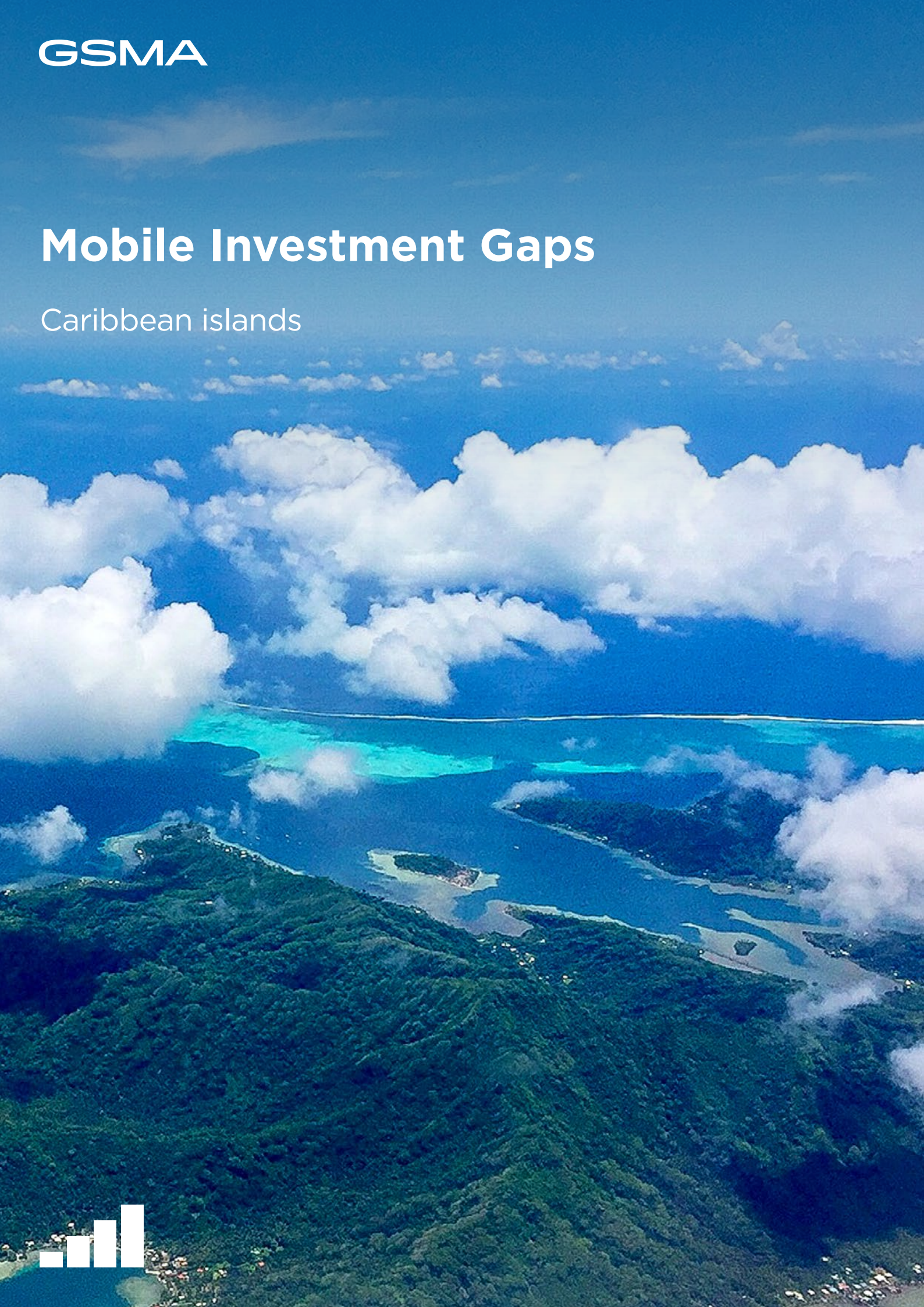
GSMA

Mobile Investment Gaps

Caribbean islands



GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive.

Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

We invite you to find out more at www.gsma.com

Follow the GSMA: @GSMA

GSMA Intelligence

GSMA Intelligence is the definitive source of global mobile operator data, analysis and forecasts, and publisher of authoritative industry reports and research. Our data covers every operator group, network and MVNO in every country worldwide – from Afghanistan to Zimbabwe. It is the most accurate and complete set of industry metrics available, comprising tens of millions of individual data points, updated daily.

GSMA Intelligence is relied on by leading operators, vendors, regulators, financial institutions and third-party industry players, to support strategic decision-making and long-term investment planning. The data is used as an industry reference point and is frequently cited by the media and by the industry itself.

Our team of analysts and experts produce regular thought-leading research reports across a range of industry topics.

www.gsmaintelligence.com

info@gsmaintelligence.com

Authors

Pau Castells, Head of Economic Analysis

Facundo Rattel, Economist

Francisco Amaya, Economist

Published July 2024

GSMA

Contents

Defining the Caribbean islands

For the purposes of this study the Caribbean islands include the following countries or territories:

Aruba; Anguilla; Antigua and Barbuda; Bahamas; Barbados; Bonaire; Sint Eustatius and Saba; Cayman Islands; Curaçao; Dominica; Dominican Republic; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; Montserrat; Puerto Rico; Saint Barthélemy; Saint Kitts and Nevis; Saint Lucia; Saint Martin; Saint Vincent and the Grenadines; Sint Maarten; Trinidad and Tobago; Turks and Caicos Islands; British Virgin Islands; and the US Virgin Islands.

Our assessment does not account for impacts in Cuba, since the market dynamics and solutions considered as part of the analysis are not viable under the country's economic and political system.

Executive summary

The Caribbean islands have experienced significant growth in mobile internet connectivity levels in recent years. Between 2015 and 2023, the number of individuals with access to 3G or superior mobile internet connectivity nearly doubled. These unique mobile internet connections increased from nearly 9 million in 2015 to over 17 million by the end of 2023. However, despite this progress, nearly half of the region's population remains unconnected today.

The mobile internet usage gap, defined as populations living in areas with existing mobile internet coverage but not accessing the internet, represents the biggest challenge. By 2023, more than 15 million people, representing 46% of the total population in the Caribbean islands, were not connected despite living within the footprint of a 3G or 4G network.

At the same time, 5G is in its early stages of deployment in the region, constituting only 1% of all mobile connections at the end of 2023. This connectivity transition poses one of the most significant challenges and opportunities for the region, considering the large socioeconomic benefits from the digital transformation that 5G can enable.

The need for additional network investments is compounded by the strong growth in data traffic. Just between 2022 and 2023, average mobile data traffic per mobile connection per month in the Caribbean islands grew from 2.2 GB to 3.0 GB. This will further increase by a substantial amount in the coming years, reaching more than 15 GB by 2030, representing a CAGR of 26% between 2023 and 2030. This will require network capacity to be multiplied by five times over the period.

The recent growth is mostly due to the traffic produced by a few large traffic generators (LTGs) that currently face limited incentives to optimise the amount of traffic they produce. In 2023, the top-two LTGs in the region (Meta and Google) alone accounted for 50% of all mobile traffic in the Caribbean islands, while the top four (including TikTok and Netflix) generated nearly 70% of all traffic.

While data traffic growth involves significant network costs, it does not generate corresponding additional revenues for mobile operators. This means that incentives to further invest in the network to provide additional capacity are currently limited.

To achieve digital inclusion and transformation targets, it is crucial to understand how 4G[1] and 5G connectivity gaps will evolve in the period to 2030 under prevailing market conditions. For this, we quantify the additional investment required to bridge mobile coverage and usage gaps in the Caribbean islands by 2030.

The analysis shows that while further progress is possible under current market conditions, this will be limited and fall short of the targets that have been set, by some distance. By 2030, there will be a significant investment gap that will remain unaddressed.

1 As 4G is widely expected to be the minimum standard of meaningful connectivity expected to access basic services by 2030, we focus on the deployment and adoption of this technology to estimate the financing needs required to bridge the gaps for mobile broadband access.

There will be a significant investment gap in the Caribbean islands by 2030 under current market conditions:

4G coverage: The market alone will deliver an additional 7 pp of additional 4G coverage, reaching 95% of the total population by 2030. Based on our quantitative assessment, under current market and regulatory conditions, reaching 99% 4G population coverage requires additional funding of $480 per additional person covered (or a total of $600 million). Providing universal coverage (100% of population covered) requires $8,800 per additional person covered (an incremental cost of $3 billion). Given the high costs in the latter case, alternative technological solutions will likely be required.

4G adoption: Under current market conditions, we expect 4G adoption to increase by almost 20 pp, reaching 47% by 2030. However, more than half of the population in the Caribbean islands will remain unconnected to 4G. The results of the quantitative analysis show that reaching 4G universal connectivity objectives by 2030 (defined as 90% adoption) would require additional funding for 15 million new 4G users of $160 per new person connected, a total of $2.4 billion.

5G coverage and adoption: There is a risk of a significant delay in 5G deployment across many markets in the region. 5G population coverage is barely expected to exceed 50% by 2030, when the projected adoption of 5G will be around 15%. Our quantitative assessment indicates that, conservatively, the capital investment needed to reach the levels of 5G that would help enable the digital transformation of the region is $1 billion. Under current conditions, we estimate that the market alone will only be able to deliver slightly more than a half of this investment requirement, generating a 5G investment gap of approximately $450 million.

One possible approach to deliver on digital agenda targets is through direct funding of these investment gaps by the public sector. However, any direct investment by the public sector eventually needs to be supported either through tax hikes or by increasing long-term indebtedness levels, both of which have broader distortive effects for economies. Furthermore, public funds invested in digital infrastructure or used to subsidise digital adoption have large opportunity costs in the Caribbean islands, where the digital agenda competes with alternative public policy priorities such as health or education.

This is why alternatives that can boost adoption and investments by changing and enhancing market conditions should be considered as a top priority.

We analyse the potential effects of three broad areas of market reform that can help unlock investments and improve affordability by correcting existing market and government failures:

1 **Efficient network use:** First, we consider the effects of a more efficient use of the network. When LTGs have no strong incentives to optimise traffic this can give rise to market failure in the form of 'the tragedy of the commons', where agents without incentives to be efficient can exhaust all of a common resource (in this case, the network capacity), to the detriment of everyone else, including consumers.

2 **Modernisation of the fiscal framework of the mobile sector:** Second, we consider the elimination of outdated sectoral fees and taxes that discourage and discriminate against the production and consumption of digital services. These legacy taxes are still a prevalent reality in many markets in the Caribbean, treating the production and consumption of digital services at higher tax rates than other goods and services. These distort market conditions and negatively affect the affordability and adoption of connectivity services, particularly among low-income populations. Fiscal reforms here can be an effective means to promote greater adoption and investments and can also result in modest or even positive net fiscal impacts for the public sector in the medium term.[2]

3 **VAT exemption for low-income groups:** Finally, we also consider an additional targeted exemption of fiscal burdens for low-income populations in the Caribbean islands. This involves the elimination of VAT on internet plans and devices, operating as a demand-boosting measure with significant potential to improve the affordability of handsets and services. We expect these to have little to no fiscal impact on public-sector revenue generation, as the measure does not involve the reduction of VAT tax revenues from existing users.

The conclusion is clear. Under current market conditions, there will be a significant investment gap by 2030 that will remain unaddressed in the Caribbean islands. Market reforms are an efficient and necessary first step to reduce this gap and make significant progress towards digital inclusion and transformation targets. The analysis shows that some of these measures can enable the expansion of both supply and demand and should therefore be considered as a top priority for governments that prioritise the digital agenda as a tool for social and economic transformation, to the benefit of Caribbean consumers.

The results of the quantitative exercise show that these measures have a large potential and could boost demand and increase expected coverage significantly:

4G adoption could increase by 18 pp by 2030, reducing the usage gap that needs to be funded by $1 billion.

4G coverage could increase by almost 3 pp by 2030, reducing the coverage gap that needs to be funded by $400 million.

5G investment gap would reduce by a third, equivalent to $120 million.

2 As recent empirical research demonstrates, the extent of digitalisation has been shown to deliver positive effects on non-resource tax revenue mobilisation in developing countries. The GSMA has also undertaken studies to understand the impact of making changes to specific tax rules and rates, with the majority of the scenarios showing an increase in tax revenues over a five-year period compared to the base case. For example, see Taxing mobile connectivity in Latin America, GSMA, 2017

01
Key challenges for digital inclusion and transformation in the Caribbean islands

The usage gap is the main challenge to universal mobile internet access in the region

Increasing access to the internet is a particularly important challenge to overcome, given the large social and economic benefits that the digital revolution can bring about. Universal access to broadband internet connectivity is therefore a top priority for governments in the region as a means to facilitate access to basic needs such as jobs, education, healthcare or financial services.[3]

In addition, the digital transformation of the business sector is widely expected to bring a new wave of productivity and economic growth. This growth will arise from the adoption of technologies such as 5G, which can enable the automation and transformation of businesses, with use cases and applications such as IoT, big data, augmented reality (AR), virtual reality (VR), the metaverse and AI.

The Caribbean islands have experienced significant growth in mobile internet connectivity levels[4] in recent years. From 2015 to 2023, the number of unique mobile internet connections, defined as access to 3G or superior mobile internet connectivity, nearly doubled, increasing from nearly 9 million in 2015 to over 17 million by the end of 2023. However, despite this progress, a significant proportion of the population (49%) remains unconnected.

This connectivity gap consists of a coverage gap and a usage gap. The former refers to populations living in areas where no mobile internet services (3G or higher) are available. There has been notable progress in the Caribbean islands in recent years, as the coverage gap has reduced from 16% in 2015 to less than 3% in 2023. However, mobile internet adoption has not kept pace with coverage expansion. By 2023, more than 15 million people in the region were not connected despite living within the footprint of a 3G or 4G network, representing a usage gap of 46%.

There is a significant disparity in mobile internet connectivity levels among the islands in the region. To illustrate this, Figure 2 presents the state of mobile internet connectivity from a sample of markets with the highest populations. For instance, the Dominican Republic, Puerto Rico and Jamaica demonstrate a higher number of unique mobile internet connections than the regional average, mainly due to their lower usage gaps.

