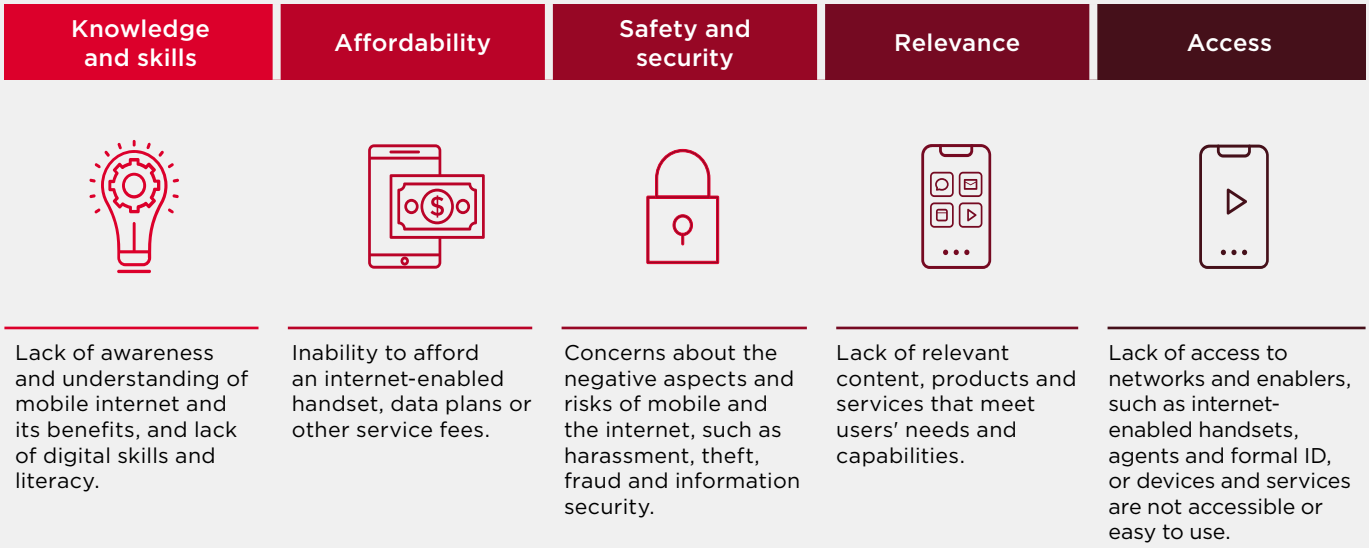
The number of connected people continues to increase each year. However, 42% of adults in LMICs are still not using mobile internet despite being covered by a mobile broadband network. A range of reasons explain why people are not adopting mobile internet. Key factors include not having the necessary knowledge and skills, not being able to afford an internet-enabled phone, concerns about safety and security online, and a lack of relevant content and services.



This chapter explores key barriers that prevent people from adopting and using mobile internet: awareness, affordability, literacy and digital skills, safety and security, and relevance (see Figure 19 and Appendix 1 for methodology).

While barriers related to access – beyond access to networks covered in Chapter 2 – are not examined in detail here, they remain significant challenges for some. Examples of access barriers include family disapproval, which is particularly strongly felt by women in some LMICs, and the internet using too much mobile phone battery. Furthermore, people face structural inequalities that underpin these barriers and translate into disparities in adoption and use. These include differences in income and education, and restrictive social norms. People experience these barriers and combinations of them in unique, complex ways. A comprehensive response is required to address them effectively.

Figure 19
Barriers to mobile internet adoption and use



Mobile users who were already aware of mobile internet but did not use it were asked what barriers were preventing them from adopting it.[50] Overall, barriers related to affordability (particularly of internet-enabled handsets) and literacy & digital skills were most often reported and ranked as top barriers (See Figure 20). The relevance and safety & security barriers were reported less often but still play important roles.

In most African countries surveyed, affordability, primarily of internet-enabled handsets, was the top reported barrier preventing people from adopting mobile internet. In the South Asian countries surveyed, literacy and digital skills emerged as the top barrier,[51] while in the Latin American countries safety and security concerns were a higher reported barrier than in other countries surveyed (see Appendix 3).[52]

In general, the barriers preventing female and male mobile users who are aware of mobile internet from adopting it are quite similar.[53] However, women tend to experience these barriers more acutely than men due to structural inequalities, including disparities in access to education and income. Furthermore, analysis shows that even when women have the same education, income, literacy and employment levels as men, they are still less likely to use

50. Survey 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. Which one of those factors would you say is the single most important reason stopping you from using the internet on a mobile phone?
51. Note: in Indonesia, affordability was ranked top above literacy and digital skills.
52. Note: a limited number of countries were surveyed per region, and barriers can vary significantly by country within regions. Caution is therefore advised in extrapolating these findings broadly across regions.
53. The Mobile Gender Gap Report 2023, GSMA, 2023

mobile internet, suggesting other issues are at play, such as discrimination and social norms.[54] There is a substantial mobile internet gender gap, meaning millions more women than men experience these barriers. Addressing the barriers is therefore likely to disproportionately enable more women to go online.

Similarly, the top barriers for both urban and rural respondents across survey countries were affordability and literacy & digital skills. While safety and security remains the third highest barrier overall for urban respondents across the countries surveyed, relevance is third for rural respondents.

Again, regional nuances appear when analysing by urban and rural respondents. It is also important to note that, in most countries surveyed, the majority of the population lives in rural areas and there is a significant rural-urban gap in mobile internet adoption, meaning millions more people living in rural areas experience these barriers than those living in urban areas.

Top reported barriers also vary by device type, and not all smartphone owners are using mobile internet. In Nigeria, smartphone owners identified difficulties with reading and writing as the top overall barrier. In India, concerns around stolen or misused identity and private information were cited as the top overall barrier for smartphone owners. In Egypt, Kenya and Bangladesh, a perceived lack of relevance was the top overall barrier to mobile internet adoption among smartphone owners.

Figure 20

Top reported barriers to mobile internet adoption in surveyed countries among mobile users who are aware of mobile internet but do not use it

Ranking	All countries
1	Affordability
2	Literacy and digital skills
3	Safety and security

Base: Adults aged 18 and above who have used a mobile phone in the last three months but have not used mobile internet in the last three months on any device, despite being aware of mobile internet (excludes mobile users who are not aware of mobile internet).
Based on the single most important barrier to using mobile internet as identified by mobile users who are aware of mobile internet but have not used it in the last three months prior to the survey. For more details, see Appendix 3.

Source: GSMA Consumer Survey 2022

54. "Does just being a woman reduce the likelihood of using mobile?", GSMA Mobile for Development, August 2020

Lack of awareness of mobile internet remains a critical initial barrier to adoption in some countries

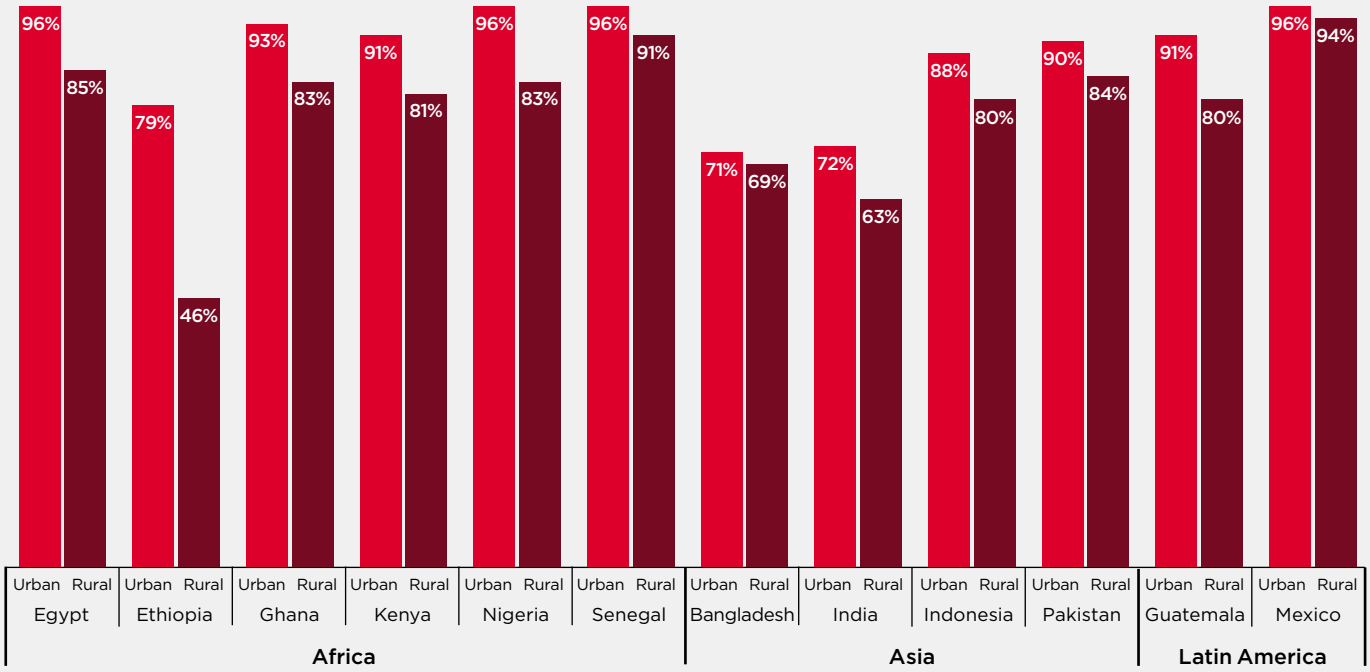
During 2017–2019, LMICs surveyed by the GSMA experienced strong growth in awareness of mobile internet. However, since then, there has been marginal growth. Overall, awareness is relatively high across survey countries. In nine of the 12 countries, more than 80% of the population are aware of mobile internet. However, awareness is not universal and some demographics are less likely to be aware, including women[55] and those living in rural areas (see Figure 21). Awareness remains notably low in Ethiopia, Bangladesh and India. In Ethiopia, as few as 46% of rural respondents were aware of mobile internet.

Considering around 77% of the population in Ethiopia is rural,[56] this represents a significant proportion of the population. It marks a substantial urban-rural gap in the country, as 79% of mobile users in urban areas are aware of mobile internet.

Lack of awareness also poses as a barrier to some existing smartphone owners. For example, in Bangladesh, 23% of smartphone owners were not using mobile internet. Among these, almost half were unaware of mobile internet. In India, 10% of smartphone owners were not using mobile internet. Of those, 38% were not aware of mobile internet. Similarly, in Kenya, 10% were not using mobile internet and of those, 27% were unaware.

Awareness does not always translate into mobile internet use, though. Many people are mobile users and are aware of mobile internet but do not use it, suggesting there are other barriers preventing them from doing so.

Figure 21
Proportion of the adult population aged 18 and above who are aware of mobile internet



Base: Adults aged 18 and above. N = from 329 to 864 for urban and from 232 to 1,482 for rural.
Note: A person is considered aware of mobile internet if they have either used mobile internet before or not used mobile internet but are aware they can access the internet on a mobile phone.
Source: GSMA Consumer Survey 2022