3 On this topic, the ITU has defined the concept of "meaningful connectivity" as a "level of connectivity that allows users to have a safe, satisfying, enriching and productive online experience at an affordable cost". See https://www.itu.int/itu-d/sites/projectumc/home/the-umc-project/

4 For the purposes of this study, mobile internet connectivity is defined as any activity that consumes mobile data (i.e. excluding SMS, MMS and cellular voice calls).

Figure 1

State of mobile internet connectivity in the Caribbean islands

Percentage of population

Source: GSMA Intelligence

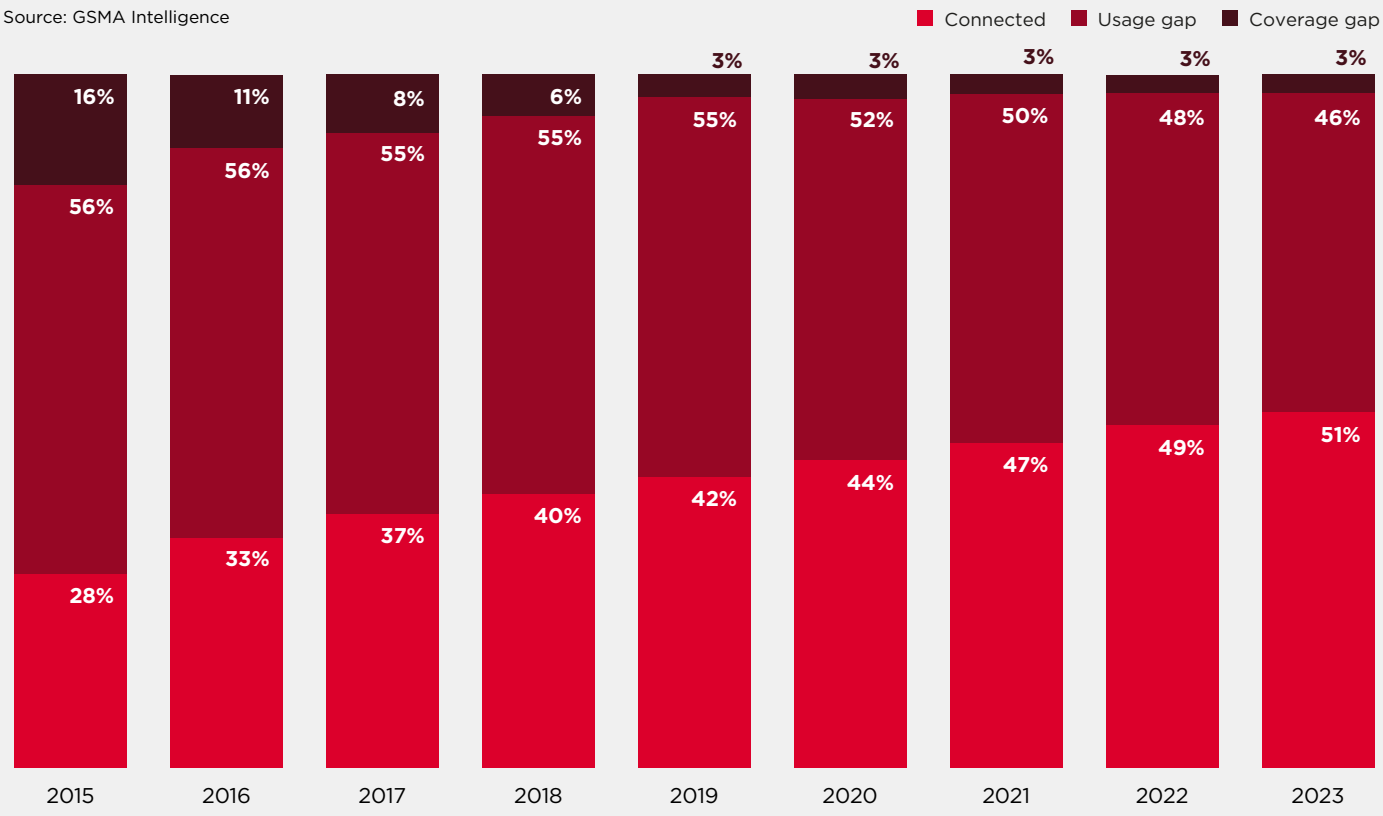
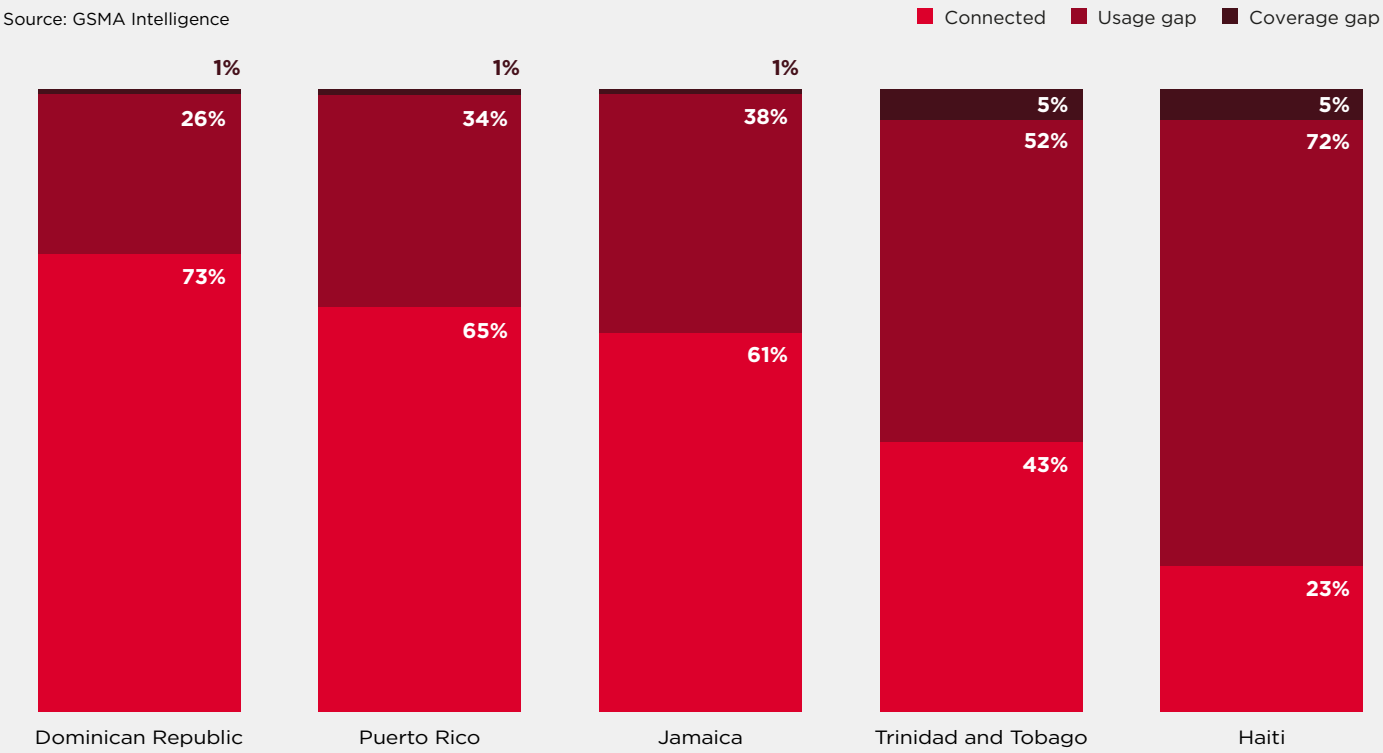


Figure 2

State of mobile connectivity in selected markets in the Caribbean islands, 2023

Percentage of population

Source: GSMA Intelligence



While 3G remains the predominant mobile technology, the number of 4G connections has been growing rapidly in recent years and will soon (by Q1 2025) become the most prevalent mobile technology in the region (Figure 3). The disparity in connectivity levels in the region is much greater when only considering 4G (or higher) connectivity levels (Figure 4). In the medium term, it is widely expected that 4G will become the minimum standard of internet connectivity required to access basic services, emphasising the urgency of the transition and the need to upgrade infrastructure to close this gap.

Figure 3

Evolution of mobile connections by technology in the Caribbean islands

Percentage of total connections

Source: GSMA Intelligence

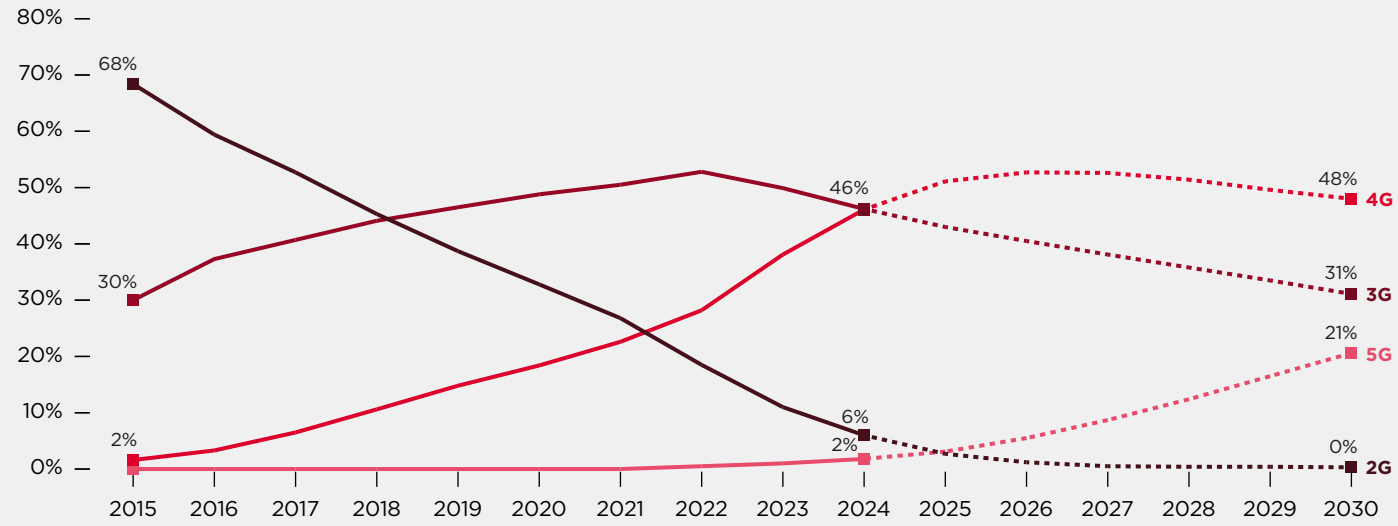
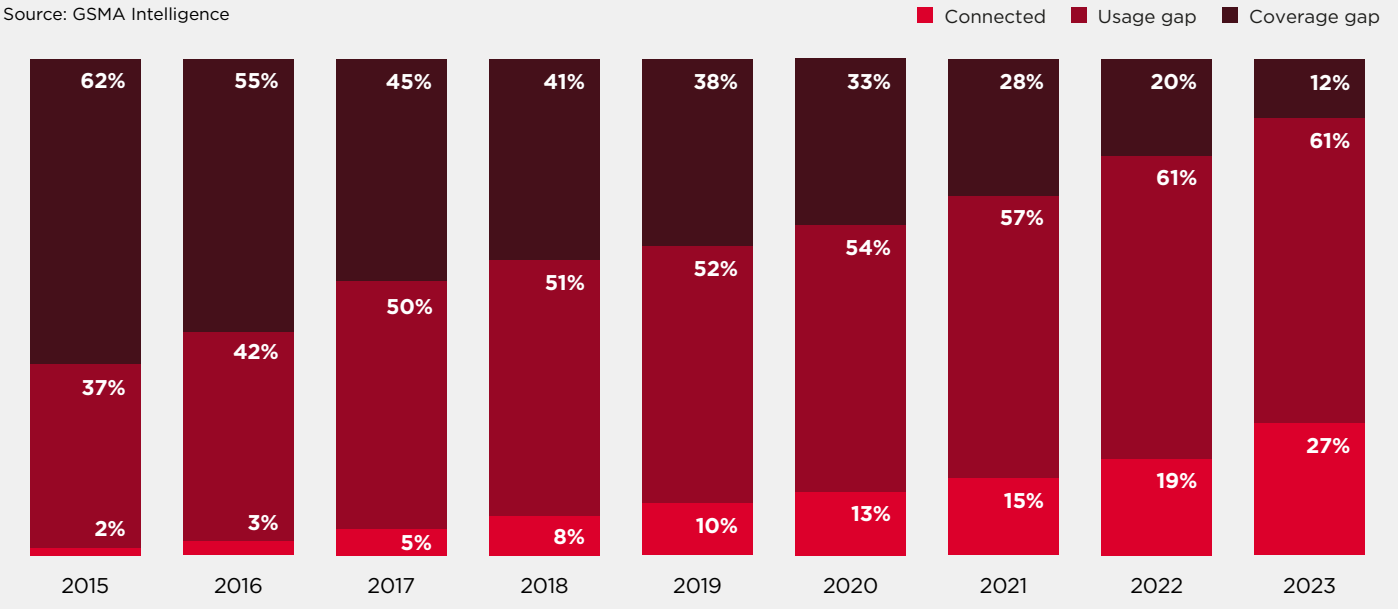


Figure 4

State of 4G or higher mobile internet connectivity in the Caribbean islands

Source: GSMA Intelligence



Handset affordability and ineffective spectrum policies are the main barriers

As with other small island developing states (SIDS), the Caribbean islands face distinct challenges to achieving widespread digital connectivity.[5] One primary obstacle is the lack of scale, which hampers investment and market growth. Limited populations and distant localities also make it challenging to attract the necessary investments in network infrastructure. Moreover, SIDS are particularly vulnerable to natural disasters, which adds further complexity to network investments, requiring resilient networks and robust disaster recovery plans.

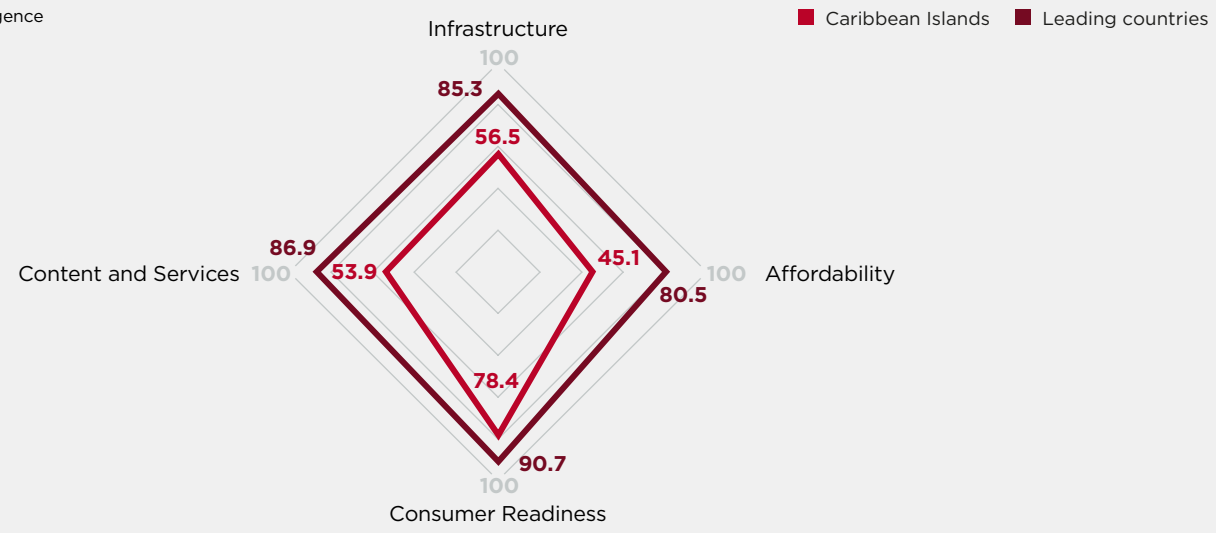
The top barriers to mobile internet use in the Caribbean islands are the lack of affordability, limited infrastructure and limited availability of relevant content and services, as a careful comparison of scores in the GSMA Mobile Connectivity Index (MCI) demonstrates.[6] Figure 5 shows that the difference in the most recent MCI scores between the Caribbean islands and leading mobile internet countries[7] is most pronounced in these areas. However, thanks to the relatively high levels of basic skills and gender equality among the population in the region, MCI scores for consumer skills and readiness are closer to those observed in leading mobile internet countries.

Figure 5

Comparative scores across MCI enablers, 2023

MCI cluster scores (0 = lowest score; 100 = highest score)

Source: GSMA Intelligence



5 Resilient connectivity: Addressing the coverage and usage gaps in small island nations, GSMA, 2024

6 Eight markets of the region are covered in the GSMA Mobile Connectivity Index, suggesting an average index score of nearly 57 points. Countries and territories included are the Bahamas, Barbados, Dominican Republic, Haiti, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago.

7 'Leader' countries in the GSMA MCI 2023 have an index score greater than 80.

Affordability, a key determinant of mobile internet service adoption, is defined as the ability of users to pay for a handset and cover the cost of mobile internet services – referred to as the total cost of mobile ownership (TCMO). The indicator is in turn a function of two variables: the cost of having a mobile internet data service and a capable device; and the consumer's income.

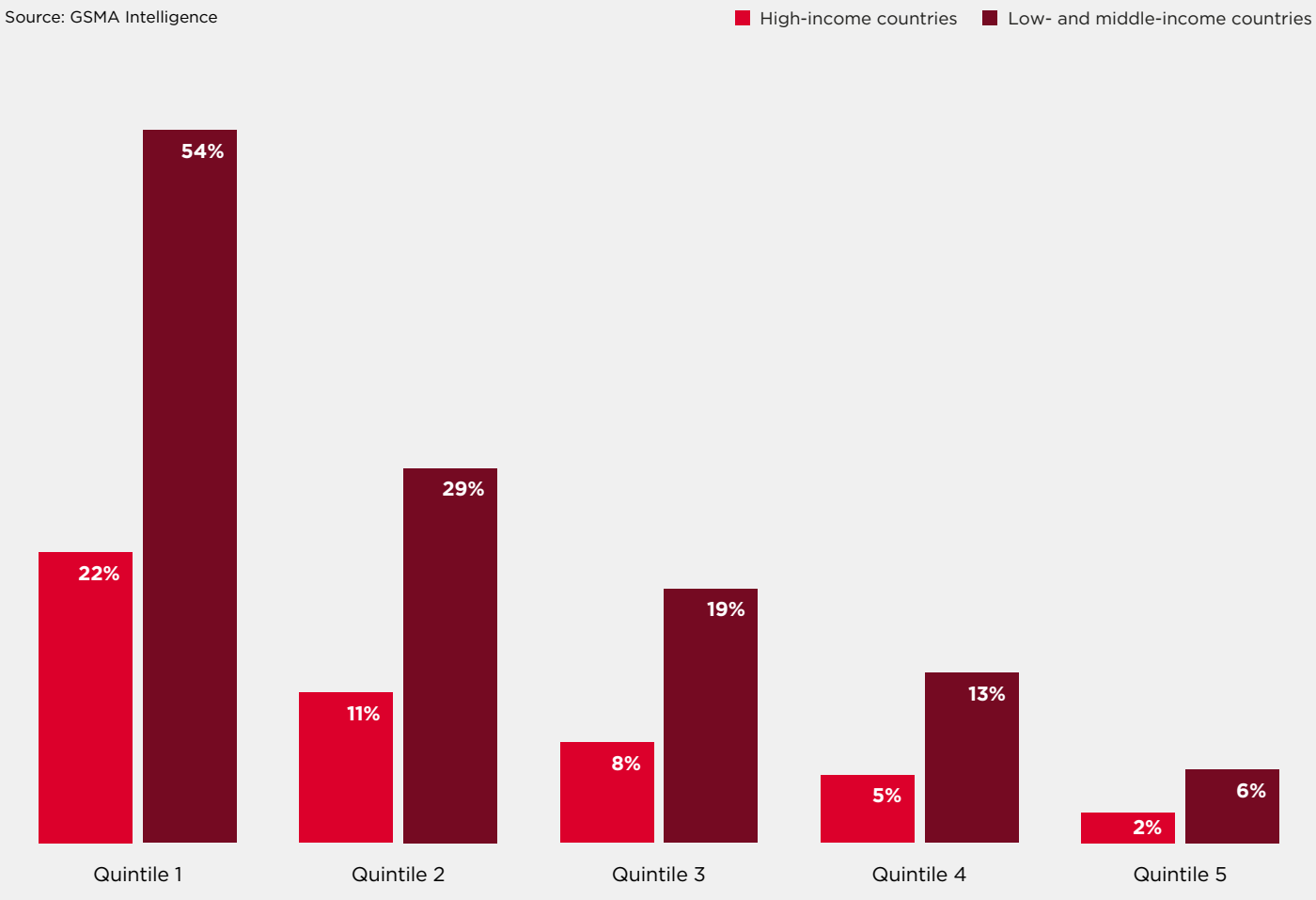
Handset affordability in particular remains a substantial barrier to internet access for the lowest-income populations in the region given its relatively high upfront value. Figure 6 illustrates the relative handset cost to monthly income, by quintile segments of the population, for markets in the region, grouped according to their income levels.

There are also significant barriers that impact the deployment of infrastructure in the region and affect overall internet connectivity levels. As the scores for the main infrastructure enablers in the MCI show (see Figure 7), some of the most notable shortcomings exist in relation to spectrum policy, with reduced spectrum assignments in the region, especially in mid-bands. Figure 8 compares the spectrum assigned in low bands and mid-bands for a selection of Caribbean islands, where information is available. The amount of spectrum available, as well as the conditions in which it is assigned, will directly influence the quality, availability and affordability of mobile services for consumers.[8]

Figure 6

Device costs as a proportion of monthly income (average) by income quintile and income group classification for the Caribbean islands, 2022[9]

Source: GSMA Intelligence



8 See The impact of spectrum assignment policies on consumer welfare, Bahia and Castells, 2022

9 Following the World Bank country classifications by income, Caribbean islands defined as high income are Antigua and Barbuda, Bahamas, Barbados, Saint Kitts and Nevis, and Trinidad and Tobago. Low- and middle-income countries include Dominica, Dominican Republic, Grenada, Jamaica, Saint Lucia, Saint Vincent and the Grenadines, and Haiti.

Figure 7

MCI infrastructure enabler scores, 2023[10]

MCI cluster scores (0 = lowest score; 100 = highest score)

Source: GSMA Intelligence

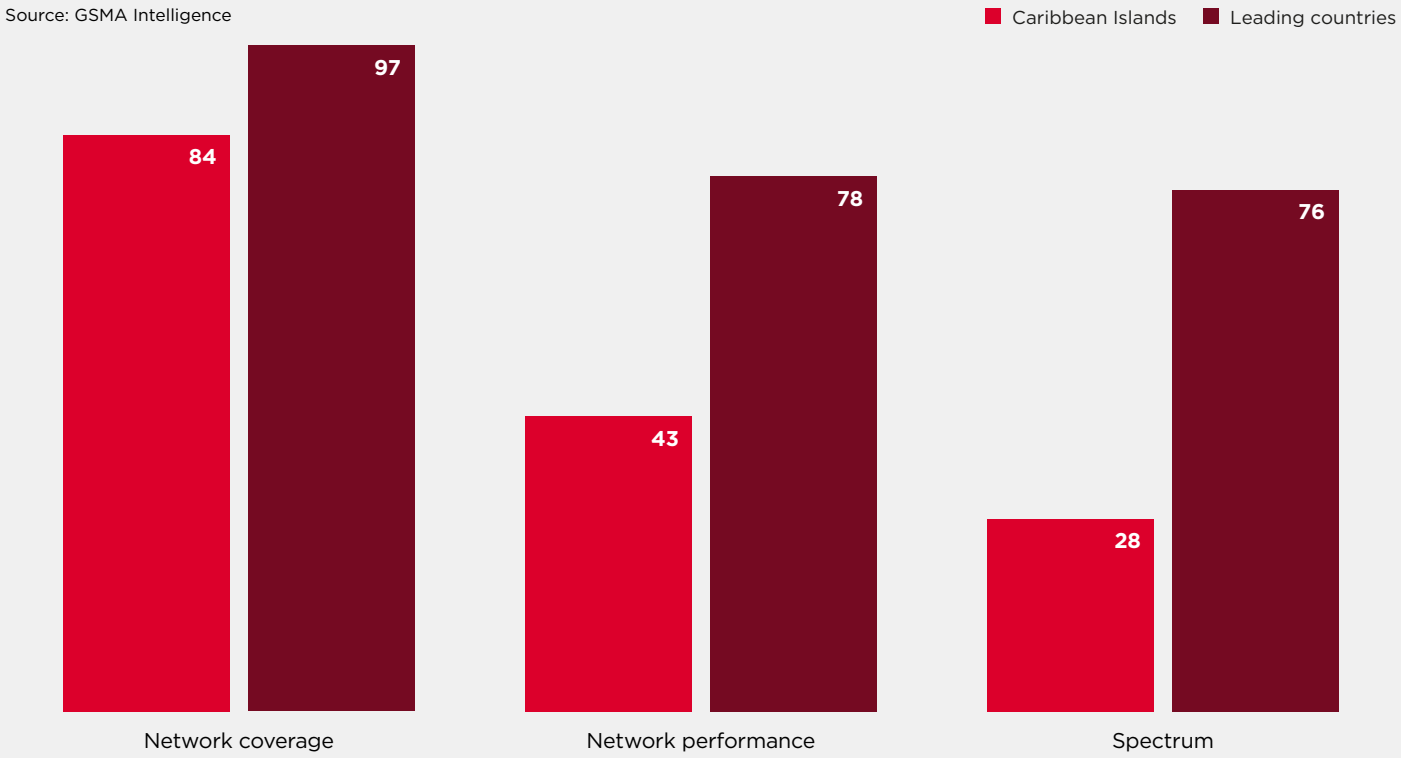
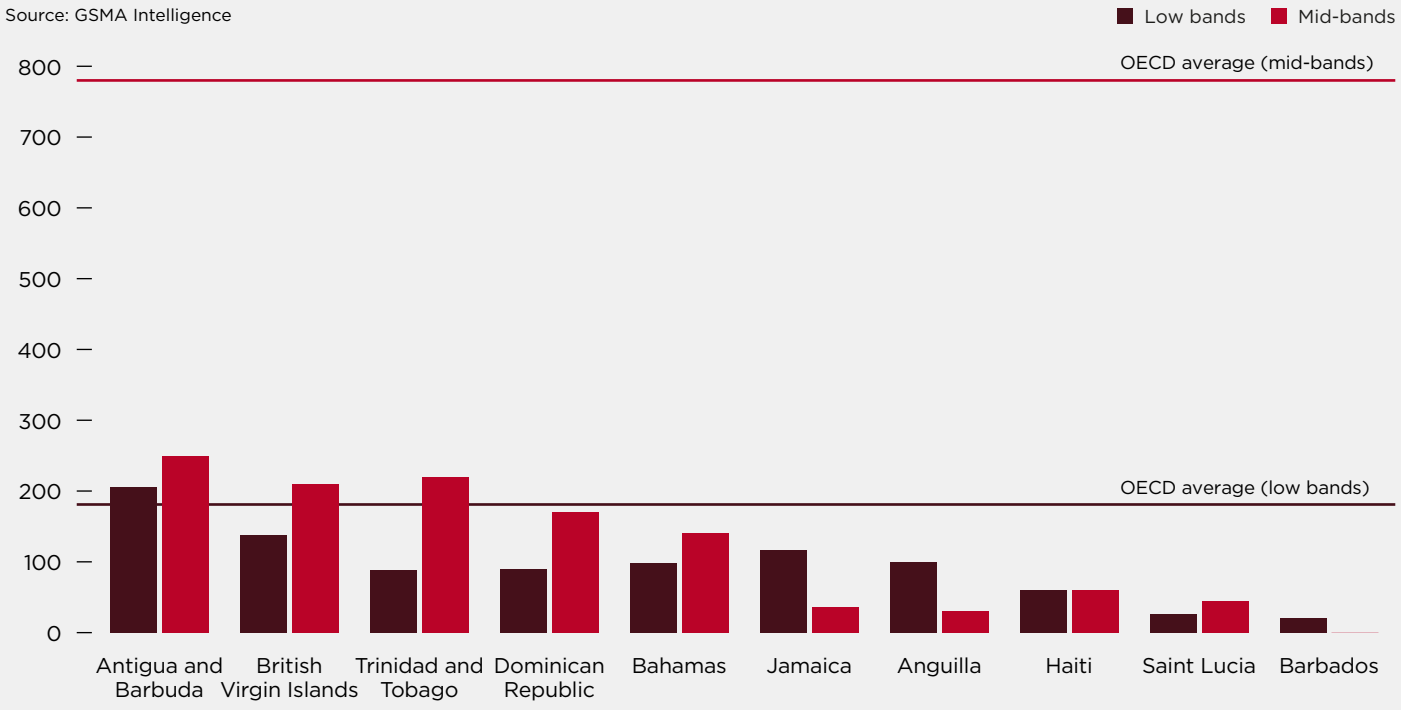


Figure 8

Spectrum holdings in the Caribbean islands and OECD average, 2023[11]

MHz

Source: GSMA Intelligence



10 Network coverage refers to population coverage. Network performance reflects the download and upload speeds and latencies. Spectrum refers to the amount of spectrum assigned to mobile operators.