55. The Mobile Gender Gap Report 2023, GSMA, 2023
56. World Bank

Lack of literacy and digital skills is a top barrier to mobile internet adoption

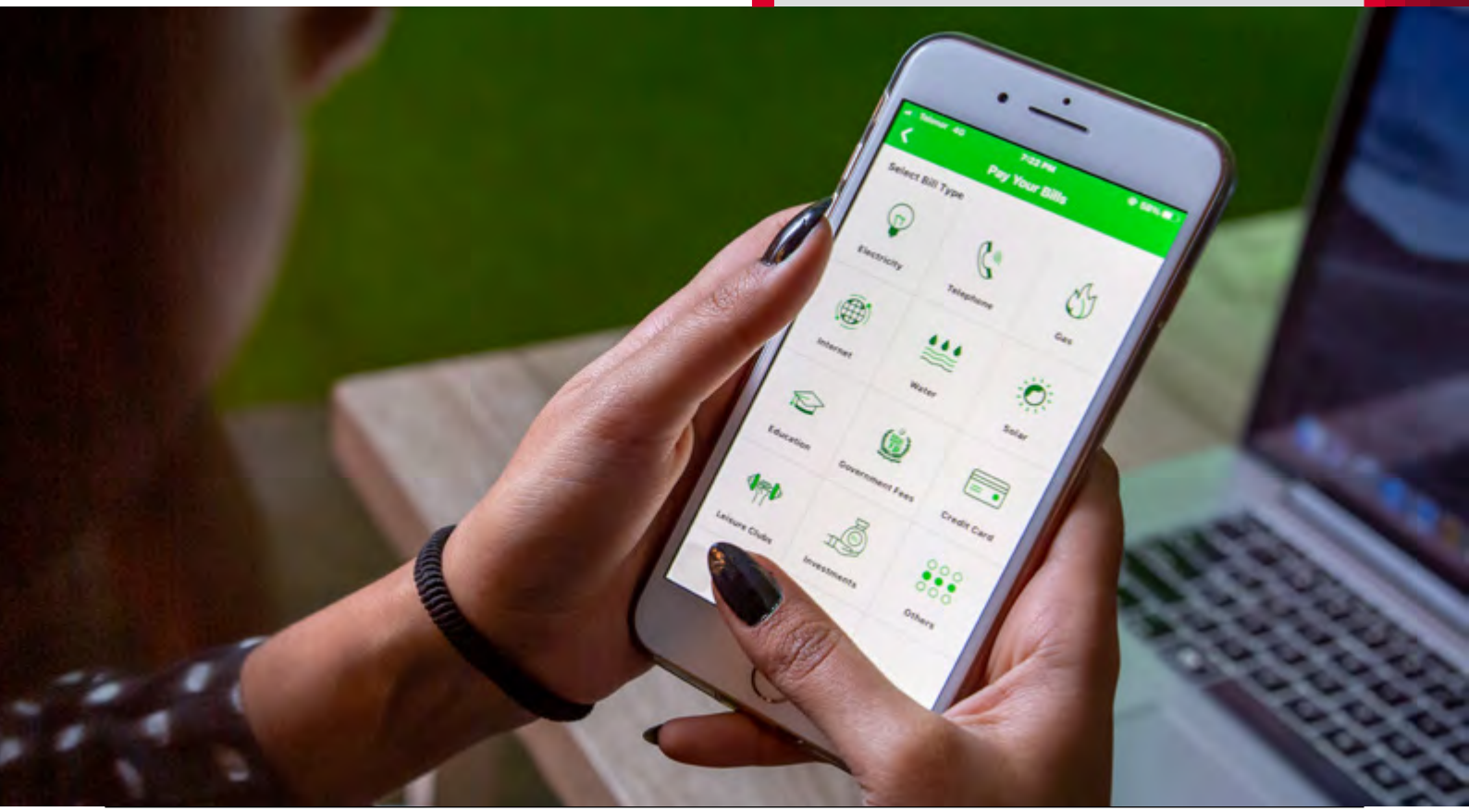
A lack of literacy and digital skills[57] ranked as the second top barrier to mobile internet adoption among mobile users aware of mobile internet but not using it, across the 12 countries surveyed (see Figure 20). However, it ranked top in the South Asian countries. Those who are more likely to report this barrier tend to be poorer, women, living in rural areas and over the age of 35 years old. Structural inequalities disproportionately affect these groups, including access to quality education and schools or opportunities to learn digital skills.

The literacy and digital skills barrier encompasses illiteracy as well as four digital skills related barriers: not knowing how to use a mobile; not knowing how to access the internet on a mobile; not having the time to learn how to use the internet on a mobile; and insufficient support for learning how to use the internet on a mobile.

Illiteracy is reported more often as the top barrier to mobile internet adoption across four of the 12 countries surveyed, see Figure 22 (Egypt, Nigeria, Bangladesh and Pakistan), while the other digital skills barriers are reported more often in India, Indonesia and Mexico. In the remaining five countries, illiteracy and digital skills are roughly equally reported. Challenges related to both basic literacy and digital skills must be addressed in order to reach the underserved.

The GSMA Mobile Internet Skills Training Toolkit

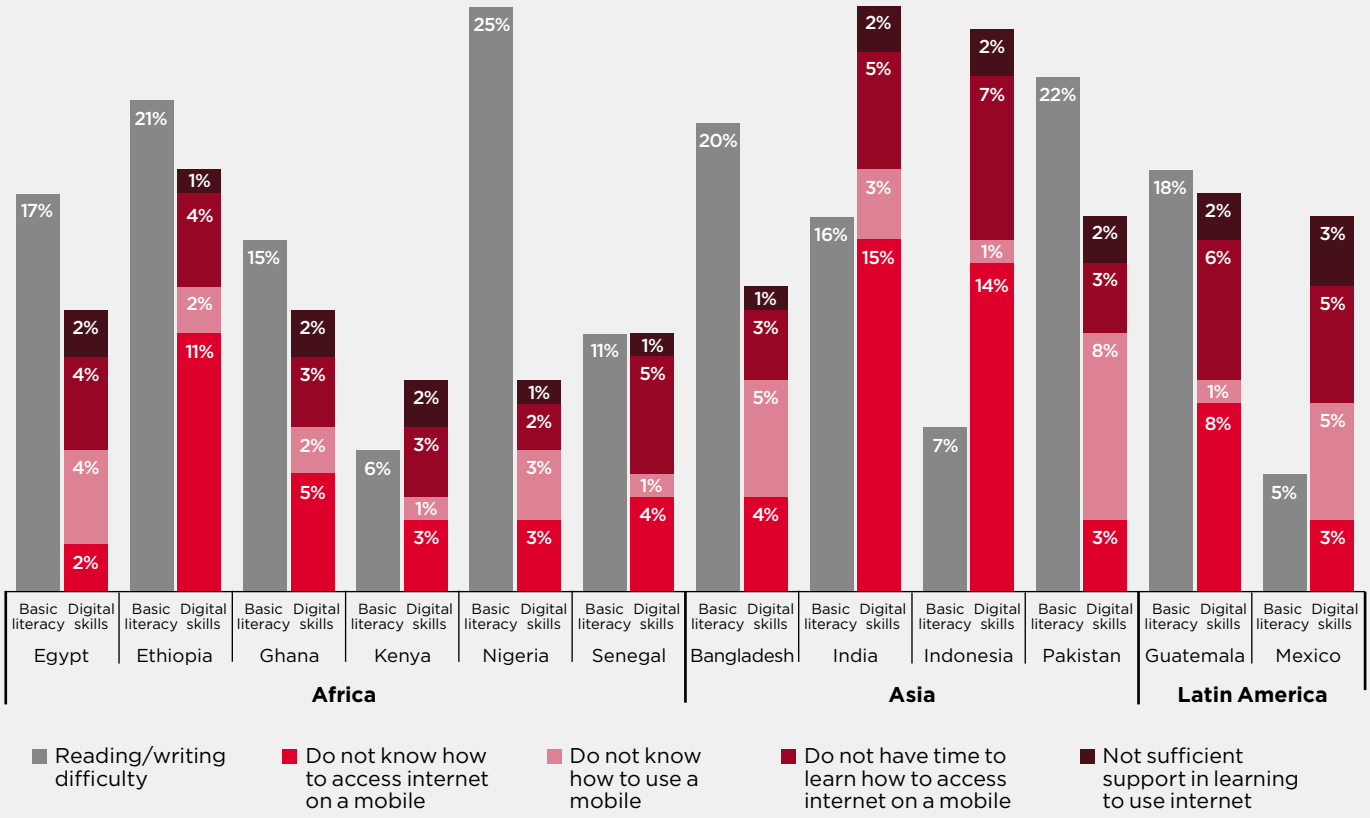
The GSMA Mobile Internet Skills Training Toolkit (MISTT), launched in 2017, is a set of free resources to teach people the basic skills they need to access and use mobile internet. It uses a 'train the trainer' approach and consists of short lessons available in PDF and video formats that can be easily adapted to local needs and languages. It has been used to train more than 65 million people in 27 countries.[58]



57. This barrier is a composite of five sub-barriers that include functional literacy as well as mobile-related digital skills. For further details, see Appendix 1.
58. The GSMA Mobile Internet Skills Training Toolkit (MISTT)

Figure 22

Proportion of mobile users aware of mobile internet but not using it who reported literacy and digital skills as a top barrier, 2022



Base: Adults aged 18 and above 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. N= from 83 to 379.

Note: For further details on the questions asked, see Appendix 1. A person is considered aware of mobile internet if they have either used it before or have not used it but are aware they can access the internet on a mobile phone.

Source: GSMA Consumer Survey 2022.

Affordability of internet-enabled handsets and data plays a critical role in adoption of mobile internet

Affordability of handsets and data is one of the main barriers to mobile internet adoption and use. Affordability of handsets is the single most cited barrier among mobile users aware of mobile internet across the 12 countries surveyed, while device cost is also the primary barrier to mobile ownership more generally.

Defining affordability

Affordability refers to the ability of consumers to both pay for a handset and cover the cost of a suitable data bundle.

The affordability of mobile data and handsets has two parts:

- The cost (in local currency) of purchasing mobile data and an internet-enabled handset
- A consumer's income.[59,60]

Affordability is calculated as the cost of data or a handset divided by monthly GDP per capita. In this context, the lower the cost of a handset and data as a share of monthly GDP per capita, the more affordable a handset and data are. However, cheaper handsets are not the only way to lower the handset cost burden. Making financing more accessible and strengthening the enabling environment, including stimulating demand by increasing awareness and willingness to pay, can also increase affordability.[61]

Cost and affordability of an entry-level internet-enabled handset remain relatively unchanged across LMICs overall, but there are differences by region

This section highlights key trends in the affordability of the cheapest internet-enabled handset found in LMICs, which can be a feature phone, smart feature phone or smartphone.[62]

Across LMICs, the median cost of an entry-level, internet-enabled handset increased from $42 to $46 in 2022, but the median affordability was relatively stable, having improved in 2021 (see Figure 23a). There was significant variation by region, as median affordability got worse in Latin America, South Asia and Sub-Saharan Africa but was stable elsewhere (see Figure 23b). Figure 23c shows the change in device affordability between 2021 and 2022 in LMICs in each region, based on whether there was a significant improvement or worsening in affordability. In this analysis, a significant change is defined as being greater than 10%. Globally across all LMICs, there was no significant change in affordability in 36% of LMICs, while it improved in 37% and got worse in 28%. More than a quarter of countries in Latin America, South Asia and Sub-Saharan Africa saw device affordability significantly worsen.

59. Income is an important factor to consider. If two consumers with different levels of income face the same handset and data costs, the consumer with the lower income will be less likely to purchase and will remain unconnected.
60. Changes in affordability over time can therefore be the result of changes in the costs of handsets and data, an individual's income, or both.
61. For more details see Making internet-enabled phones more affordable in low- and middle-income countries, GSMA, 2022
62. For further details on the methodology for gathering device prices, see the GSMA Mobile Connectivity Index Methodology.

Figure 23a
Median cost and affordability of an internet-enabled handset across LMICs, 2018–2022

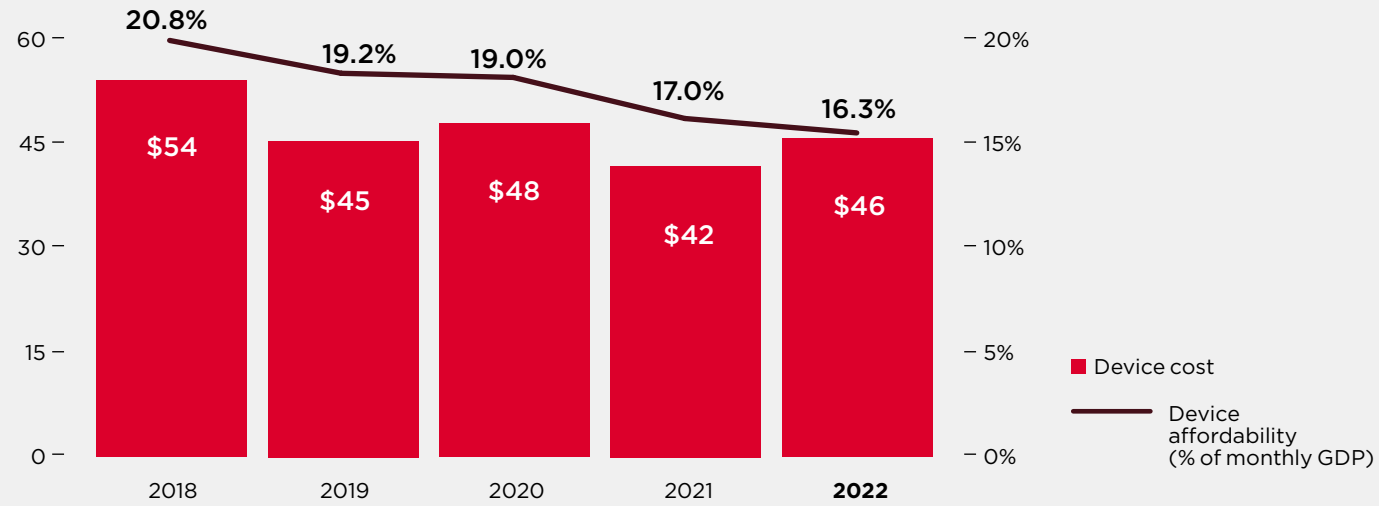


Figure 23b
Median affordability of an internet-enabled handset across LMICs by region, 2018–2022

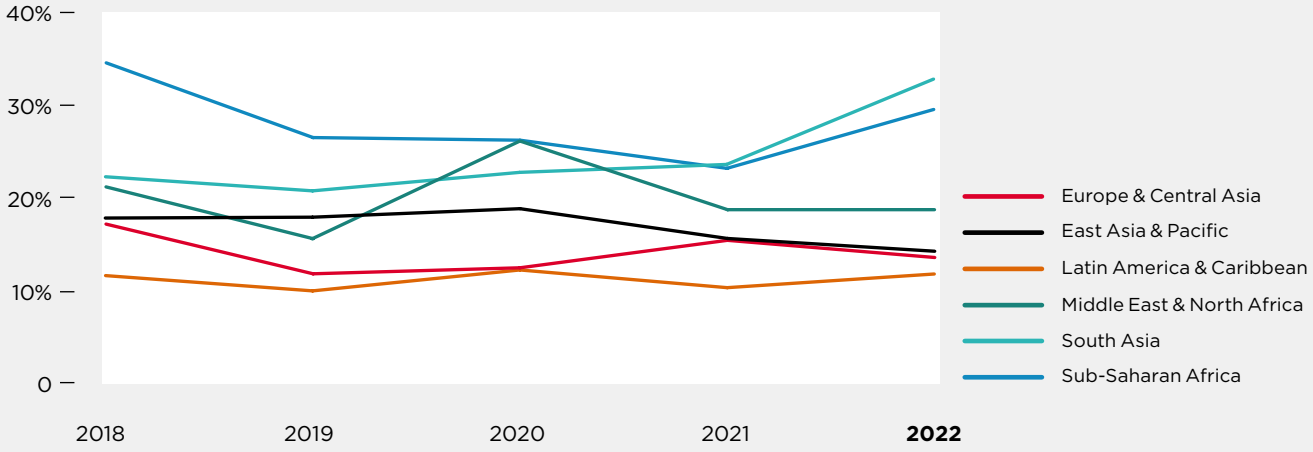
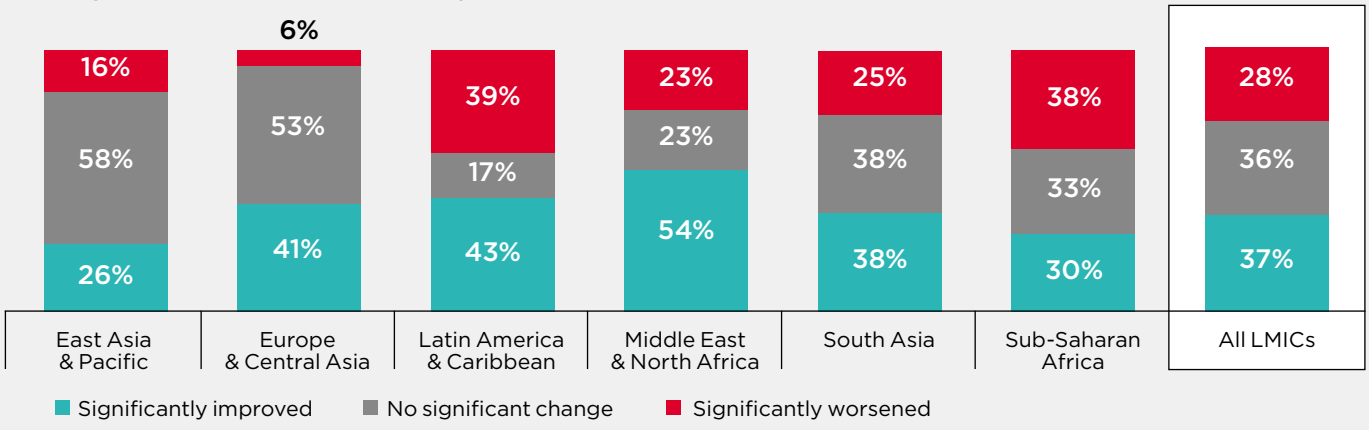


Figure 23c
Change in device affordability between 2021 and 2022



Note: Price of handset is the cheapest internet-enabled feature phone, smart feature phone or smartphone available (at the time of collecting data) sold by mobile operators or mobile phone retailers (it does not reflect prices for second-hand or black markets handsets).
Source: GSMA Intelligence calculations based on pricing data from Tarifica.

The cost-of-living crisis is likely to have impacted ability and willingness to acquire new devices

While the affordability of entry-level devices remained generally unchanged or otherwise improved in most countries in 2022, shipments of smartphone devices declined significantly in 2022, by more than 10%.[63] Market analysis also suggests shipments continued to decline in the first quarter of 2023, including in Africa and South Asia.[64] Many of these devices would have been replacement handsets for existing smartphone users, including higher cost, premium smartphones; some of these have increased in price due to either higher costs or because users are upgrading to more expensive 5G devices. Consequently, although total smartphone sales have declined, there has been growth in the more expensive premium segment.[65]

A key factor in the fall in smartphone sales is likely to be the wider inflationary trend and cost-of-living crisis. Across LMICs, the median inflation rate doubled to 8.5% in 2022. Analysis by the IMF shows that while energy and food costs drove higher inflation in 2021 (to 4.3%) and continued to become more expensive in 2022, other price items also increased that year, driving increased inflation.[66] In some large LMICs, inflation reached much higher levels, such as 19% in Nigeria, 34% in Ethiopia, 49% in Iran and 72% in Türkiye. This can impact device affordability for certain population segments by reducing real wages if incomes do not keep up with inflation[67] or by making consumers reluctant to acquire a new device if they perceive a high risk of continued inflation.

This wider economic outlook could also partly explain the slowdown in mobile internet connectivity growth in 2022, as the unconnected were less able to afford a device and the monthly data cost, even though the latter continued to fall.

63. Source: IDC and Counterpoint Research. See for example "Smartphone Shipments Suffer the Largest-Ever Decline with 18.3% Drop in the Holiday Quarter and a 11.3% Decline in 2022, According to IDC Tracker", IDC, January 2023; and "2022 Global Smartphone Shipments Lowest Since 2013; Apple Regained No. 1 Rank with Highest-Ever Operating Profit Share of 85%", Counterpoint Research, February 2023.
64. Source IDC: See for example "Africa's Smartphone Market Falls to New Low as Inflation Stifles Demand", IDC, June 2023; and "India Smartphone Market Declined by 16% YoY in 1Q23, says IDC", IDC, May 2023.
65. See for example "Global Smartphone Market Declines for Eighth Straight Quarter; Premium Segment Growth a Silver Lining", Counterpoint Research, July 2023.
66. World Economic Outlook Report 2022: Countering the Cost-of-Living Crisis, IMF, 2022
67. Global Wage Report 2022-2023, ILO, 2022. The study shows that, in 2022, for 39 countries with available data, 30 saw real monthly wages fall due to higher inflation. Wage or salaried workers represent 53% of global employment.

Affordability of 1 GB and 5 GB continues to improve across most regions

This section highlights key trends in the affordability of mobile data, based on the cheapest package that allows consumers to use 1 GB and 5 GB of data per month.[68]

In general, the affordability of 1 GB continues to improve (see Figure 24a). While affordability of 1 GB became slightly worse in Sub-Saharan Africa (see Figure 24b), only 12% of countries in the region saw the affordability of 1 GB worsen by more than 10% (see Figure 24c). In most countries, the affordability of data plans either stayed the same or significantly improved. Meanwhile, the affordability of 5 GB has improved even more (see Figure 25a), as operators continue to respond to greater demand for mobile data with cheaper tariffs, enabling consumers to access more data affordably.

The ITU has set an aspirational target of ensuring that an entry-level broadband subscription costs less than 2% of income per capita, as well as 2% of the average income of the bottom 40% of the population.[69] In total, across the 129 LMICs for which 1 GB pricing data was available in 2022, 53 countries (41%) have yet to meet this affordability target of 1 GB at less than 2% of average monthly income. This compares to 56 countries (43%) that did not meet this affordability target for 1 GB in 2021. Sub-Saharan Africa is the only region where more than half the countries have yet to meet the affordability target of 1 GB at less than 2% of average monthly income. When considering the second affordability target to make entry-level broadband less than 2% of average income for the bottom 40% of the population, 85 LMICs (66% of the total) did not meet the target in 2022 (compared to 89 countries, or 69%, in 2021). This highlights the remaining challenge to make mobile broadband affordable for everyone.

Across all LMICs, of the 127 countries for which 5 GB pricing data was available, 75 countries – 59% of the total – have 5 GB affordability of more than 2% of monthly income. This compares favourably to 2018, when it was 69%. South Asia, Middle East & North Africa and Europe & Central Asia are the regions where 5 GB affordability is less than 2% of average monthly income in more than half of countries. However, when considering the average income of the bottom 40%, at the end of 2022 there were 100 LMICs (79% of the total) where 5 GB cost more than 2% of monthly income for the poorest population segments.

68. For further details on the methodology for gathering mobile data prices, see the GSMA Mobile Connectivity Index Methodology.
69. Aspirational targets for 2030, ITU, 2022. While the ITU's target refers to affordability based on GNI per capita, we use GDP per capita to incorporate more up-to-date data on income per capita.