11 Low bands correspond to sub-1 GHz, mid-bands to 1–6 GHz and high bands to 24–40 GHz.

The rollout of 5G will mark a milestone in the path to digital transformation for many Caribbean islands

5G is still in the early stages of deployment in the region, constituting only 1% of total connections across the Caribbean islands at the end of 2023. This emphasises the region's still untapped potential as it can accelerate digital transformation by increasing the level of 5G adoption.

This connectivity transition poses one of the most significant challenges and opportunities for the region, considering the large socioeconomic benefits expected from 5G. In 2030, 5G is projected to contribute over $930 billion to the global economy, making up nearly 1% of global GDP. 5G is expected to benefit all sectors of the economy, with varying degrees of impact depending on the capacity of businesses to integrate 5G applications into their operations.

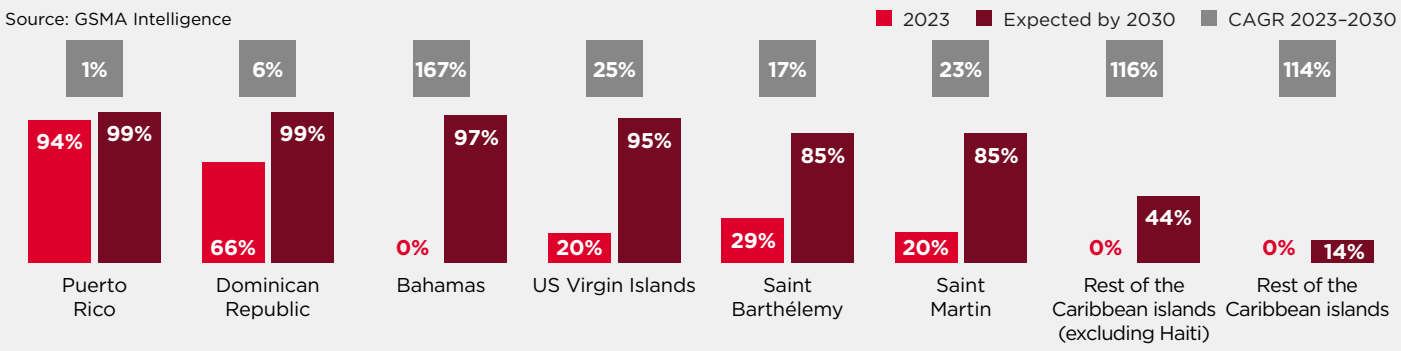
Positive developments are already underway in the Caribbean, with some countries and territories having successfully launched 5G networks. By the end of 2023, 5G coverage had reached 94% of the population in Puerto Rico[12] and 66% in the Dominican Republic.[13] These levels are comparable to those observed in leading countries when it comes to 5G connectivity.[14] However, the rollout of 5G networks is limited for now to a select few islands of the region. GSMA Intelligence forecasts show that apart from Puerto Rico and the Dominican Republic, only the Bahamas, US Virgin Islands, Saint Barthélemy and Saint Martin are projected to achieve a 5G network population coverage of 50% or higher by the end of 2027. By 2030, seven more markets will achieve 50% coverage or more,[15] but only barely. At that point, 5G coverage in the region overall will stand at just 50%.

Figure 9

5G Network population expected coverage by 2030 in Caribbean Islands

Percentage of population

Source: GSMA Intelligence



12 The 5G rollout in Puerto Rico was accelerated due to the need to rebuild a large part of the network affected by Hurricane Maria in 2017.

13 Other countries and territories, such as Saint Barthélemy, Saint Martin and the US Virgin Islands, have also demonstrated development in 5G population network coverage, although at a lower level.

14 According to GSMA Intelligence's 5G Connectivity Index, during the same period, countries classified in tier 1, representing those with the highest scores in 5G infrastructure and services, achieved an average 5G population coverage of 96%. Countries in tier 2 reached an average coverage of 82%, while those in tier 3 attained 38% coverage on average.

15 Aruba, the Cayman Islands, Curaçao, Dominica, Guadeloupe, Martinique, and the Turks and Caicos

Without further investments, mobile network capacity in many Caribbean islands will soon be constrained

Just between 2022 and 2023, average mobile data traffic per mobile connection per month in the Caribbean islands increased from 2.2 GB to 3.0 GB. This traffic is mostly produced by a few large traffic generators (LTGs). The top-two LTGs (Meta and Google) alone generated 50% of all traffic in the Caribbean islands in 2023, with the top four (including TikTok and Netflix) generating nearly 70% of all traffic in the region (Figure 10). More than 50% of this traffic is video streaming. The remaining traffic is nearly evenly distributed, primarily among gaming, retail and social communication online services.

Figure 10

Evolution of internet traffic in the Caribbean islands

Exabytes (EB), percentage of total mobile traffic

Source: GSMA Intelligence, Cisco, Sandvine, mobile operator traffic reports

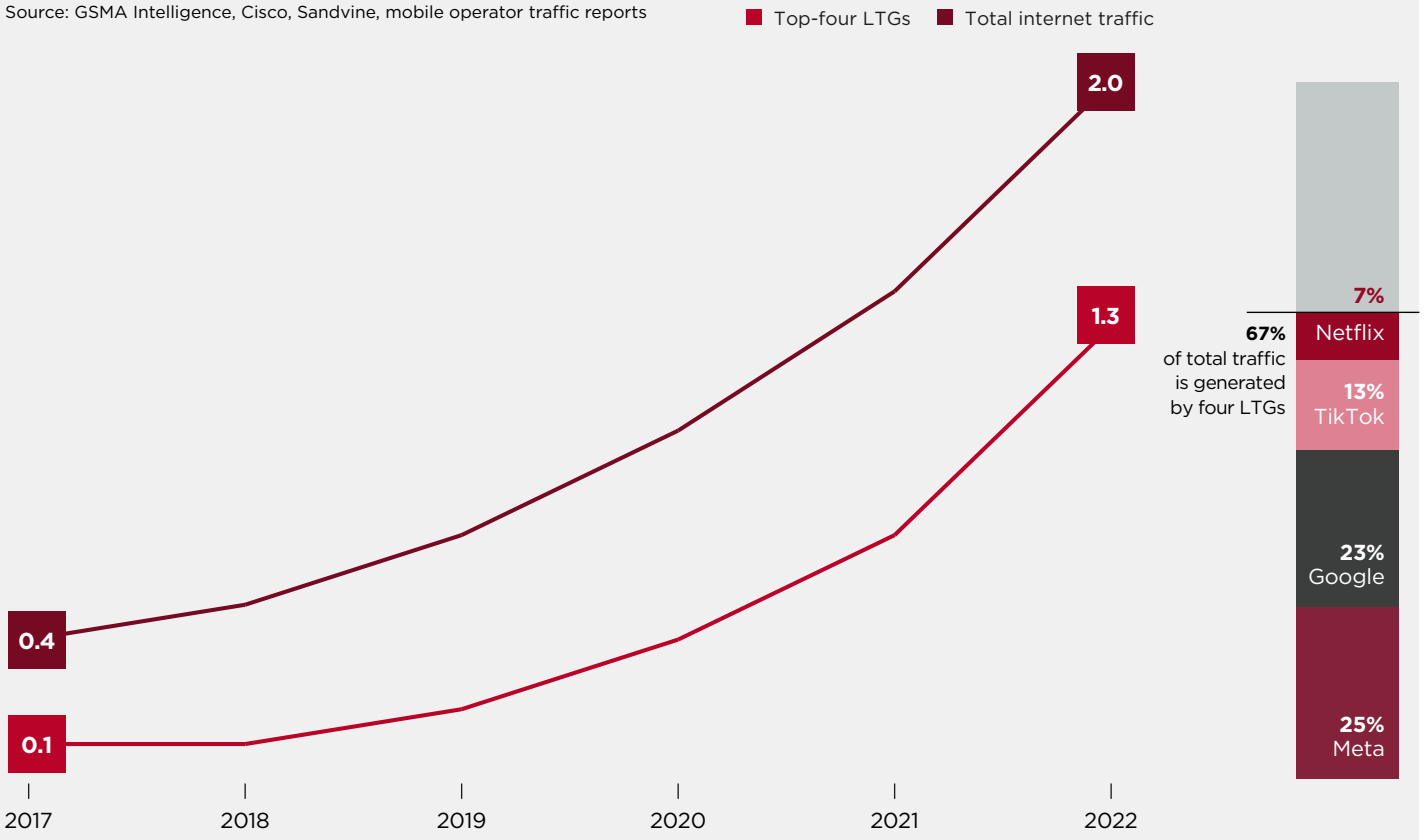


Figure 11

Mobile traffic in the Caribbean islands by app, 2023

Percentage of total mobile traffic

Source: Mobile operator traffic reports

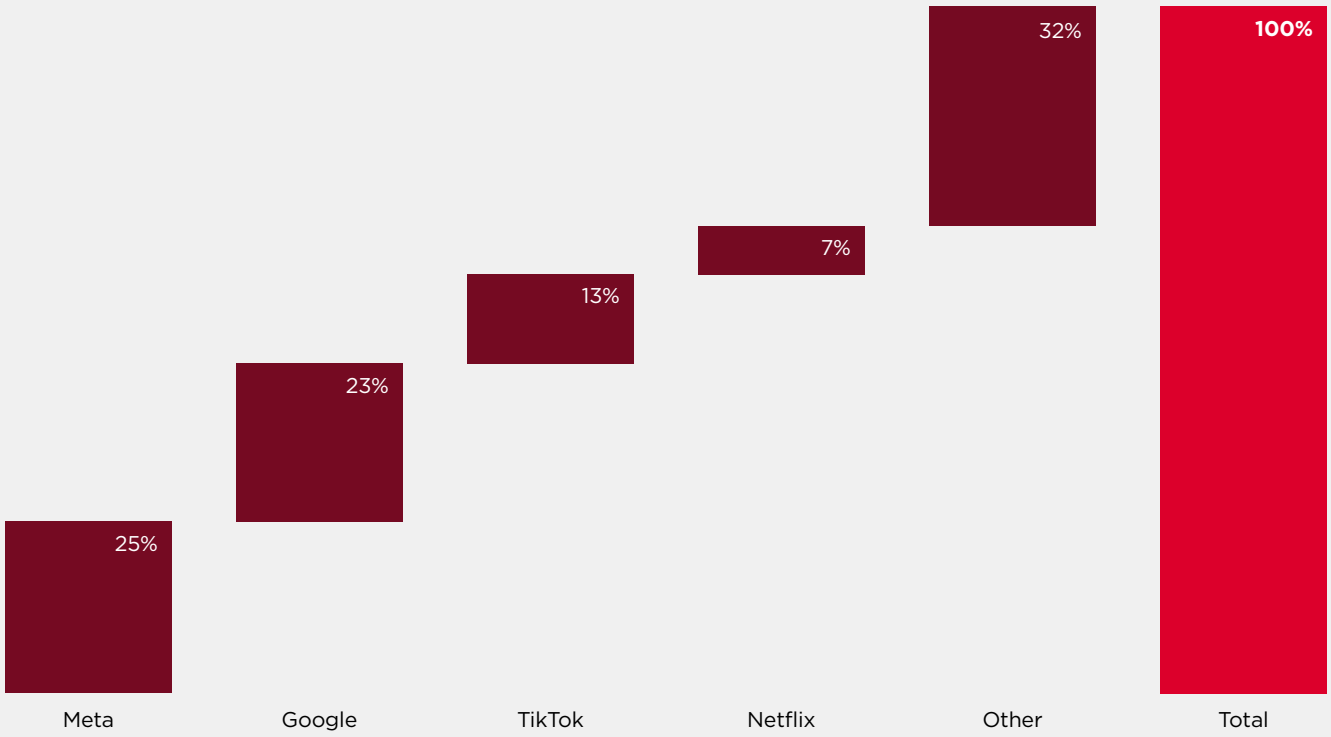


Figure 12

Mobile traffic in the Caribbean islands by type of traffic, 2023

Percentage of total mobile traffic

Source: Mobile operator traffic reports

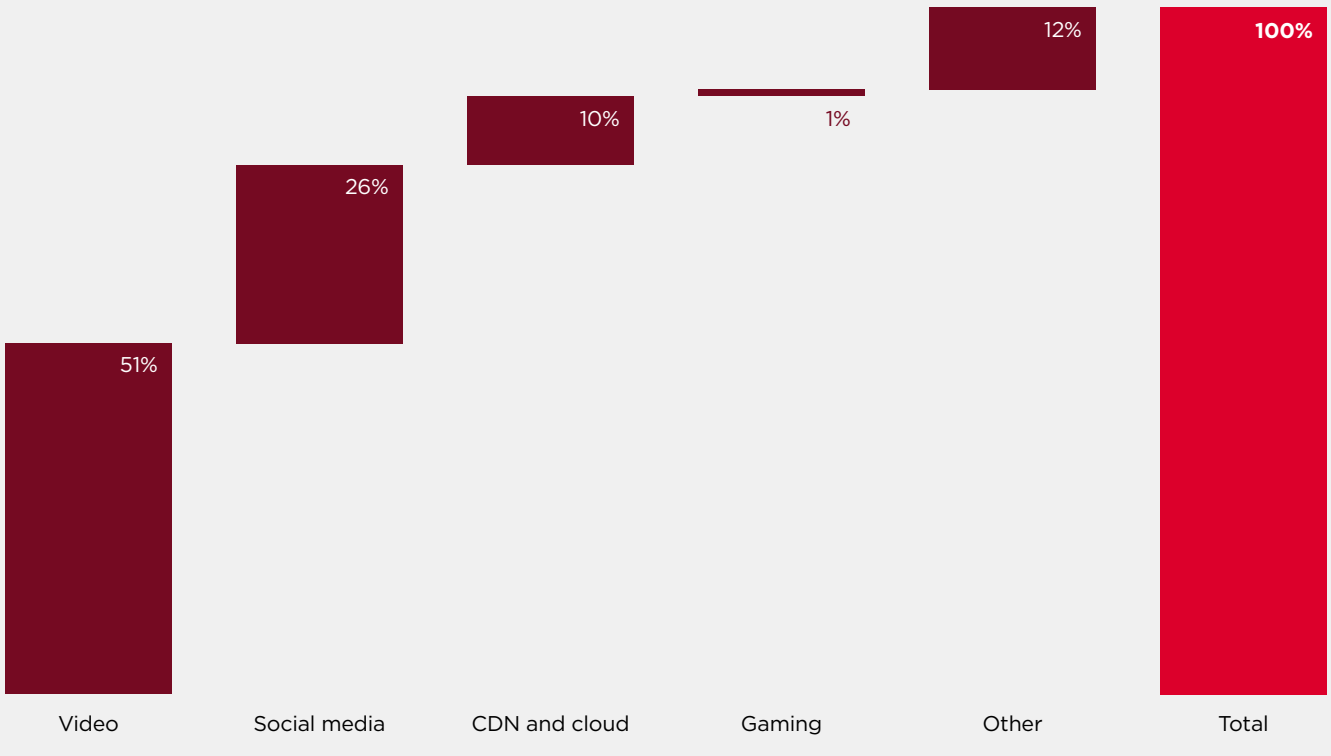
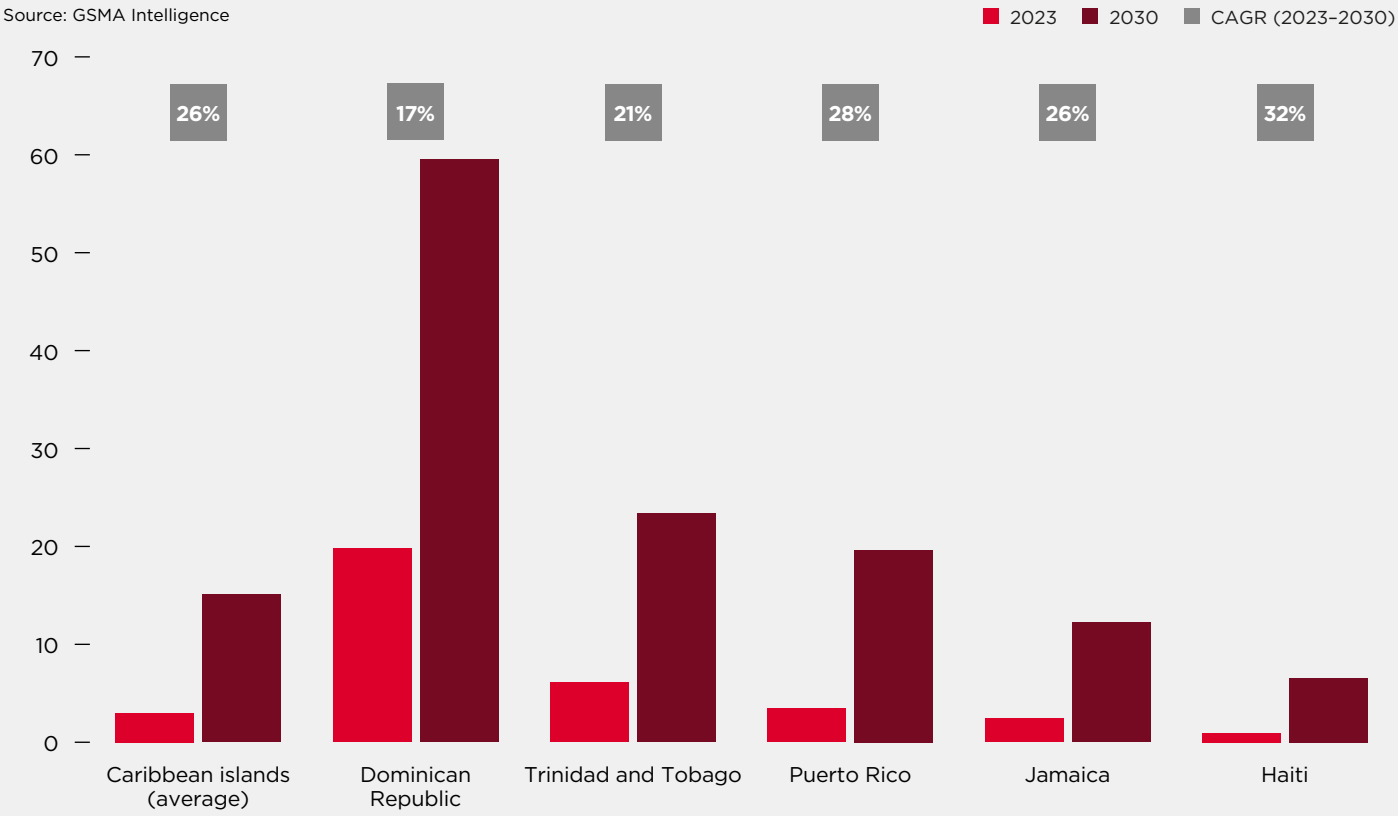


Figure 13

Data traffic per connection per month

Data traffic (GB), CAGR (%)

Source: GSMA Intelligence



Similar to trends seen globally, the Caribbean islands will experience substantial increases in data traffic and consumption in the period to 2030. Average data traffic per mobile connection per month is expected to further increase to 15.1 GB by 2030, representing a CAGR of 26% between 2023 and 2030.[16] The main factors that will drive this data growth include increased video use, higher video resolutions and new use cases enabled by 5G such as XR and AI. Figure 13 shows these projections for a selection of markets in the region.

This significant increase in data traffic will exhaust network capacity and create network costs in the medium term or as soon as existing network capacity is exhausted, meaning additional network investments will be required. These additional costs may include, for example, the need to obtain additional spectrum, transition to new technologies with greater spectral efficiencies such as 5G or further densify networks by building additional radio access network (RAN) sites.

With nearly 70% of all traffic in the Caribbean islands generated by four LTGs, and with the continued growth in traffic leading to an increase in long-term average costs for mobile networks, the key question is whether the use of the network is as efficient as it should be.

LTGs do not currently face a price signal when generating traffic. They therefore have limited incentive to optimise the amount of traffic they produce. Evidence suggests that the extent of the problem is significant. For example, the amount of traffic that is unwanted or unsolicited by consumers is estimated to account for 15–30% of all traffic generated by some of the most popular social media applications accessed by consumers.[17] There is also compelling evidence that the delivery of video is often inefficient and that where video traffic can be optimised, this can result in total traffic reductions of 15–25% while delivering the same user experience.[18]

With LTGs not facing price signals for the amount of traffic they generate, and no other strong incentive to optimise traffic in place, this can give rise to market failure in the form of 'the tragedy of the commons', where agents that do not have incentives to be efficient can exhaust all of a common resource (in this case, the network capacity), to the detriment of everyone else, including consumers.

16 Source: GSMA Intelligence data traffic forecast

17 Characterisation of Unsolicited Traffic Advertisements in Mobile Devices, José Pedro Veiga Silva, Paulo Carvalho Solange Rito Lima, 2020

18 Based on tests carried out by Telefónica and a CAP consisting on limiting the maximum bitrate of video connections up to the maximum level possible. This was not noticeable on the small screens of smartphones, thus having no impact on perceived quality of experience while resulting in relevant network resource savings.

Limited revenue growth opportunities for telcos exacerbate connectivity and digital transformation challenges

While data traffic growth generates significant costs, it does not currently generate corresponding additional revenues for mobile operators. This means that incentives to further invest in the network to provide additional capacity are limited at present.

Globally, the mobile internet ecosystem has experienced profound changes in the last decade, which have led to a significant shift in the generation of revenues across different segments of the technology industry. A similar trend is observed for the main telecoms operators and content and application providers (CAPs) in Latin America and the Caribbean.[19]

Analysing the evolution of both segments from 2015, revenues for telecoms operators remained relatively stable throughout the period from 2015 to 2023, with a decline during the Covid-19 pandemic. In contrast, CAPs experienced substantial growth, with revenues surging by nearly 280% over the same period.

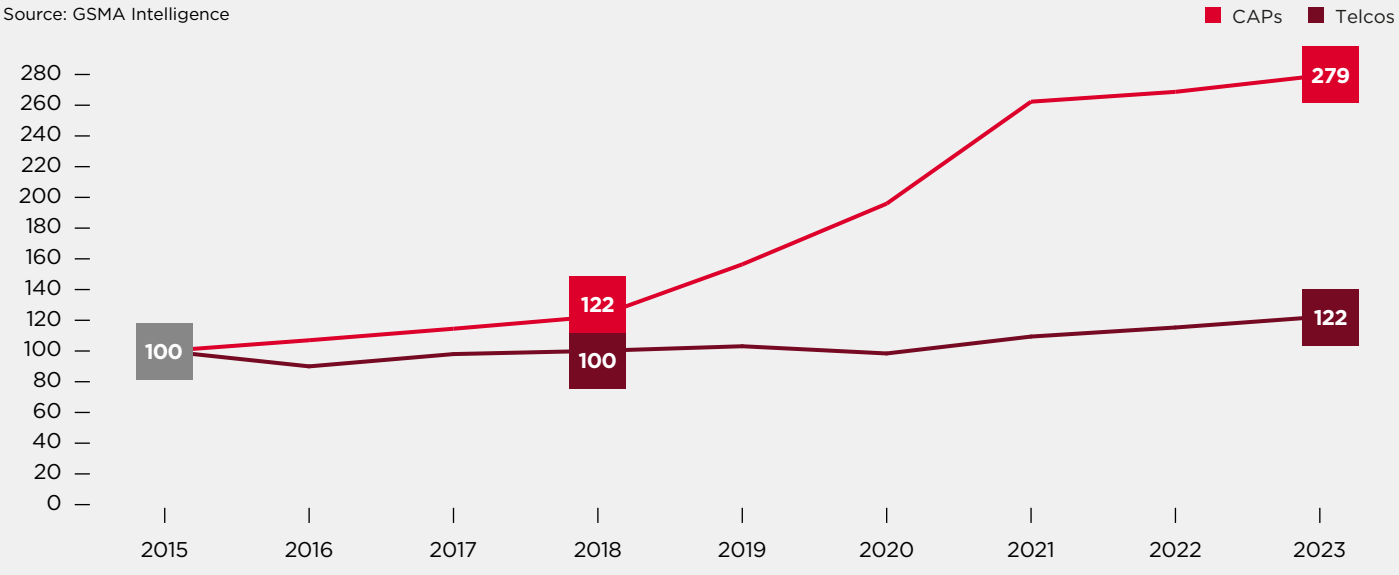
This reflects that while overall revenues across the ecosystem have increased, growth has been largely been captured by CAPs. Meanwhile, connectivity revenues, which are mostly captured by those investing in network infrastructure (i.e. telecoms operators), have remained flat.

Figure 14

Revenues index in Latin America and the Caribbean

2015=100

Source: GSMA Intelligence



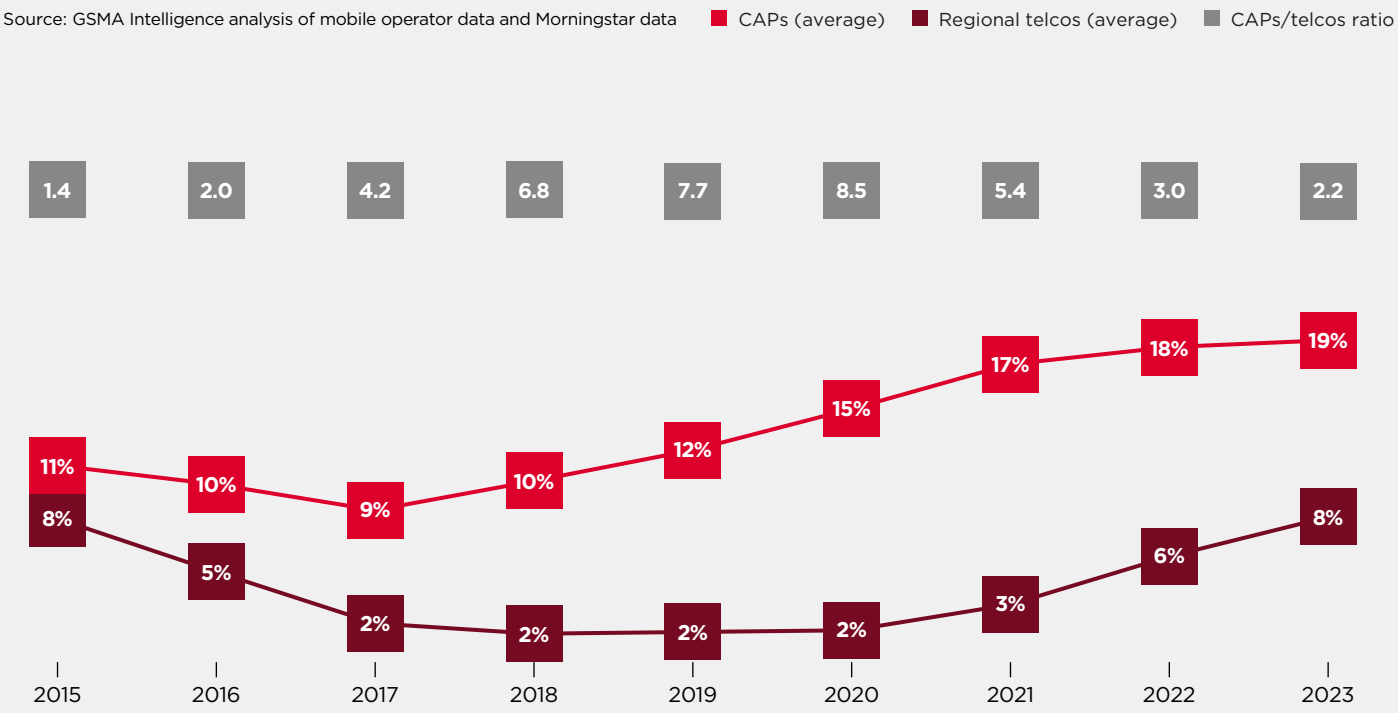
19 Revenue trends for CAPs have been adjusted to the Latin America and the Caribbean where possible, despite there often being a lack of breakdown available. Alphabet, Meta and Netflix are the main traffic generators considered.