Figure 24a
Median cost and affordability of 1 GB data across LMICs, 2018–2022

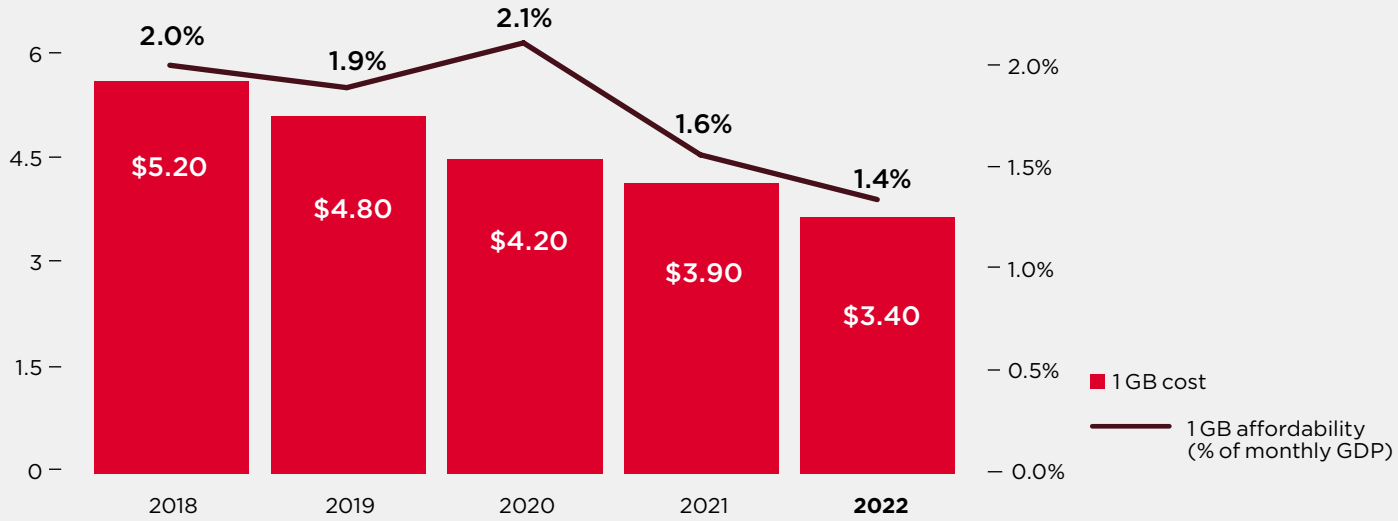


Figure 24b
Median affordability of 1 GB data across LMICs by region, 2018–2022

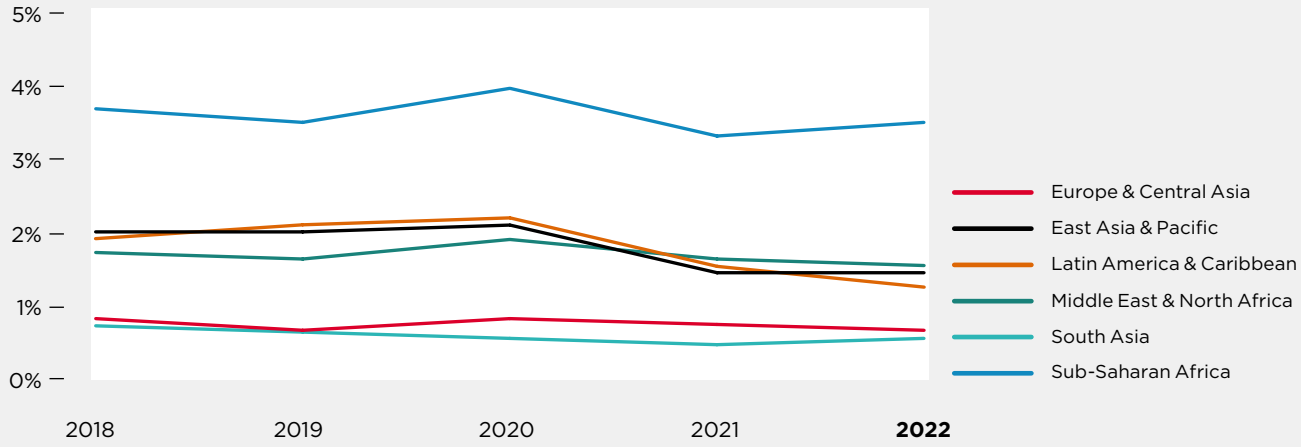
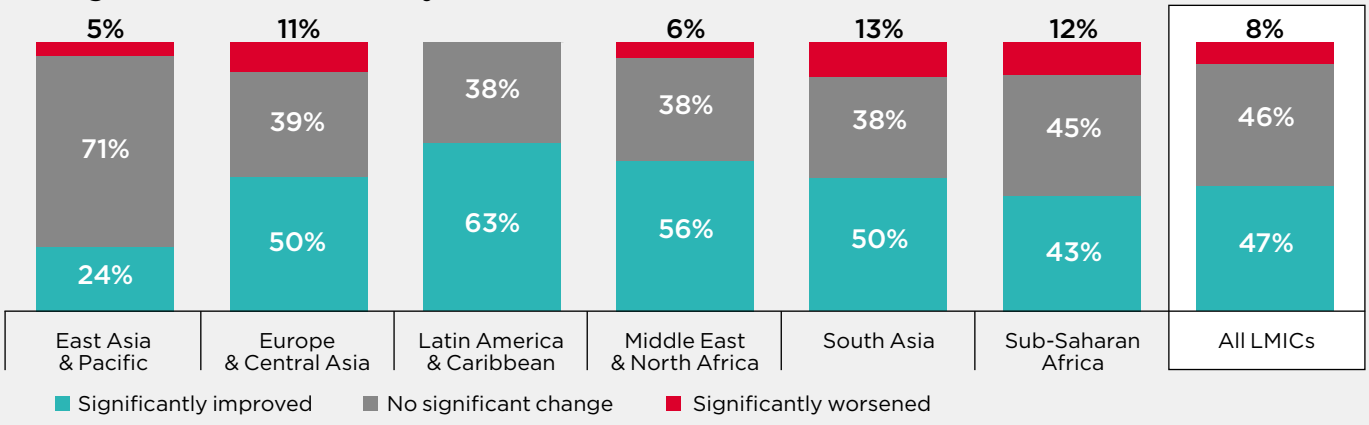


Figure 24c
Change in 1 GB affordability between 2021 and 2022



Note: Price of 1 GB is the price of 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. To determine affordability, we divide the price by monthly GDP per capita (sourced from IMF World Economic Outlook).

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

Figure 25a
Median cost and affordability of 5 GB data across LMICs, 2018–2022

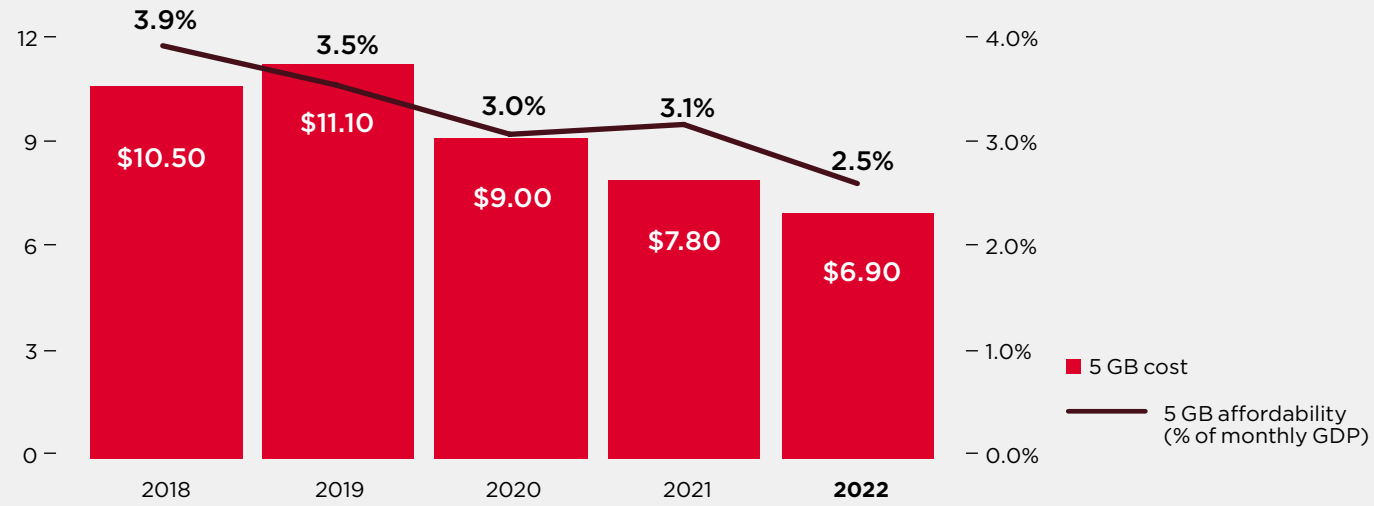


Figure 25b
Median affordability of 5 GB data across LMICs by region, 2018–2022

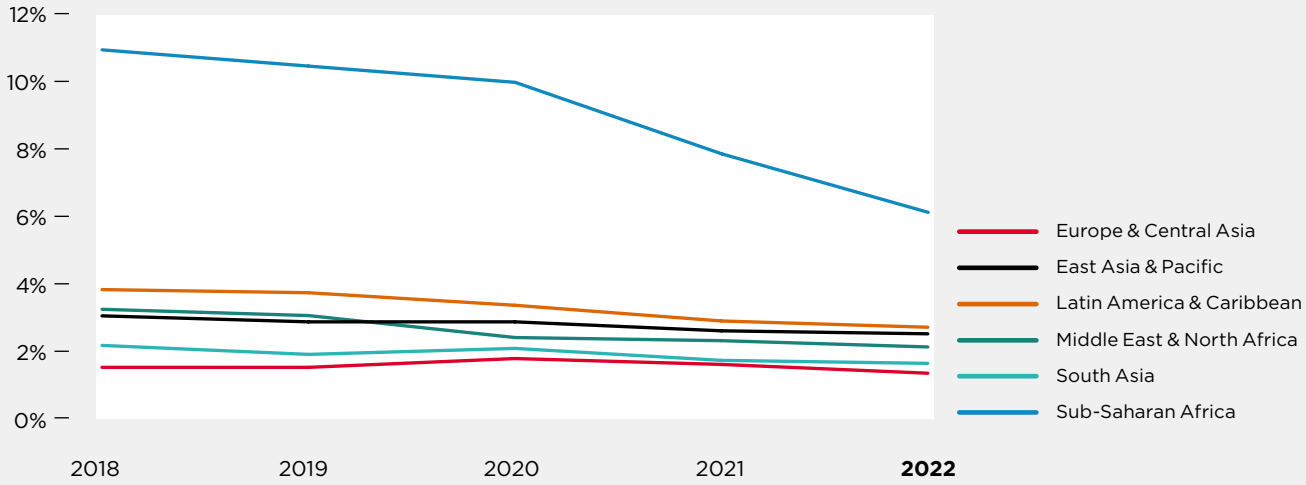
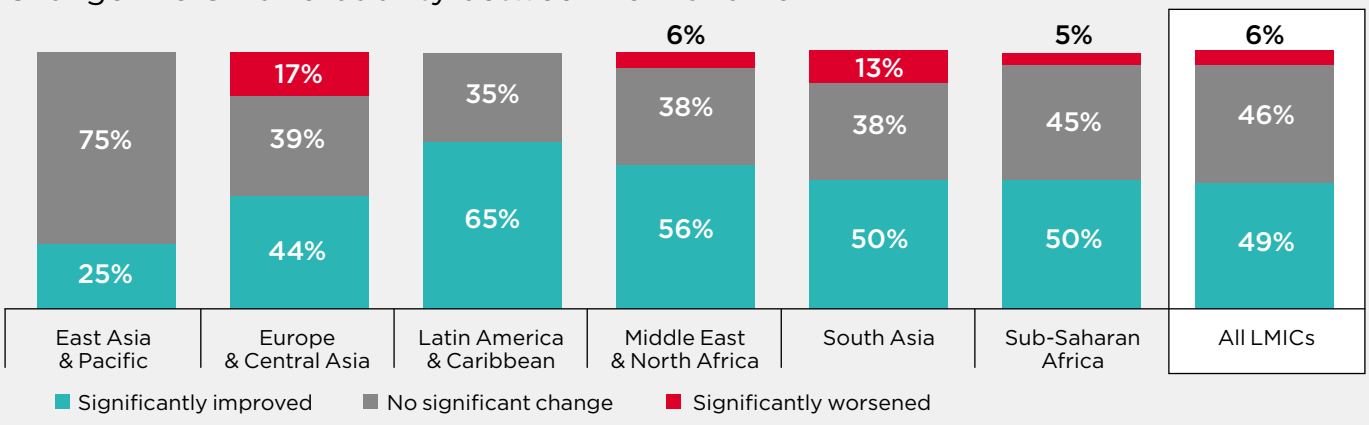


Figure 25c
Change in 5 GB affordability between 2021 and 2022



Note: Price of 5 GB is the price of the cheapest plan available (at the time of collecting data) to purchase at least 5 GB of data per month. Further details on how pricing data is gathered can be found in the Mobile Connectivity Index Methodology. To determine affordability, we divide the price by monthly GDP per capita (sourced from IMF World Economic Outlook).

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

Affordability continues to disproportionately affect underserved populations

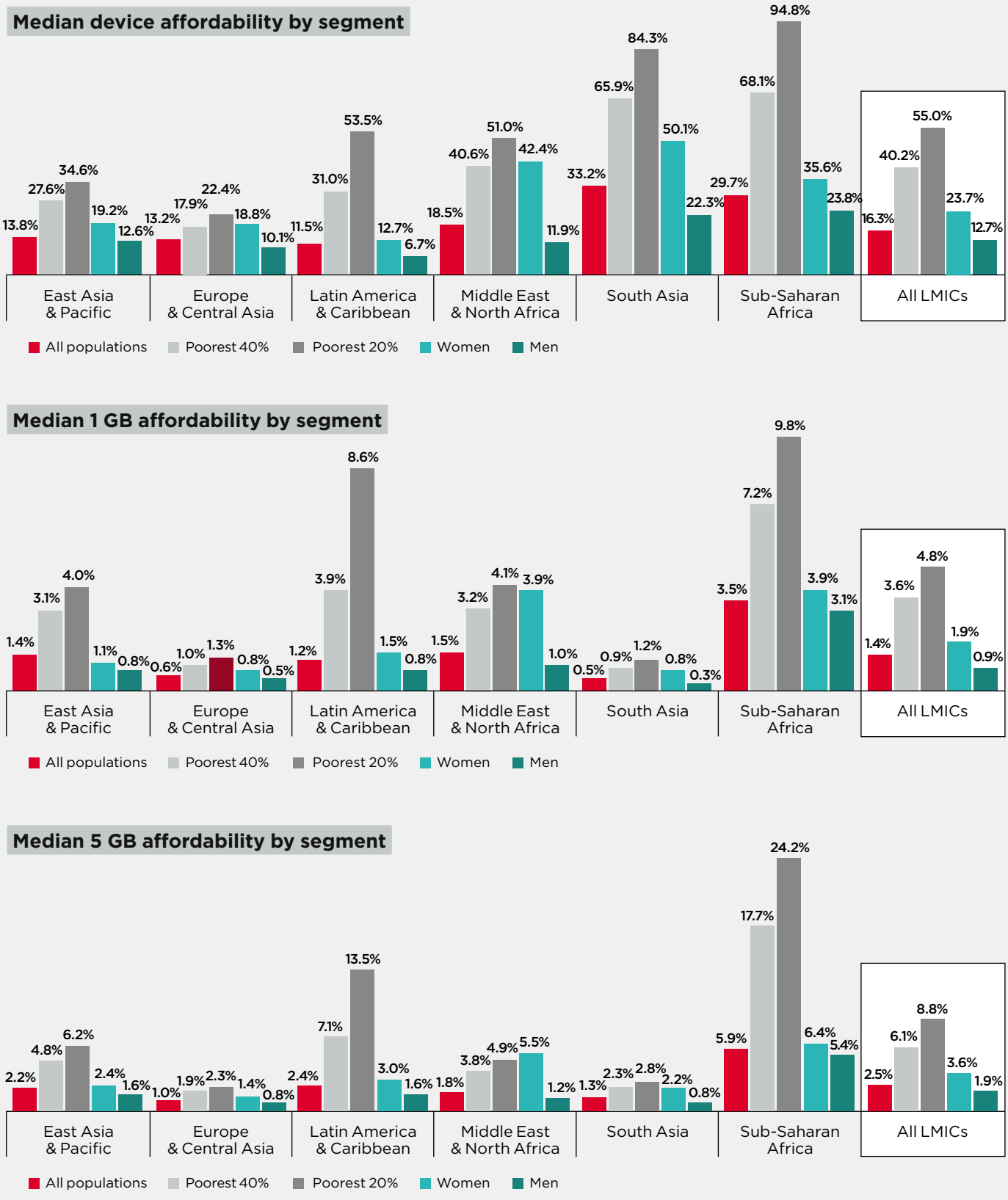
The affordability of devices shows significant variation by segment (see Figure 26). While across LMICs the affordability of an entry-level device is 16% of average monthly income overall, it is equivalent to 40% of average monthly income for the poorest 40%. For the poorest 20%, it would cost 55% of average monthly income. In Sub-Saharan Africa, which accounts for a quarter of the unconnected population, an entry-level device costs 95% of average monthly income for the poorest 20%. Furthermore, in practice, handset affordability is likely to be even more of a barrier for the poorest, as many of the cheaper handsets that are available in a market may not actually be accessible to all consumers – particularly those living in rural areas. In rural areas, the price of a handset tends to be higher than in large cities due to high transport and logistics costs, the commission taken by intermediaries and a limited presence of handset distributors.[70]