While some operators have made strides into new sources of revenue beyond traditional connectivity,[20] these are generally not significant enough yet to compensate for the lack of growth in traditional connectivity revenue sources. Figure 15 shows how this also translates into lower returns on investment when compared to CAPs.[21] Limited revenue growth opportunities for telcos weaken the case for further investments in infrastructure, exacerbating connectivity and digital transformation challenges, and ultimately leaving consumers worse off.

Figure 15

Return on invested capital and CAPs/regional telcos ratio

Three-year moving average



20 From telco to digital telco: navigating trends and drivers shaping revenue growth beyond connectivity, GSMA Intelligence, 2023

21 Return on invested capital for regional telcos includes companies with operations in the Caribbean islands (Claro, Liberty, Millicom, Digicel and TSTT). Return on invested capital for CAPs considers the following companies: Alphabet, Meta and Netflix. For regional telcos and CAPs, the analysis considers the performance of the entire companies i.e. the aggregate results of all the countries in which they operate, as published in the companies' annual reports.

02
Investment and connectivity gaps in the Caribbean islands in 2030

"To achieve ambitious digital inclusion and transformation objectives, it is crucial to understand how gaps today will evolve in the period to 2030 under prevailing market conditions."

For this, we quantify the additional investment required to bridge mobile broadband coverage and usage gaps in the Caribbean islands by 2030. As 4G is widely expected to be the minimum standard of meaningful connectivity to access basic services by 2030,[22] we focus on the deployment and adoption of this technology to estimate the financing needs required to bridge the gaps for mobile broadband access.

This chapter also includes a 5G investment gap assessment, quantifying the additional financing required to reach the levels of 5G deployment that would enable a fuller digital transformation of the business sector and help bring the next wave of economic growth and prosperity to the region.

In both cases, estimated capex investments do not include backbone infrastructure costs. Projected figures therefore have to be taken as a lower-bound estimate of future investment requirements.

22 For example, see Global Connectivity Report 2022, ITU

The 4G coverage gap will reduce by 2030, but 5% of the population will remain uncovered

Starting from the current coverage level in the Caribbean islands, the quantitative exercise to estimate the 4G coverage gap into the future involves projecting a path of coverage expansion towards 2030.

New 4G site deployments are assumed to be carried out annually. Any new deployments entail a one-off investment in capex, yearly opex and the expected revenues generated by any new users living in newly covered areas. Further details of the model functionality are explained in the accompanying annex.[23]

By comparing revenues with costs, the profitability of that incremental deployment can be estimated. If it is positive, it means that existing market conditions permit a continued expansion of coverage and hence no additional financing is required for that deployment.

However, when the profitability turns zero or negative, it indicates that the market frontier has been reached. The market frontier represents the last profitable level of coverage expansion given current market conditions. It is important to identify this threshold because it determines the point where mobile operators will most likely stop investing in additional sites. This implies additional financing from third parties will be needed to continue expanding connectivity to areas that will otherwise remain unconnected.

The additional financing (or investment gap) required to bridge the coverage gap is estimated as the sum of the (negative) financial results from expanding the coverage beyond the market frontier until reaching the coverage target. The most ambitious coverage target possible is achieving universal coverage, meaning 100% of the population covered with 4G technology by 2030.

In 2023, 4G coverage in the Caribbean islands was nearly 88% of the total population. After conducting the quantitative analysis discussed above, we expect the market alone to deliver an additional 7 pp of 4G coverage by 2030, reaching 95% of the total population.

23 https://data.gsmaintelligence.com/research/research/research-2024/mobile-investment-gaps-caribbean-islands

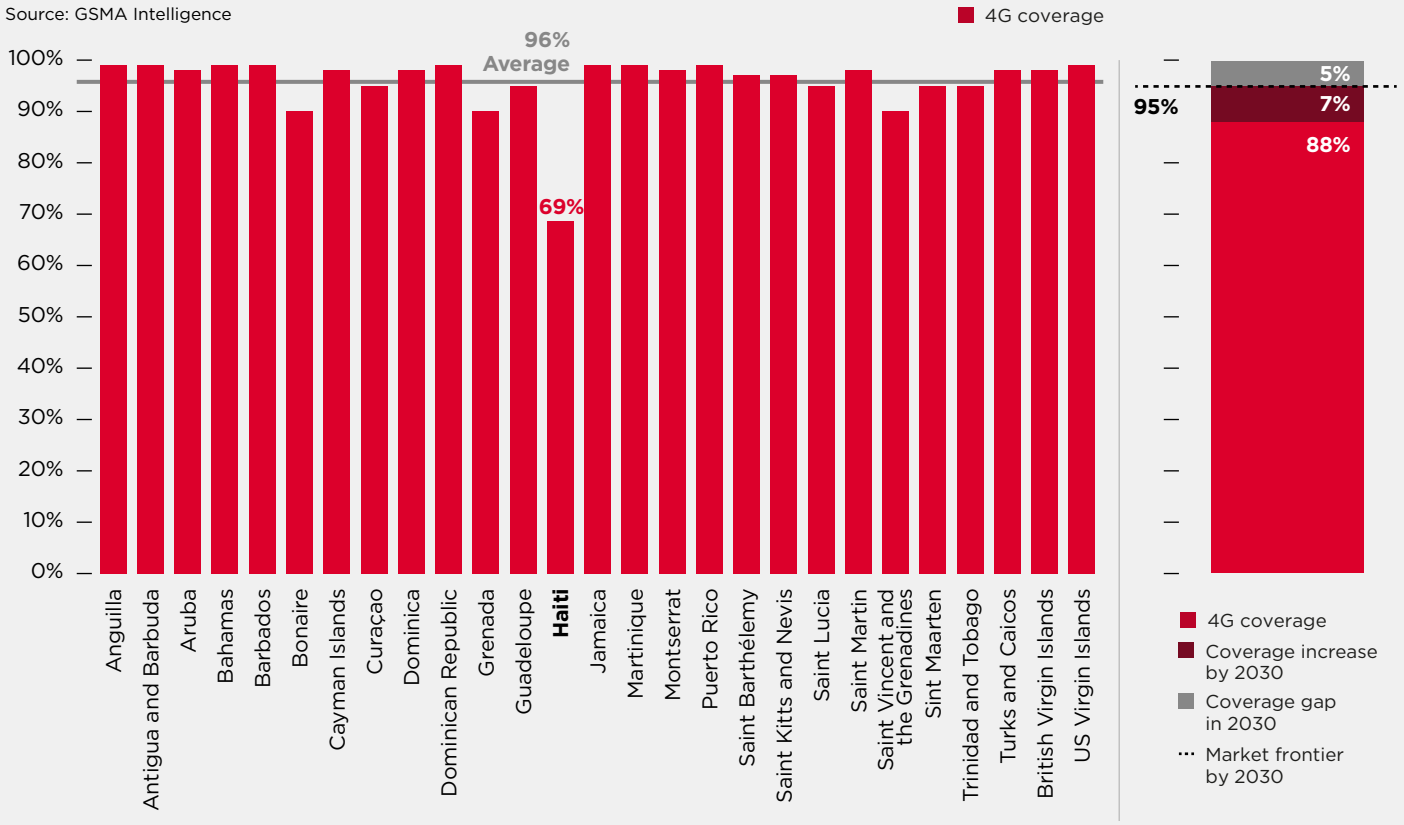
However, regional-level figures hide a significant disparity across markets. Haiti, for example, is a clear outlier: it has the lowest 4G coverage (69%) in the region today and while the market is expected to deliver significant additional 4G coverage investments going forward, it will reach its market frontier at just 89%. This implies a substantive 4G coverage gap of around 11% of the total population in Haiti in 2030, unless additional funding is obtained or market conditions and incentives are changed significantly. As Haiti is one of the most populous countries in the region, this has a strong influence on the total estimated coverage gap (5%) for the Caribbean islands as a whole: the 4G coverage gap in the region in 2030 will represent 1.7 million people, of which 1.4 million will be from Haiti.

Based on our quantitative assessment, under current market and regulatory conditions, reaching 99% of total population of the Caribbean islands by 2030 would require additional funding of $480 per additional person covered (or a total of $600 million). Providing universal access (100% population coverage) would require $8,800 per additional person covered (an incremental cost of $3 billion). In the latter case, given the high costs, alternative technology solutions will likely be required.

Figure 16

4G coverage in the Caribbean islands in 2023 and expected 4G coverage gap by 2030

Percentage of population



By 2030 the 4G usage gap will still represent over 40% of the population in the Caribbean islands

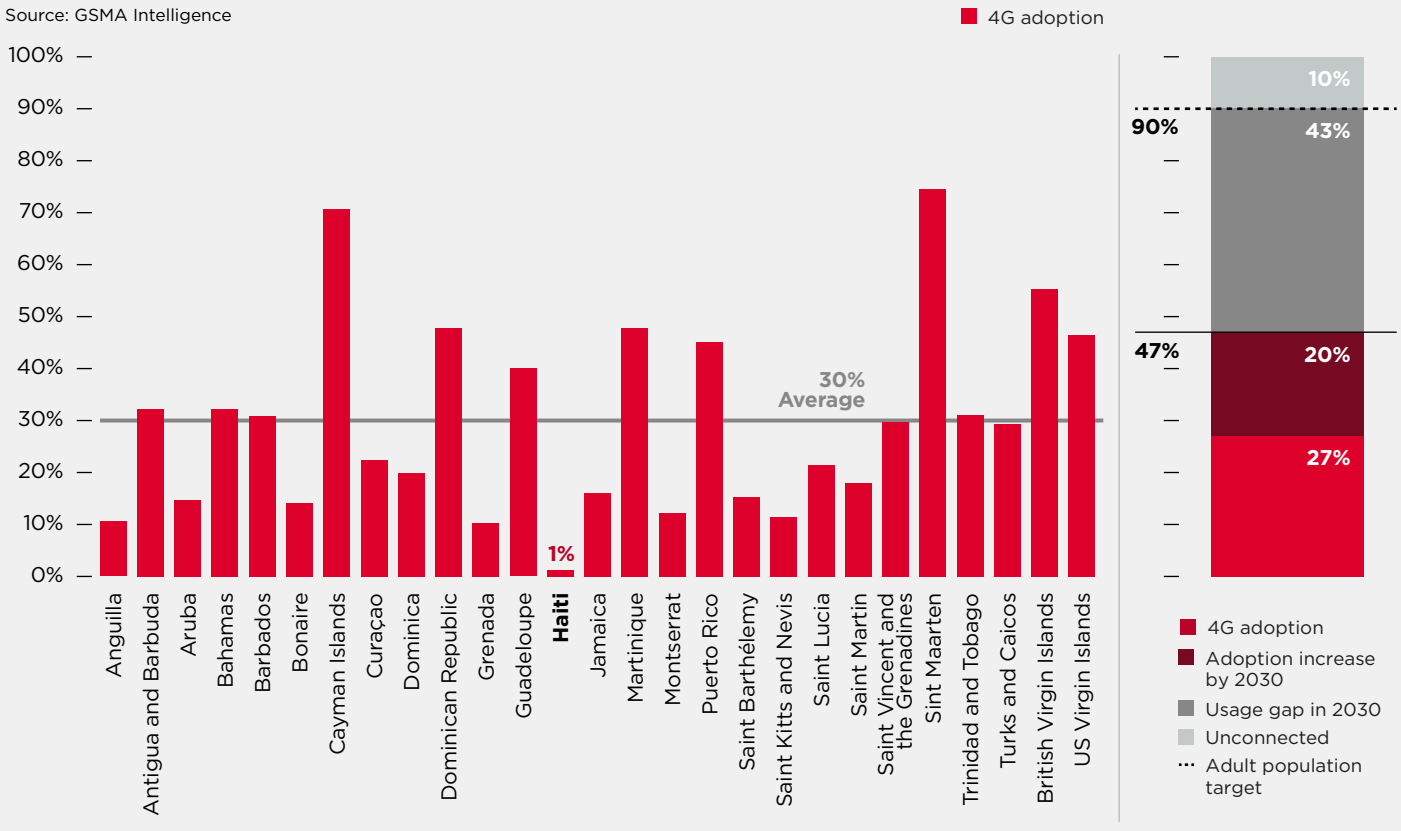
In the Caribbean islands, bridging the usage gap is the main challenge to universal mobile internet access. In 2023, the adoption of 4G mobile broadband in the Caribbean islands stood at just 27% of the total population. We expect adoption to increase by around 20 pp by 2030, reaching a total adoption rate of 47%. However, more than half of the population in the Caribbean islands will remain unconnected to 4G. As in the case of the coverage gap, part of this gap can be explained (but not exclusively) by the particularly low adoption levels expected in Haiti.

Figure 17

4G adoption in the Caribbean islands in 2023 and expected 4G usage gap by 2030

Percentage of population

Source: GSMA Intelligence



As discussed in Chapter 1, the nature of the challenge is mostly related to device and service cost affordability. Figure 18 shows how for lower-income populations, the TCMO in 2023 is a substantial entry barrier to internet access across the region.