While the overall affordability for 1 GB and 5 GB has continued to improve, affordability of mobile data remains a significant barrier to access for underserved populations, particularly the poorest populations and women. In 2022, Europe & Central Asia and Southeast Asia were the only regions where more than half the countries had 1 GB affordability at less than 2% of monthly income for the poorest 40%. In the case of 5 GB, only Europe & Central Asia had a median affordability of less than 2% for the poorest 40%, while no region achieved this for the poorest 20%.

There also remains a significant gap in affordability between men and women for mobile data, especially in the Middle East & North Africa and South Asia, where women face greater affordability barriers due to larger gender gaps in wages and employment. On average, the cost of an entry-level, internet-enabled handset in LMICs is 24% of monthly income for women, compared to 13% for men. Similarly, on average, 1 GB of data in LMICs is 2% of monthly income for women versus 1% for men.

70. Making internet-enabled phones more affordable in low- and middle-income countries, GSMA, 2022

Figure 26
Affordability of 1 GB, 5 GB and entry-level internet-enabled device for poorest 20% and 40%, and men and women, by region in 2022



Note: Data on incomes for the poorest 20% and 40% of the population and men and women is based on information sourced from the World Bank, World Inequality Database, UN and the IMF World Economic Outlook.

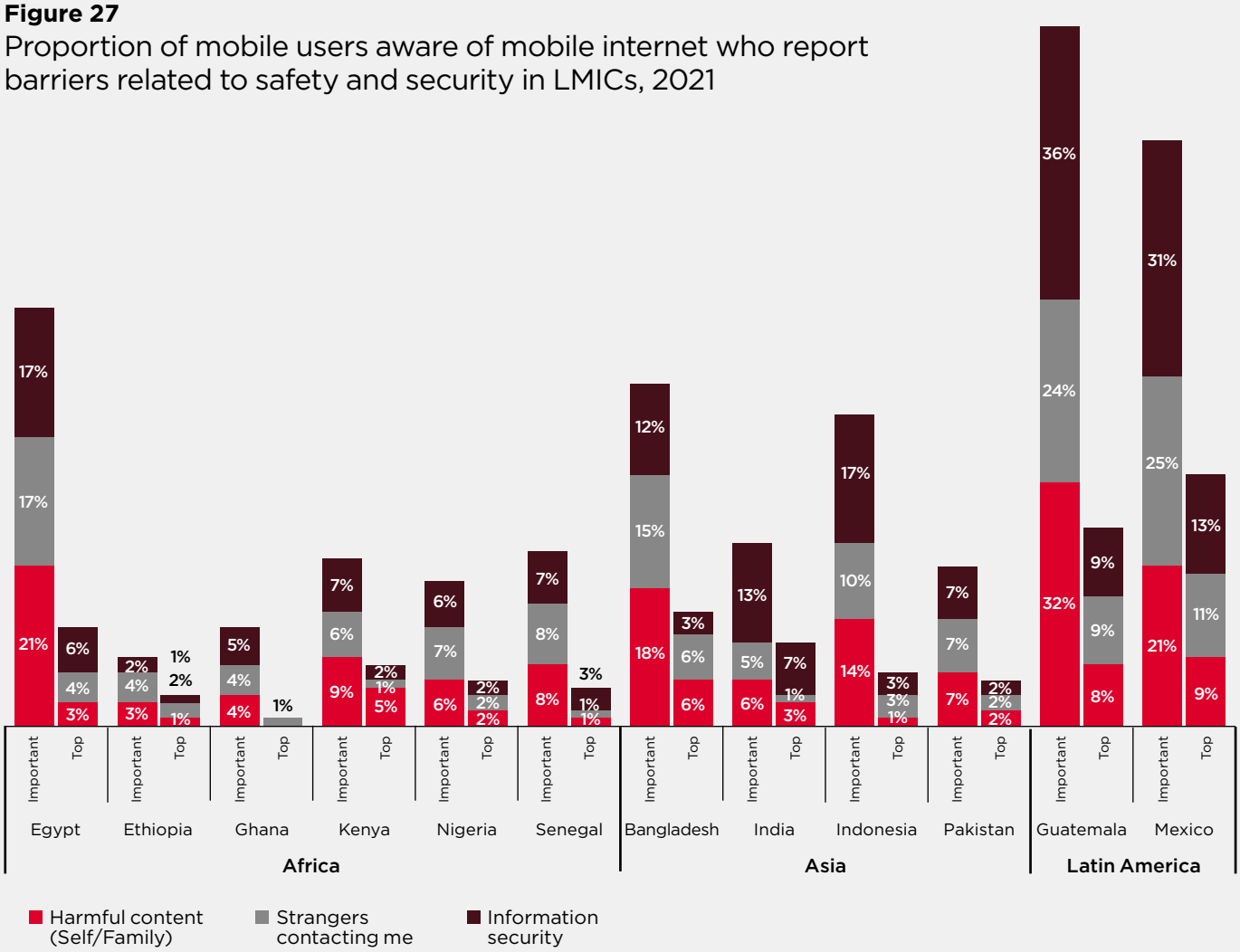
Source: GSMA Intelligence calculations based on pricing data from Tarifica and ITU.

Safety and security remains an important barrier to mobile internet use and is particularly strongly felt in Latin America

While not a commonly reported top barrier, across the countries surveyed, safety and security concerns remain an important barrier for a significant proportion of mobile users aware of mobile internet but not using it. The safety and security barrier encompasses concerns relating to unwanted contact online, concerns relating to being exposed to harmful content online, and concerns relating to identity and other private information being stolen or misused.

Safety and security concerns have consistently been a significant barrier in Latin America and rank as the top barrier for the region. In both Mexico and Guatemala, half of mobile owners aware of mobile internet but not using it reported this as an important barrier,[71] and it is reported as the top barrier by 34% in Mexico and 26% in Guatemala (see Figure 27). Safety and security is also commonly reported as an important barrier in Egypt (37%), Bangladesh (29%) and Indonesia (23%).

Figure 27
Proportion of mobile users aware of mobile internet who report barriers related to safety and security in LMICs, 2021



Base: Adults aged 18 and above 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 it. N = from 87 to 379 for important barrier and from 83 to 379 for top barrier.

Note: While respondents were only allowed to select one top barrier, they were allowed to select multiple important barriers. The proportion of respondents selecting each barrier as important is therefore not mutually exclusive.

Source: GSMA Consumer Survey 2022

71. While respondents were only allowed to select one top barrier, they were allowed to select multiple important barriers. In Figure 27, the proportion of respondents selecting each barrier as important is therefore not mutually exclusive. Hence the percentage of respondents stated in the text will be smaller than if the bars in the chart were summed. The data is presented in this way to illustrate the prominence of each of the three safety and security concerns and to show how – even though in many countries safety and security is not the top barrier overall – these concerns still play a big role in preventing people from adopting mobile internet.

Relevance is a common barrier to mobile internet adoption and plays a role in other key barriers

The availability and awareness of online content and services that are accessible and relevant to the local population is a key enabler of mobile internet adoption and usage. Without it, people will not have a compelling reason to invest time and resources into accessing the internet. Furthermore, relevance plays an important role in other key barriers to adoption. For instance, availability of relevant content and services is also a key factor in perceived value and in driving willingness to pay – a key component of affordability.[72]

Relevance was the third most reported top barrier to mobile internet adoption among those aware but not using it across surveyed countries in both Africa and Asia. This holds true for both urban and rural respondents in these regions. While it is not reported as significantly as affordability or literacy and digital skills as a top barrier, it is commonly reported as a barrier more generally and one that needs to be addressed in step with other barriers, through providing locally relevant content and ensuring that a broad range of languages are covered to make content accessible (see *Spotlight: The impact of digital language support*).[73]

It is also worth noting that being aware of mobile internet does not necessarily translate to being aware of services that are relevant.

72. Making internet-enabled phones more affordable in low- and middle-income countries, GSMA, 2022
73. While we do not have an expansive dataset covering this analysis for smartphone owners in a wider set of countries, the apparent prominence of relevance as a key barrier to mobile internet adoption among smartphone owners not using mobile internet is interesting to note and warrants further research.

Spotlight

The impact of digital language support

The majority of internet users, particularly those who speak English, often take for granted the amount of content and information available to them in their native language. Almost 60% of websites are in English, by far the most popular language for web content, followed by Russian at 5% and Spanish at 4%.[74] Of the 6 million mobile apps active and available on the Apple App Store, Google Play and other app platforms, almost three quarters are available in English. The next most popular mobile app languages are Spanish, Arabic and Portuguese, which are available on less than 40% of active mobile apps. There are only eight languages that can be used on at least 20% of active mobile apps – and the only non-European based languages represented in that list are Standard Arabic and Japanese.[75]

More than 7,000 languages are spoken in the world. Half do not have a digital footprint, meaning there are no keyboards, operating systems or fonts available. Meanwhile, less than 0.5% of the world's living languages are considered as attaining 'full' digital capabilities.[76] This represents a digital language divide and particularly affects countries that are linguistically diverse or where large segments of the population do not speak an 'official' language. To track this language barrier, in the latest update to the GSMA Mobile Connectivity Index,[77] a new indicator was added to measure digital language support (DLS). The data, sourced from Derivation LLC, assesses the aggregated digital capabilities for all languages in each country, based on the availability and accessibility of language-specific hardware and software support.[78]

Figure 28 shows the average DLS score by region in the MCI. It demonstrates the high level of DLS in North America and Europe, which also have the highest mobile internet connectivity levels worldwide. On the other hand, countries in the Middle East and Africa have much lower levels of DLS, followed by Asia Pacific. Due to the widespread use of Spanish, Portuguese or English in Latin America and Caribbean countries, more people in the region can access content in one of their spoken/written languages compared to most countries in Asia and Africa.

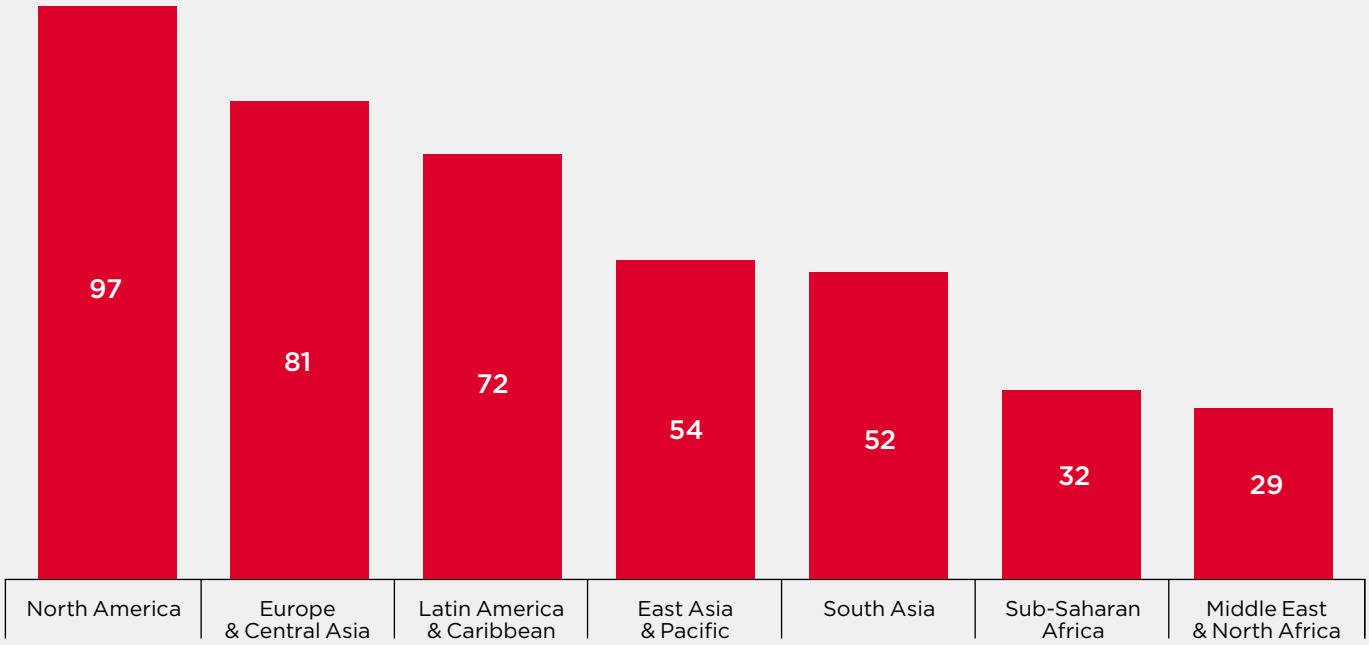
In the Middle East and North Africa, Arabic is typically the most common language. However, while Standard Arabic is a widely used digital language, other varieties of Arabic that are often used in the region are less well supported. Meanwhile, in Sub-Saharan Africa, as well as much of Asia and especially the Pacific Islands, many speakers, readers and signers of non-digital languages have no access to information and communication, meaning they are excluded from digital content.

74. Source: Digital 2023 Global Overview Report, DataReportal, 2023
75. GSMA Intelligence analysis of data sourced from AppFigures.
76. Full digital capabilities are those defined as having a level of 'Thriving' in the DLS methodology. For further details, see Assessing Digital Language Support on a Global Scale, Simons et al, 2022
77. https://www.mobileconnectivityindex.com/
78. For further details, see https://derivation.co/digitallanguagesupport/, https://intelligence.derivation.co/ and Assessing Digital Language Support on a Global Scale, Simons et al, 2022

Spotlight continued

The exclusion of these languages from the digital sphere has wider socioeconomic implications, as speakers of such languages have little or no access to e-government services, online education and health services, and social interaction. Meanwhile, enterprises have narrower market access and lose out on business opportunities. The diversity of languages may also act as a disincentive to developing local mobile apps if local developers cannot realise sufficient economies of scale. Furthermore, given that 40% of languages are currently endangered,[79] there is an increased risk that many will fall out of use if they are not brought online.

Figure 28
Average digital language support score by region in the Mobile Connectivity Index 2022



Source: GSMA Intelligence analysis of data sourced from Derivation

There is a risk that the digital language divide will become further entrenched, especially with the increasing use of AI and development of large-language models such as ChatGPT and Bard, which are trained on publicly available text on the internet that already has a strong English language bias.

Fortunately, new AI-driven technologies also have the potential to close the digital language divide – for example, through the use of natural language processing and machine translation to bring more minority and indigenous languages online.[80] While these technologies remain in their early stages, they could offer an important means to bridge the gap between digitally established languages and those that have been left behind.

79. Source: Ethnologue. A language becomes endangered when its users begin to teach and speak a more dominant language to the children in the community.
80. See for example "How tech can bridge the global digital language divide", Raconteur, July 2022; "Scaling Speech Technology to 1,000+ Languages", Meta, May 2023; and "Unlocking Zero-Resource Machine Translation to Support New Languages in Google Translate", Google Research, May 2022

Conclusion and recommendations

In recent years, mobile operators and governments worldwide have been working on advancing digital inclusion, recognising its transformative potential for societies. While there have been notable achievements and mobile internet adoption continues to grow, this report shows that progress has slowed. Furthermore, with an ongoing cost-of-living crisis, many are now further at risk of remaining unconnected.

Mobile has provided resilience in times of difficulty

Mobile internet connectivity can deliver significant economic benefits, reduce poverty and transform people's lives, providing them with access to information and services that assists them in their daily lives. During the COVID-19 pandemic, mobile was increasingly used to meet educational and healthcare needs, to provide access to government services and to offer remote access to job applications, particularly as many lived through nationwide lockdowns.

Beyond serving as a tool for mitigating some of the impact of crises, at the micro-economic level, studies have shown that expanding mobile broadband coverage reduces poverty and increases household consumption.[81, 82] In addition, mobile internet is associated with higher levels of wellbeing among men and women.[83, 84]

Providing mobile broadband also has a positive impact on the economy. Research by the ITU shows that an increase of 10% in mobile broadband penetration leads to 1.5% GDP growth,[85] with even higher impacts of 2.5–2.8% GDP growth in LDCs.[86]

By not having access to the internet, the unconnected – who are more likely to be poor, living in rural areas and women – are less able to cope with the continuing economic and social disruptions caused by the pandemic, climate change and cost-of-living crisis. This emphasises the importance and urgency of accelerating internet access.

Progress towards digital inclusion is stalling

In 2022, growth in mobile internet adoption slowed, and the coverage gap remained unchanged, indicating that the digital divide was not going to close on its own. More needs to be done to ensure people can access and use mobile internet and that underserved people are not increasingly left behind.

Of the 3.4 billion people who remain unconnected to mobile internet, almost 90% live in an area already covered by mobile broadband but do not use mobile internet services. The majority of these people do not own a mobile phone, highlighting that tackling barriers such as affordability of handsets is critical. However, even where people own a smartphone, many are still not able to use it, drawing attention to the importance of tackling barriers to mobile internet adoption beyond device ownership, such as ensuring people have the required knowledge and skills, addressing safety and security concerns, and ensuring there is locally relevant content including in local languages. It is also important to ensure people are aware of mobile internet and how it can support their needs.

As the industry looks to the future, retirement of 2G and 3G networks will drive greater technological efficiencies. However, driving innovation and new technologies must not come at the cost of those who are at risk of (or have already been) left behind. The industry needs to ensure it is fostering an inclusive future for all.

81. The poverty reduction effects of mobile broadband in Africa: Evidence from Nigeria, World Bank, GSMA, 2020
82. Mobile Broadband Internet, Poverty and Labor Outcomes in Tanzania, Bahia, K. et al., 2021
83. Mobile Internet Use, Well-being and Gender: Understanding the Links, GSMA 2022; The Impact of Mobile and Internet Technology on Women's Wellbeing Around the World, GSMA, 2019
84. The Impact of Mobile on People's Happiness and Well-Being, GSMA, 2018
85. How broadband, digitization and ICT regulation impact the global economy, ITU, 2020
86. Economic impact of broadband in LDCs, LLDCs and SIDS, ITU, 2021

Addressing the digital divide ranks high on the policy agenda

Digital inclusion has emerged as a top policy priority worldwide. In 2022, various stakeholders came together to raise awareness and address the digital divide on the global stage. Notable efforts, such as the UN's Global Digital Compact initiative, the G20 Leaders' Summit, and the ITU's Plenipotentiary Conference and elections brought digital inclusion to the forefront of global policy discussions.

The Global Digital Compact, called for by the UN Secretary General, aims to set forth shared principles for an open, free and secure digital future for all. It has a specific objective on closing the digital divide and is to be agreed at the UN's Summit of the Future in September 2024.[87] The importance of digital inclusion and addressing challenges such as affordability, online safety and quality connectivity was also acknowledged in the G20 Leaders' Declaration, published in November 2022.[88]

Furthermore, the ITU's Plenipotentiary Conference and elections in October 2022 resulted in Member States agreeing on the ITU's strategic plans, which emphasise fostering an enabling policy environment to drive digital inclusion on a global scale.[89] In her acceptance speech, the newly elected ITU Secretary-General Doreen Bogdan-Martin highlighted the importance of a united effort to connect the unconnected.[90]

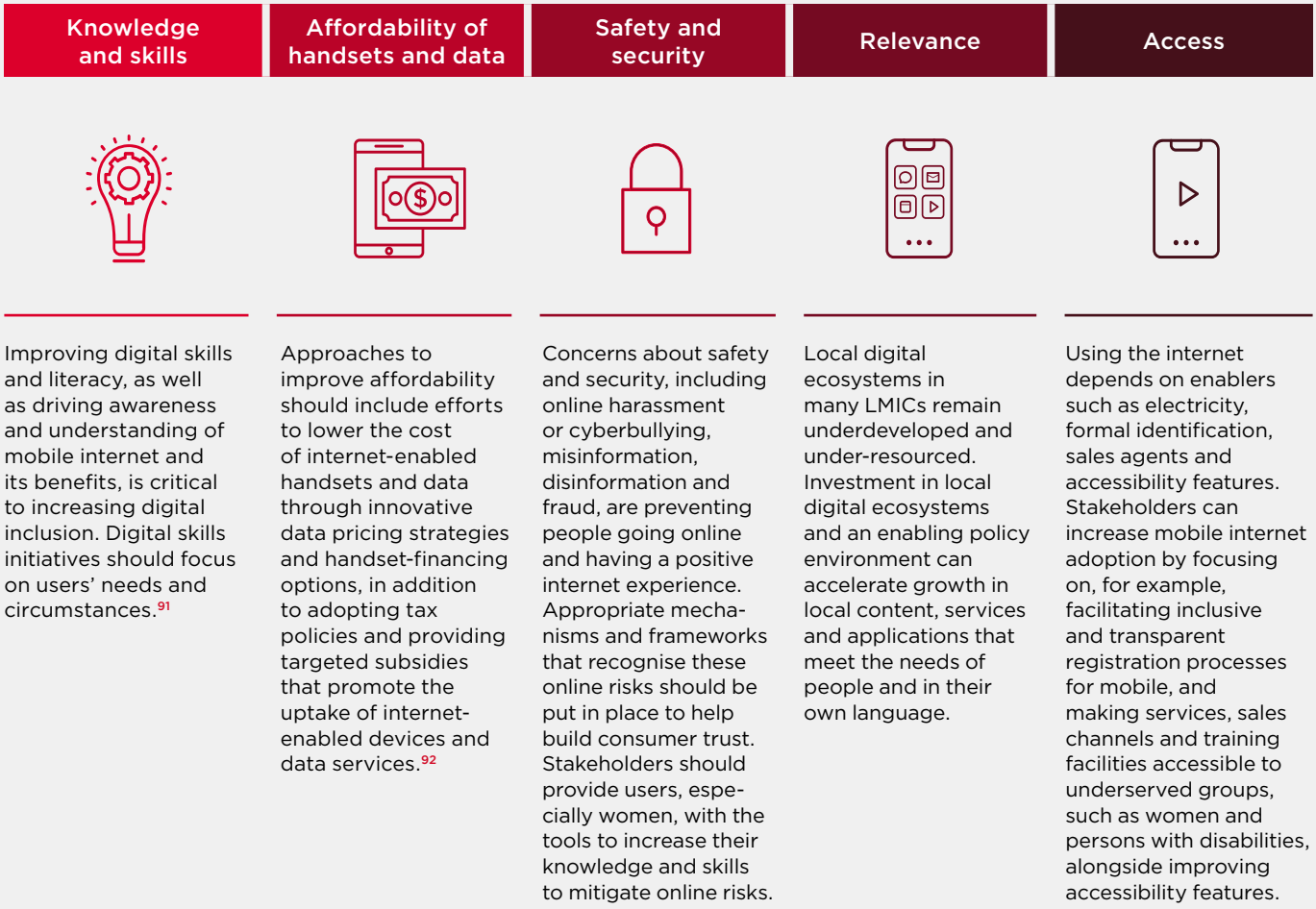
These efforts show that the international community is committed in its pursuit of digital inclusion and addressing the challenges laid out in this report. It is now up to all stakeholders to translate such global priorities into action at the national and sub-national levels, focusing on policies that help ensure meaningful connectivity for all.

The barriers to digital inclusion are complex and interconnected

A united and determined effort is essential to attain meaningful connectivity, enabling users to have a safe, enriching experience that is affordable. Achieving this goal demands focused actions from stakeholders including mobile operators, policymakers, international partners and the broader private sector. Strategies should take into account structural disparities, such as income and education levels, and societal norms that affect adoption and usage. Figure 29 presents the barriers to be addressed.