Quantifying the cost to bridge this usage gap involves measuring the additional funding needed for lower-income segments to access the service affordably i.e. ensuring that the incidence of the TCMO does not exceed 2% of their income.[24] As a target and for the purposes of the analysis, we define 90% 4G adoption as equivalent to universal 4G internet access.[25]

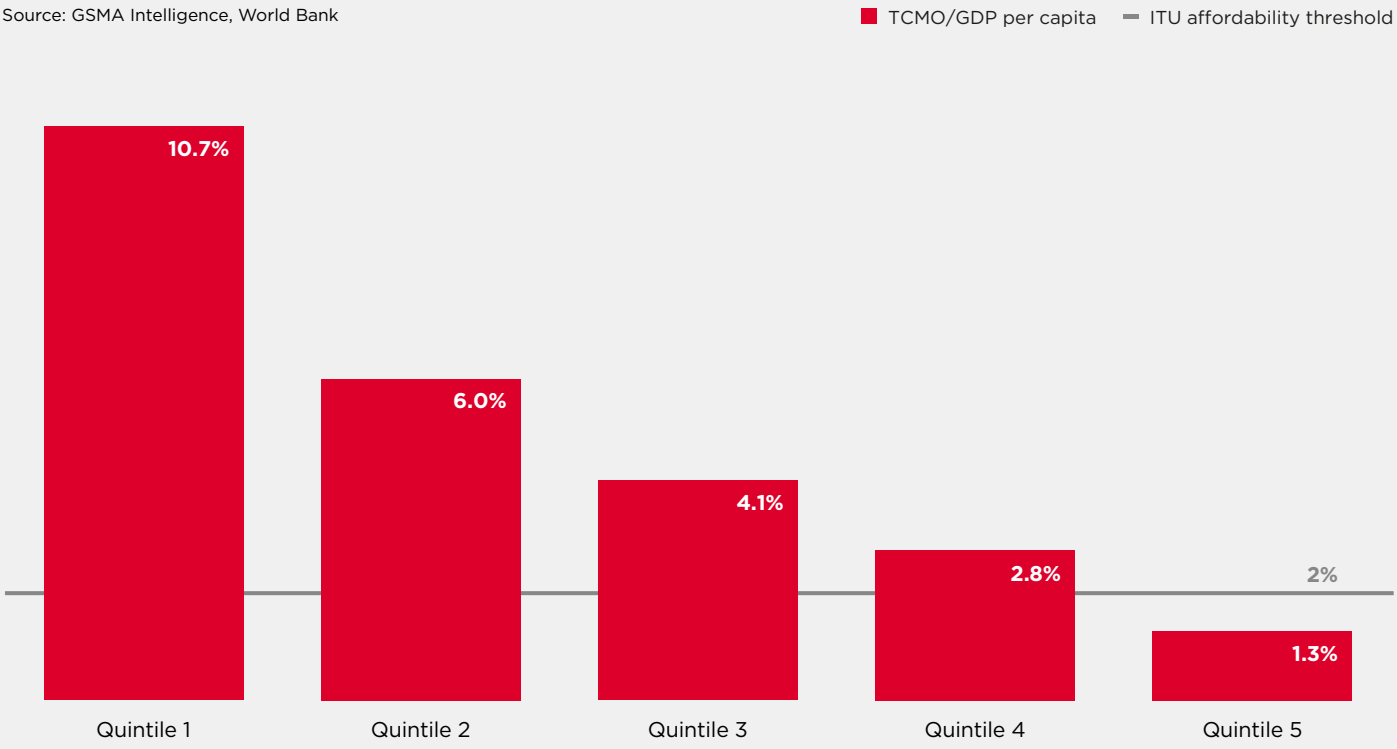
The results of the quantitative analysis[26] show that closing the gap by 2030 requires around 15 million new 4G users adopting the service. This in turn involves tackling the significant affordability challenges highlighted above.

Our analysis reveals an average affordability gap of $160 per new person connected. In total, the affordability gap (i.e. the funding required to make the service affordable for new users in order to achieve 4G universal connectivity objectives by 2030) amounts to $2.4 billion. Without substantial reforms, affordability will persist as a notable barrier, slowing down adoption and hindering the accomplishment of digital inclusion targets in the Caribbean islands.

Figure 18

TCMO as a percentage of GDP per capita by quintile, 2023

Source: GSMA Intelligence, World Bank



24 The UN Broadband Commission has established an affordability threshold, which is that internet tariffs should not exceed 2% of monthly income per capita.

25 This target is equivalent to reaching universal adoption as it assumes that the remaining unconnected 10% are those who do not want to use mobile devices or those who might not have access to a device due to their age (under 10 or 85+). It is also in line with two ITU objectives. See Achieving universal and meaningful digital connectivity in the decade of action: Aspirational targets for 2030, ITU and Connecting humanity: Assessing investment needs of connecting humanity to the Internet by 2030, ITU.

26 Further details on the quantitative analysis are explained in the annex.

The 4G mobile broadband usage gap in Haiti: affordability as a key barrier to adoption

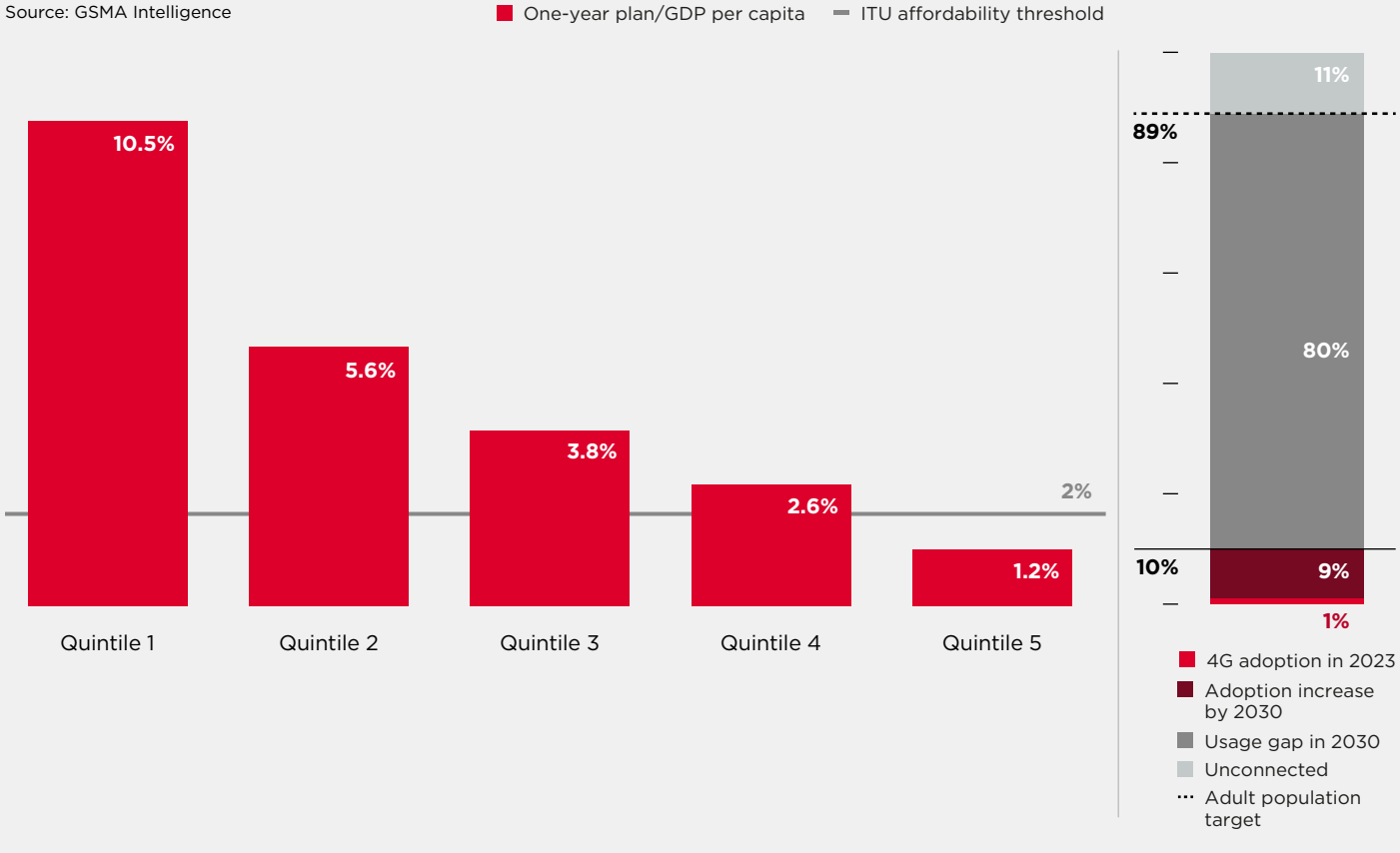
4G adoption in Haiti was just above 1% in 2023, with forecasts indicating an increase of just 8 pp by 2030, reaching around 9%. Affordability is a key barrier to adoption in Haiti: in 2023 only the top-income quintile of the population had a TCMO incidence below the ITU's affordability threshold (2%). More than 10 million of the 15 million new 4G users required to reach universal 4G connectivity in the Caribbean islands will be from Haiti.

Figure 19

Haiti: affordability analysis in 2023 and usage gap by 2030

5 GB plan as a percentage of GDP per capita per quintile, percentage of poApulation

Source: GSMA Intelligence



Deploying 5G will cost at least $1 billion, but almost half of this investment will not materialise without reforms

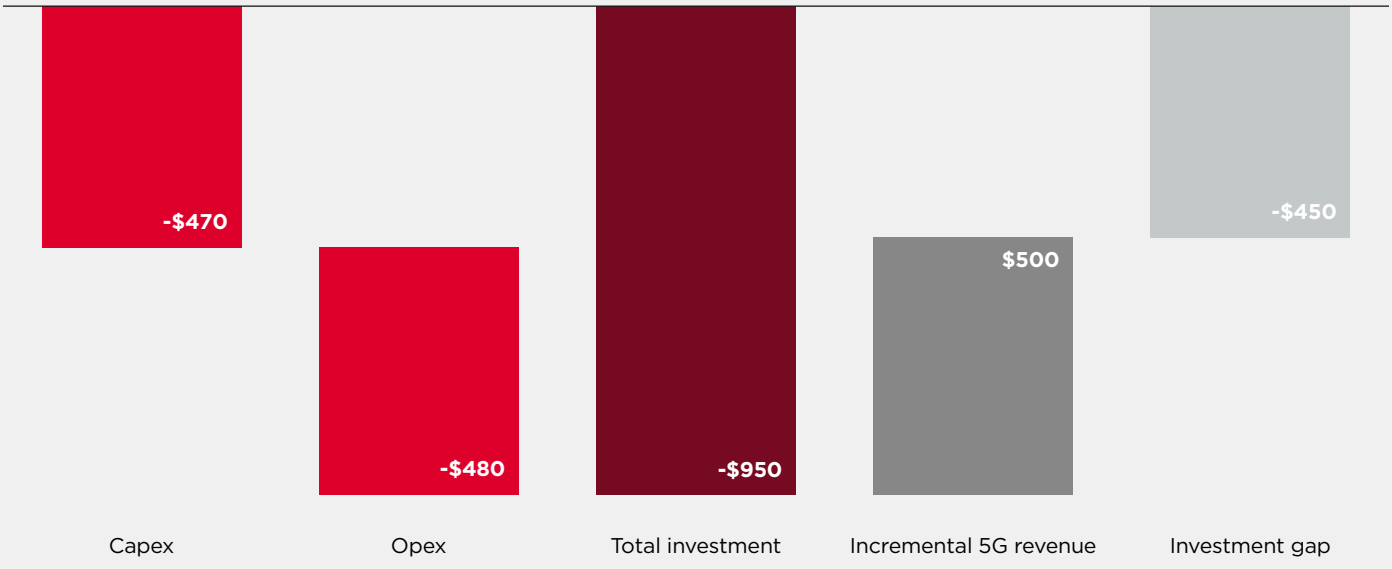
The deployment of 5G will represent a milestone in the journey towards digital transformation in the Caribbean islands. Although rollout in the region is still in the early stages, the outlook to 2030 indicates the risk of a significant delay in 5G deployment across many markets in the region. 5G coverage is expected to barely exceed 50% of the total population by then, and the projected adoption of 5G by 2030 is around 15% of the total population.

Figure 20

NPV investment gap for 5G deployment in the Caribbean islands

Million

Source: GSMA Intelligence



Our quantitative assessment conservatively estimates that the investment needed for all Caribbean islands to reach 5G coverage levels in line with the leading markets in the region is just under $1 billion. However, only half of that investment requirement will be recovered by the revenues generated under current market conditions. To estimate the 5G investment gap, we consider the investment needed to eliminate the difference between the levels of 5G coverage and adoption that are feasible under current market conditions[27] and those that would be required under an alternative scenario where 5G for the region as a whole reaches the same levels of coverage and adoption that are expected in leading Caribbean islands by 2030.[28]

Our quantitative assessment[29] indicates that the investment needed to bridge that gap is approximately $450 million.