87. Our Common Agenda Policy Brief 5 A Global Digital Compact — an Open, Free and Secure Digital Future for All, UN, 2023
88. G20 Bali Leaders' Declaration, G20, 2022
89. Final Acts of the Plenipotentiary Conference, ITU, 2022
90. Secretary-General-elect Acceptance Speech, ITU, 2022

Figure 29
Addressing key barriers to digital inclusion



Given the scale of the challenge, a strong collective effort is required to close the digital divide. It will require stakeholders working together to provide coverage for those living in areas without mobile broadband and to address usage barriers for those living within the footprint of a mobile broadband network. These actions must be informed by an understanding of the digital gaps, the needs of individuals not yet using mobile internet, the barriers they face and opportunities to address them. Additionally, this highlights the importance of collecting relevant, timely and accurate data on the digital divide. No single entity or action can close this divide – but with the concerted effort and collaboration of different stakeholders, we can accelerate progress and ensure that no one is left unconnected in an increasingly connected world.

91. See Developing mobile digital skills in low- and middle-income countries, GSMA, 2021, and GSMA Mobile Internet Skills Training Toolkit.
92. Making internet-enabled handsets more affordable in low- and middle-income countries, GSMA, 2022

Appendix 1: **The GSMA Consumer Survey**

This report uses the results of the GSMA Consumer Survey. As part of the survey, the GSMA conducted face-to-face interviews in 12 LMICs in 2022, 10 LMICs in 2021, eight LMICs in 2020, 15 LMICs in 2019, 18 LMICs in 2018 and 24 LMICs in 2017.

The 12 LMICs surveyed in 2022 were Bangladesh, Egypt, Ethiopia, Ghana, Guatemala, India, Indonesia, Kenya, Mexico, Nigeria, Pakistan and Senegal. The countries included in the survey across all years account for 75% of the population in LMICs.

Survey methodology

In all countries, a nationally representative sample of around 1,000 adults aged 18 and above was surveyed – with the exception of India and China,[93] 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 nationally representative sample, quotas were applied in line with census data.[94] 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.
The research used a mix of purposive and random sampling approaches. Interviews were conducted under the direction of Ipsos with individuals in their local language, typically on the doorstep of the home due to COVID-19 safety precautions. Data was collected using computer-assisted personal interviewing (CAPI). 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 mobile internet use

Survey respondents were asked **"Have you ever used the internet on a mobile phone?"** and to select from one of the following answers:

— Yes, I have used the internet on a mobile phone in the last three months
— Yes, I have used the internet on a mobile phone longer than three months ago
— No, I have never used the internet on a mobile phone
— Don't know

In this report, a respondent in the GSMA Consumer Survey is considered a mobile internet user if they have used the internet on a mobile phone in the last three months.

Question on smartphone ownership

Survey respondents were asked **"Do you have a mobile phone that you have the sole or main use of? This may be a handset that you carry with you most days"**.

They were then asked a follow-up question, **"What type of mobile phone is that?"** and to select from one of the following answers:

— A basic mobile phone
— A feature mobile phone
— A smartphone

In this report, a respondent in the GSMA Consumer Survey is considered a smartphone owner if they have a smartphone that they have the sole or main use of.

Question on awareness

Survey respondents were asked **"Which of the following best describes your knowledge of accessing the internet on a mobile phone?"** and to select from one of the following answers:

— I was not aware it is possible to access the internet on a mobile phone
— I was aware it is possible to access the internet on a mobile phone

In this report, a respondent in the GSMA Consumer Survey is aware of mobile internet if they have ever used the internet on a mobile phone, or are aware it is possible to access the internet on a mobile phone.

93. China was included in the 2017 and 2018 Consumer Surveys.
94. Quotas were applied on the following metrics: age category by gender, urban and rural distribution by gender, region/state and socioeconomic class (SEC) to ensure representativeness of lower-income segments (no such quota was applied in Mozambique in the absence of reliable profiling data on SEC).

Question on barriers to mobile internet use

Survey 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. 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

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)

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

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

Access

- 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)
- 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
- It is hard to find somewhere to buy a mobile phone which is able to connect to the internet

Question on mobile internet activities

For mobile internet use cases, this report uses data from the GSMA Consumer Survey on the tools and services used on a mobile phone. The GSMA Consumer Survey framed the following question: **"Thinking now about different tools and services you may use on a mobile phone. How frequently, if at all, do you do each of the following on a mobile phone?"**

Respondents could answer with one of the following:

- At least once a day
- At least once a week
- At least once a month
- Less than once a month
- Never use

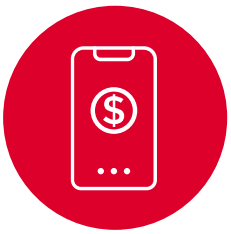
They were asked this question about the following use cases:

- Make or receive phone calls on a mobile phone using an online provider (e.g. Skype, WhatsApp, Facebook Messenger, KakaoTalk, Google Voice, Viber)
- Make or receive video calls where you can see the person you are speaking to (e.g. FaceTime, Skype, WhatsApp, Viber)
- Use instant messaging on a mobile phone (e.g. Facebook Messenger, WhatsApp, KakaoTalk, LINE, Viber, Snapchat)
- Visit social networking websites on a mobile phone (e.g. Facebook, Twitter, Kakao, LinkedIn, Pinterest)
- Play free games on a mobile phone
- Watch free-to-access online video on a mobile phone (e.g. YouTube, Dailymotion)
- Listen to free online music on a mobile phone (e.g. Deezer, Spotify, Pandora)
- Use my mobile money account to send or receive money from friends/relatives/business associates
- Get information about products and services on a mobile phone (e.g. pricing, availability)
- Order and/or purchase goods or services online on a mobile phone
- Use my bank's mobile banking service/app
- Manage or pay my bills on a mobile phone (using mobile money or online banking)
- Access services that help me to improve or monitor my health, on a mobile phone
- Access government services on a mobile phone
- Look or apply for a job on a mobile phone
- Access information to support my education, or that of my children or relatives on a mobile phone
- Read the news on a mobile phone.

Appendix 2: **Methodology for measuring handset and data affordability**

Mobile data cost

Estimating the cost (or price) of mobile internet services is a complex task, given the wide range of available tariffs. This is particularly the case in LMICs, where more than 80% of SIMs in 2022 used prepaid plans. A single operator in a given country will often have a large number of tariffs that consumers can choose from, with different data allowances and validity periods (e.g. daily, weekly or monthly allowances). Tariffs can also vary based on the service available (e.g. 3G, 4G or 5G), customer segments (e.g. discounts for younger or older users) and additional 'value-add' services (e.g. reduced prices for roaming or certain content). Furthermore, such tariffs can change regularly over time. To compare prices on a comparable basis across countries, we use a 'basket' approach: we look at the cheapest way a consumer can access 1 GB and 5 GB of data per month from any national operator in each market.[95]



Handset cost

In each country, consumers have a range of choices when deciding which handset to purchase. For this report, as we are primarily focused on affordability for those who are not connected, we look at the price of the cheapest internet-enabled smartphone or feature phone available in each market.[96] This represents the minimum cost required for a consumer to access a device that allows them to use mobile internet services. However, it may not reflect the phones that the majority of consumers have purchased historically (for example, premium handsets).

Income

With regard to income, we source data from the IMF World Economic Outlook on each country's GDP per capita. This allows us to express affordability as the cost of data/handset relative to monthly GDP per capita and to compare each country with the ITU aspirational affordability target, which aims to make entry-level broadband services less than 2% of monthly income per capita by 2030.[97] One issue with this indicator is that average incomes do not reflect variations in income inequality, which can be significant in many LMICs. This means that while mobile broadband may be less than 2% of average monthly income per capita in a given country, it could be much higher than this threshold for a large segment of the population. We therefore also look at affordability in each country for the poorest 20% and 40% of the population, using income distribution data sourced from the World Bank and the World Inequality Database.

95. This is similar to the approach taken by others (for example, the ITU, OECD and A4AI) to measuring mobile prices. Data on mobile pricing is sourced from Tarifica. For further details on the methodology, see Mobile Connectivity Index Methodology.
96. Data on handset prices is sourced from Tarifica. For further details on the methodology, see Mobile Connectivity Index Methodology.
97. See Aspirational targets for 2030, ITU, 2022. While the ITU'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.

Appendix 3: **Additional figures**

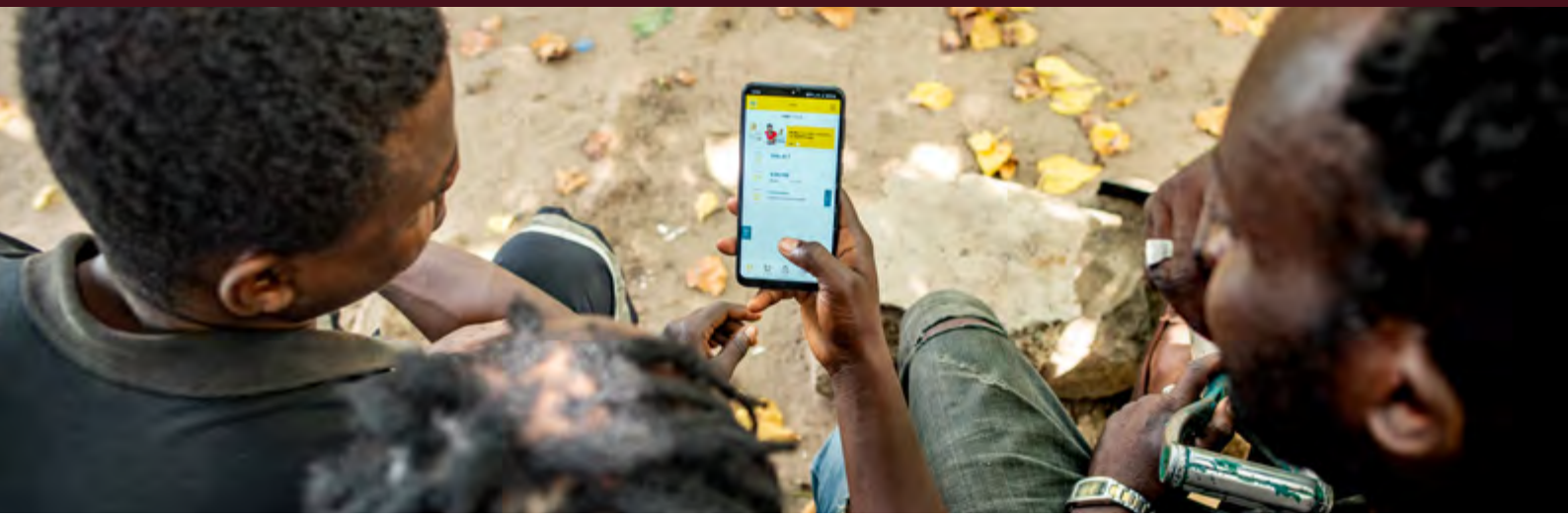


Figure A1 shows a list of countries with a coverage gap of 10% or more. These countries are further categorised by those experiencing a protracted humanitarian crisis, such as acute hunger or active conflict,[98] and those that have a high level of vulnerability to climate change but a low level of readiness, indicating a heightened risk to extreme natural hazards.[99]

In the GSMA Consumer Survey 2022, 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 1). Figure A2 shows the top barrier reported by urban and rural respondents in surveyed markets in 2022.

Respondents who were using mobile internet were asked which activities they were typically doing at least daily, weekly, monthly and less than monthly on a mobile phone. Figure A3 shows the proportion of mobile internet users in the surveyed countries that have done different activities at least once on a mobile phone. Figure A4 shows the proportion of mobile internet users that have used mobile for different activities on a daily, weekly and monthly basis across six countries surveyed from 2019 to 2022.

98. Global Humanitarian Assistance Report 2023, Development Initiatives, 2023
99. ND-GAIN Matrix, Notre Dame Global Adaptation Initiative, 2023

Figure A1
List of countries with a coverage gap of 10% or more, categorised by those experiencing protracted crisis or at risk of climate change

Countries with >10% coverage gap	Protracted crisis	Climate risk
Afghanistan		
Burkina Faso		
Burundi		
Central African Republic		
Chad		
Congo		
Congo; Democratic Republic		
Cuba		
Djibouti		
Equatorial Guinea		
Eritrea		
Gambia		
Haiti		
Liberia		
Libya		
Madagascar		
Malawi		
Marshall Islands		
Mauritania		
Micronesia		
Mozambique		
Namibia		
Nicaragua		
Niger		
Nigeria		
Pakistan		
Papua New Guinea		
Sierra Leone		
Solomon Islands		
Somalia		
South Sudan		Lack of available data
Sudan		
Tanzania		
Tuvalu		Lack of available data
Zambia		
Zimbabwe		

Source: GSMA analysis of Global Humanitarian Assistance Report 2023 and Notre Dame Global Adaptation Initiative.

Figure A2

Top barriers to mobile internet use

Percentage of mobile users who are aware of mobile internet but do not use it, and who identified the following as the single most important barrier to using mobile internet

		AFFORDABILITY				LITERACY AND DIGITAL SKILLS										RELEVANCE				SAFETY AND SECURITY						ACCESS											
		Handset cost		Data cost		Do not know how to access internet on a mobile		Do not know how to use a mobile		Reading/ writing difficulties		Do not have time to learn how to access internet on a mobile		Not sufficient support in learning to use internet		Internet is not relevant for me		Insufficient content in local language		Harmful content (self/ family)		Strangers contacting me		Information security		Internet drains my battery		Network coverage		Family does not approve		Access to agent support		Slow connection/ cannot do what I want		No access to internet enabled phone		Hard to find where to buy internet enabled phone	
		U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R	U	R
AFRICA	Egypt	24%	22%	3%	6%	2%	2%	5%	3%	21%	16%	6%	3%	2%	2%	11%	12%	0%	3%	5%	3%	0%	6%	2%	8%	0%	2%	6%	2%	6%	7%	0%	1%	4%	0%	4%	0%	0%	0%
	Ethiopia	39%	29%	3%	3%	13%	10%	1%	2%	4%	28%	7%	3%	1%	1%	11%	5%	2%	0%	1%	1%	3%	1%	0%	1%	0%	2%	5%	8%	2%	0%	0%	0%	2%	2%	1%	0%	5%	4%
	Ghana	50%	45%	8%	5%	4%	7%	4%	0%	15%	15%	4%	3%	0%	3%	9%	12%	1%	0%	1%	0%	0%	2%	1%	0%	2%	1%	0%	1%	1%	2%	0%	0%	0%	1%	0%	2%	1%	1%
	Kenya	51%	52%	4%	6%	4%	3%	0%	1%	2%	7%	4%	3%	3%	1%	13%	13%	0%	1%	9%	3%	3%	0%	0%	2%	1%	4%	0%	1%	0%	0%	1%	0%	1%	0%	2%	0%	1%	2%
	Nigeria	39%	34%	4%	6%	2%	4%	3%	3%	20%	29%	2%	2%	3%	0%	11%	7%	2%	1%	2%	2%	4%	1%	2%	2%	0%	0%	1%	2%	4%	2%	0%	0%	1%	2%	0%	2%	1%	0%
	Senegal	49%	57%	2%	4%	8%	2%	5%	0%	7%	12%	8%	4%	0%	1%	5%	6%	0%	0%	2%	1%	0%	1%	6%	2%	0%	1%	5%	2%	0%	0%	0%	1%	0%	2%	0%	4%	3%	0%
ASIA	Bangladesh	3%	11%	4%	3%	6%	4%	4%	5%	25%	18%	2%	4%	3%	1%	20%	16%	2%	4%	4%	7%	6%	6%	5%	2%	0%	0%	4%	4%	5%	8%	0%	0%	4%	2%	2%	1%	0%	2%
	India	14%	15%	8%	4%	13%	15%	6%	1%	16%	16%	3%	6%	4%	2%	5%	5%	5%	2%	3%	3%	0%	1%	2%	9%	2%	6%	6%	4%	2%	4%	2%	1%	5%	2%	1%	3%	2%	0%
	Indonesia	26%	24%	14%	16%	12%	16%	0%	2%	0%	13%	12%	2%	2%	2%	12%	12%	2%	0%	2%	1%	6%	1%	4%	2%	0%	0%	2%	4%	2%	0%	2%	1%	2%	2%	0%	3%	0%	0%
	Pakistan	18%	14%	4%	4%	1%	4%	7%	8%	29%	19%	3%	3%	3%	1%	15%	11%	3%	6%	0%	3%	1%	3%	0%	3%	0%	1%	1%	2%	10%	9%	0%	1%	1%	2%	1%	3%	2%	1%
LATIN AMERICA	Guatemala	7%	12%	9%	8%	9%	7%	0%	2%	14%	23%	9%	2%	2%	2%	2%	0%	0%	0%	7%	9%	10%	7%	11%	7%	7%	6%	2%	6%	0%	0%	0%	0%	4%	6%	0%	2%	3%	2%
	Mexico	20%	-	6%	-	3%	-	6%	-	5%	-	4%	-	4%	-	2%	-	0%	-	10%	-	14%	-	16%	-	2%	-	2%	-	2%	-	0%	-	2%	-	2%	-	0%	-

Base: Adults aged 18 and above 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 (excludes mobile users who are not aware of mobile internet). N = from 43 to 127 for urban and from 53 to 254 for rural.
Note: 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?" Cells in grey reflect where sample sizes were below 30 and therefore deemed insufficient for analysis.
Source: GSMA Consumer Survey 2022

U URBAN R RURAL

Least frequently cited barrier in that country — Most frequently cited barrier in that country

Figure A3

Activities done online (ever done on mobile)

Percentage of mobile internet users that report having done the activity at least once on a mobile phone

		USE INSTANT MESSAGING	MAKE OR RECEIVE CALLS ONLINE	MAKE OR RECEIVE VIDEO CALLS	WATCH FREE-TO-ACCESS ONLINE VIDEO	READ THE NEWS	PLAY FREE GAMES	LISTEN TO FREE ONLINE MUSIC	GET INFORMATION ABOUT PRODUCTS AND SERVICES	ACCESS INFORMATION TO SUPPORT MY EDUCATION, OR THAT OF MY CHILDREN AND RELATIVES	MANAGE OR PAY MY BILLS	ORDER AND/ OR PURCHASE GOODS OR SERVICES	ACCESS HEALTH SERVICES	ACCESS GOVERNMENT SERVICES	LOOK OR APPLY FOR A JOB
AFRICA	Egypt	98%	97%	95%	93%	89%	83%	79%	64%	49%	41%	55%	43%	43%	38%
	Ethiopia	71%	68%	71%	60%	68%	66%	41%	36%	43%	15%	18%	24%	20%	18%
	Ghana	93%	91%	89%	76%	78%	66%	58%	66%	57%	40%	41%	33%	29%	26%
	Kenya	93%	76%	71%	81%	64%	60%	61%	70%	55%	76%	36%	29%	33%	42%
	Nigeria	94%	90%	85%	75%	80%	72%	54%	67%	57%	59%	44%	41%	38%	37%
	Senegal	90%	92%	87%	83%	65%	55%	55%	36%	37%	35%	27%	25%	24%	19%
ASIA	Bangladesh	88%	90%	92%	74%	56%	55%	46%	30%	44%	40%	30%	35%	39%	29%
	India	82%	80%	88%	87%	55%	53%	66%	47%	49%	36%	48%	33%	29%	33%
	Indonesia	97%	97%	97%	84%	67%	44%	41%	43%	36%	20%	44%	18%	16%	16%
	Pakistan	77%	81%	91%	74%	46%	66%	45%	38%	30%	26%	21%	29%	20%	19%
LATIN AMERICA	Guatemala	91%	89%	84%	74%	75%	43%	54%	47%	60%	29%	40%	34%	28%	26%
	Mexico	97%	90%	82%	84%	76%	54%	72%	59%	71%	51%	46%	48%	48%	37%

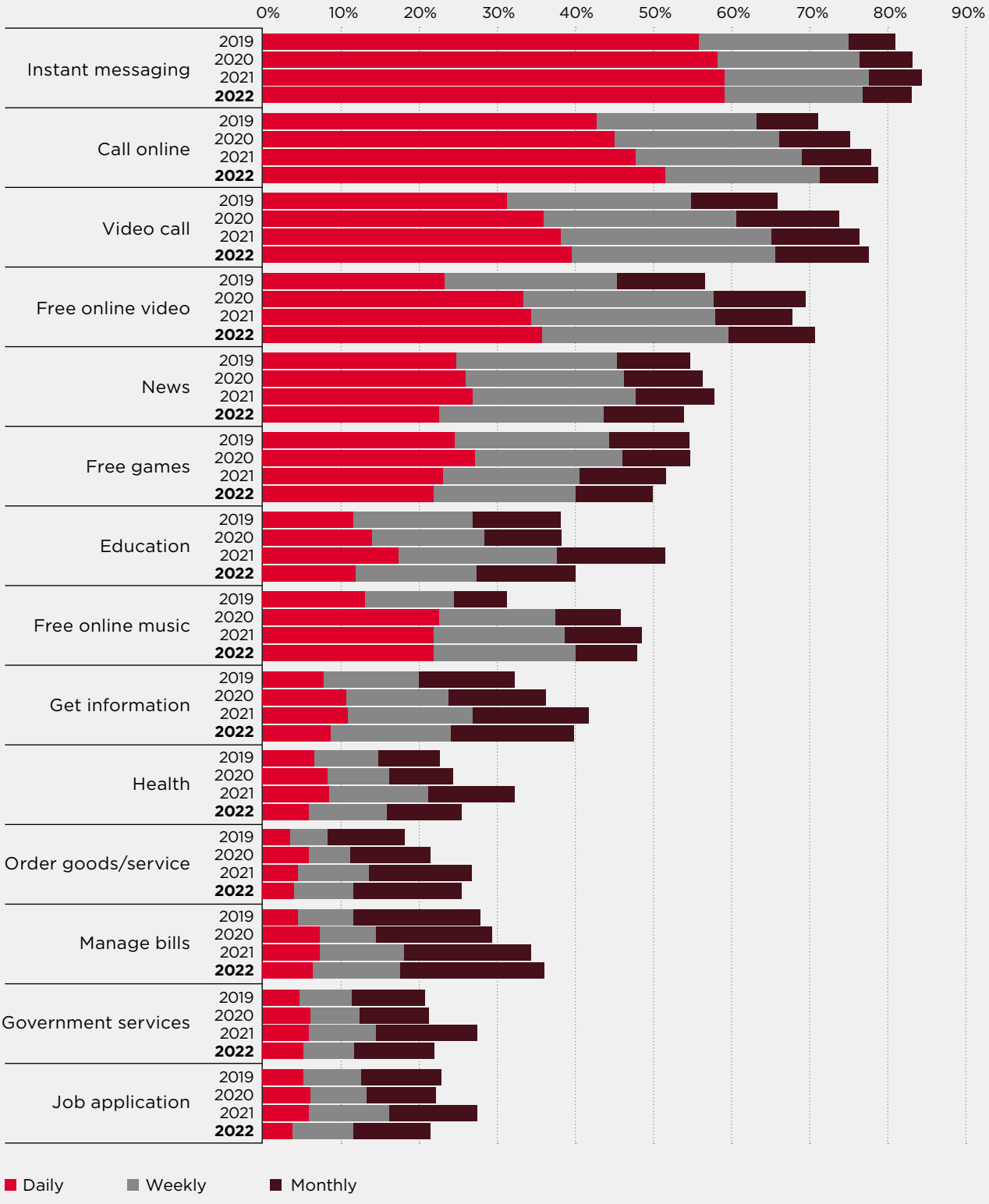
0-10% 11-30% 31-50% 51-70% 71-90% 91-100%

Base: Mobile internet users aged 18 and above. N = from 264 to 1,008
Note: Percentages indicate the proportion of respondents who answered that they have ever performed each activity on a mobile. Respondents may have engaged in some use cases on a phone other than their own.
Source: GSMA Consumer Survey 2022

Figure A4

Frequency of activities that mobile internet users report having done on a mobile phone in countries surveyed, 2019–2022

Percentage of mobile internet users



Base: Mobile internet users aged 18 and above. N = from 285 to 1,008 across the six countries surveyed in 2019, 2020, 2021 and 2022.
Note: Chart uses data for six countries that were surveyed 2019–2022 (Bangladesh, Guatemala, India, Kenya, Nigeria and Pakistan)
Source: GSMA Consumer Survey 2022

Appendix 4: **Glossary**

Connected	'The connected' or 'connected population' refers to people who use mobile internet. 'The unconnected' refers to those who 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 telecoms services (voice, SMS, data). The coverage provided by 2G, 3G or 4G networks[100] 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.
Least developed countries (LDCs)	Countries classified as low-income countries that are facing severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets.
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.

100. For further details on different technologies, see ITU-R FAQ on International Telecommunications (IMT), ITU, 2022.

Smart feature phone	A feature phone that has an operating system that supports a range of applications created by third-party developers and that is 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 and iOS, support a broad range of applications created by third-party developers.
Unique subscribers	The GSMA Intelligence unique subscriber dataset uses insights from the annual GSMA Consumer Survey that looks at the habits of mobile users around the world. Since 2016 we have reviewed and analysed the annual results of the survey from 56 countries (accounting for more than 70% of the world's population), alongside external sources and existing knowledge enabling us to calculate subscriber, mobile internet and smartphone penetration. We then use the GSMA Consumer Survey as a benchmark for different regions around the world, taking into account macroeconomic indicators and growth potential and current mobile use cases.
Usage gap	Populations that live within the footprint of a mobile broadband network but do not use mobile internet.

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