Figure 21

5G coverage in the Caribbean islands by 2030

Percentage of population

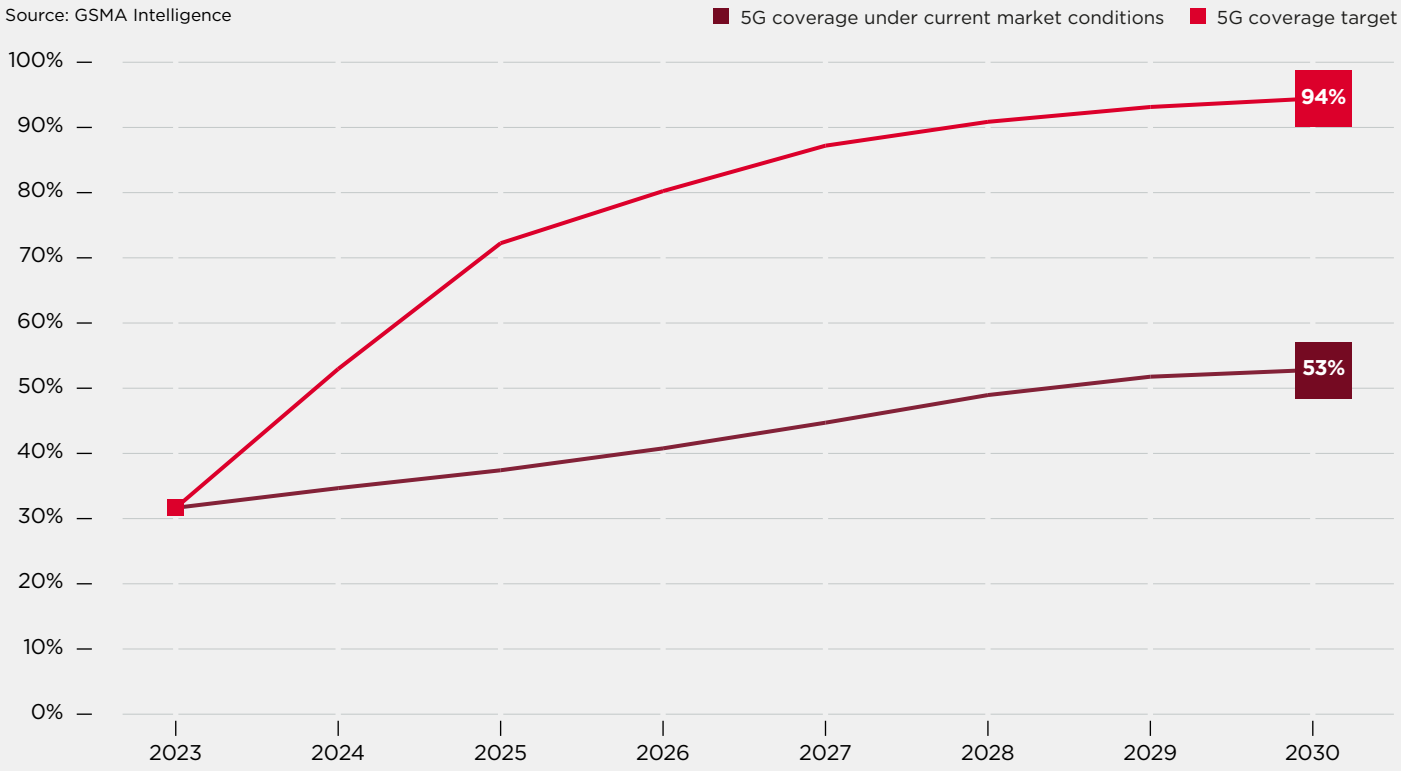
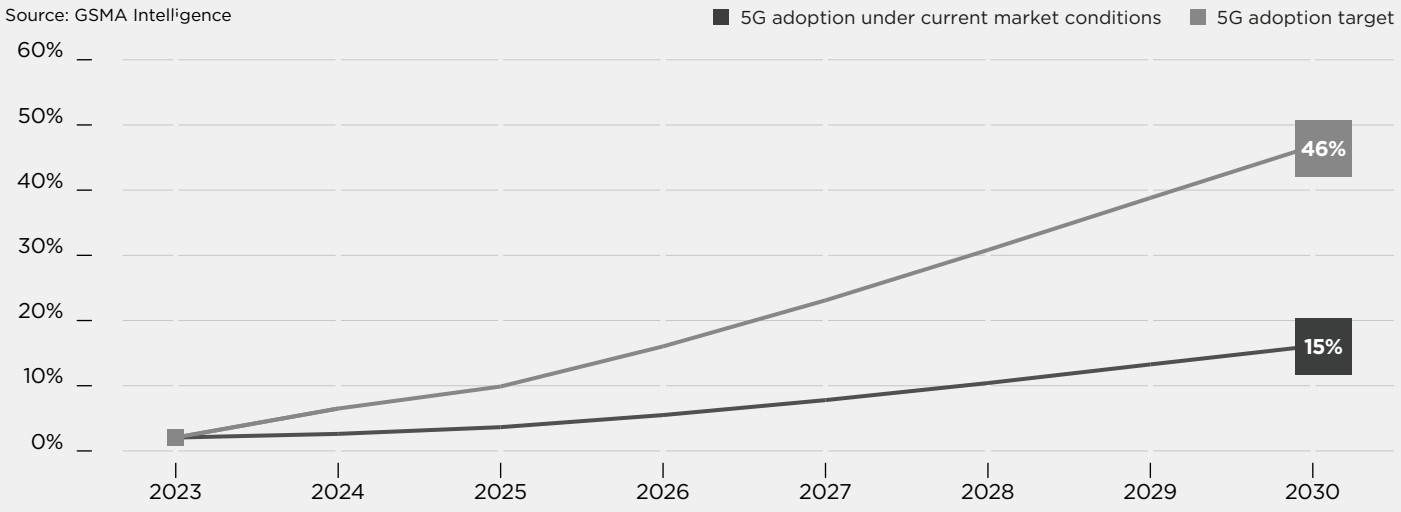


Figure 22

5G adoption in the Caribbean islands by 2030

Percentage of population



27 53% 5G coverage and 15% 5G adoption by 2030
28 94% 5G coverage and 46% 5G adoption by 2030
29 Further details on the quantitative assessment are explained in the annex.

03
Market reforms can boost adoption and investments

"While further progress towards digital transformation and inclusion targets is possible under current market conditions, this will be limited and will fall short of the targets that have been set, by some distance."

One possible solution to deliver public policy objectives beyond what the market can deliver under current conditions is through direct funding by the public sector or international development agencies.

However, with a total investment gap exceeding $3.5 billion, the scale of the challenge makes it unrealistic for such an approach to be viable. Any funding by the public sector eventually needs to be supported either through tax hikes or by increasing long-term indebtedness levels, both of which have broader implications and distortive effects for economies. Furthermore, public funds invested in digital infrastructure or used to subsidise digital adoption have large opportunity costs in the Caribbean islands, where public-sector spending competes with alternative public policy priorities such as health or education.

This is why alternatives that can boost adoption and investments by enhancing market conditions but without requiring the use of additional public-sector funds should be considered as a priority. There are several public policy options to help bridge this gap, including an effective spectrum policy that ensures that sufficient spectrum is available under conditions that enable investment and innovation in the deployment of new networks and services.

In this report, we consider and analyse the potential effects of three broad areas of market reform that can help unlock investments and improve affordability by correcting existing market and government failures: efficient network use; modernisation of the fiscal framework of the mobile sector; and VAT exemption for low-income groups.

Efficient network use

We consider the likely effects of a more efficient use of the network by improving existing incentives to minimise inefficient and unsolicited traffic generation in mobile networks. This policy reform aims to promote the efficient use of mobile networks, given the lack of incentives that LTGs currently face when generating traffic. As discussed in Chapter 1, evidence suggests that there is a sizable amount of traffic that is either unsolicited by consumers or generated inefficiently. In particular, we quantify the potential effects of this reform in slowing down traffic growth and costs, as well as knock-on effects on greater user adoption.

Quantifying the traffic reduction

Estimation of potential traffic reduction (unsolicited traffic originating from advertising, prebuffering, autoplay or videos sent at a higher resolution than watchable)

Reduction's impact on capex and opex

Assessing the reduction in costs generated by decreasing the traffic overload in mobile networks

Impact on adoption

Increase in adoption resulting from a reduction in long-term network costs, feeding through to end-user prices

Modernisation of the fiscal framework of the mobile sector

We consider the elimination of outdated sectoral fees and taxes that discourage and discriminate against the production and consumption of digital services. These legacy taxes are still a prevalent reality in many markets in the region, treating the production and consumption of digital services at higher tax rates than other goods and services. These distort market conditions and negatively affect the affordability and adoption of connectivity services, particularly among low-income populations.

While being an effective means to promote greater adoption and investments, such fiscal reforms would also likely result in modest or even positive net fiscal impacts for the public sector in the medium term.[30] Fiscal and regulatory modernisation measures[31] that are considered are as follows:

- On the supply side, we consider the elimination of fees that undermine incentives and hinder companies' capacity to invest. This includes, for example, broadening the base of contributors to universal service funds (USFs) and the elimination of sector-specific fees and customs duties on equipment.
- On the demand side, we consider the elimination of taxes and fees beyond VAT for internet access (both on devices and plans), such as the removal of customs duties on devices where this applies in the region.

Identify fees distorting market conditions

Supply side: USFs, operating and administrative fees, and customs duties on equipment

Demand side: customs duties on devices

Impact on prices and costs

Assessment of the fees' impacts on prices and costs (capex and opex)

Impact on adoption

Increase in adoption resulting from the impact generated by the policy reform's price reduction, according to the price elasticity of demand in the specific market

30 The removal of sector-specific taxes can result in increased demand for mobile services and more investment but also overall growth in government tax revenues over the medium term. For example, see How does digitalization improve non-resource tax revenue mobilization? Evidence from developing countries, Jule Kaïni TINTA, 2023

31 These measures are detailed in the annex.

VAT exemption for low-income groups

We consider an additional targeted exemption of fiscal burdens for low-income populations in the Caribbean islands. This involves the elimination of VAT on internet plans and devices, operating as a demand-boosting measure with significant potential, as it removes a tax that adds between 12% and 20% to price levels on both plans and devices in the Caribbean islands. This can represent significant improvements in the affordability of handsets and services for low-income populations in the Caribbean islands, supposing a significant advancement on the digital inclusion of vulnerable populations. When designed to target low-income populations exclusively, we expect these to have little to no fiscal impact on public-sector revenue generation, as the measure does not involve the reduction of VAT tax revenues from existing users.

VAT in the Caribbean islands	Impact on prices and costs	Impact on adoption
Estimation of the average VAT rate in the Caribbean islands, considering the different rates among markets	Assessment of the VAT impact on prices (data plan) and devices	Increase in adoption resulting from the impact generated by the policy reform´s price reduction, according to the price elasticity of demand in the specific market

Market reforms can reduce the 4G usage gap by 18 pp and the overall 4G investment gap, from $3 billion to $1.6 billion

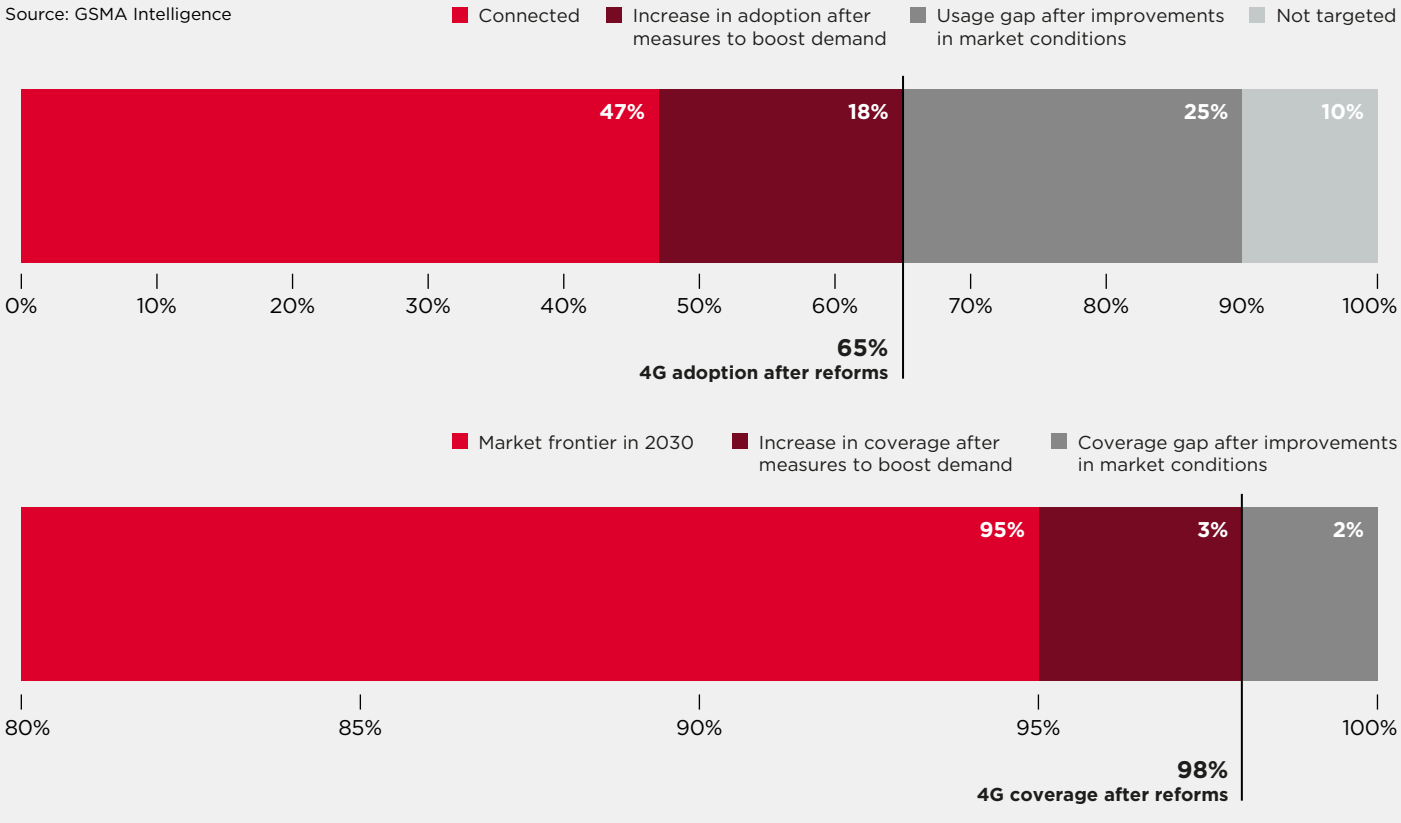
The results of the analysis show that collectively adopted these measures may potentially boost demand and increase expected coverage by expanding the market frontier significantly.

The expected effects on the adoption of 4G services is an increase of 18 pp by 2030. This would bring 4G adoption in the Caribbean islands close to 65% of the total population by 2030. The remaining 4G usage gap of 25% is highly influenced by the expected 4G usage gap in Haiti, which represents 19 pp of this figure.

Figure 23

Usage gap and market frontier expansion in the Caribbean islands by 2030 after policy reforms

Percentage of population



This increase in adoption implies a reduction of $1 billion in the usage gap that needs to be funded, from $2.4 billion without reforms to $1.4 billion after reforms. As Figure 24 shows, while VAT exemption is the measure with the greatest overall impact, both an efficient use of the network and the modernisation of the fiscal regime for the sector can drive large effects.[32]

The implementation of market reforms would also make it possible for the market to expand 4G mobile coverage of the overall population by almost 3 pp. This would make it profitable to extend coverage to nearly 98% of the total population in the Caribbean islands, reducing the coverage gap that needs to be funded by by $400 million.

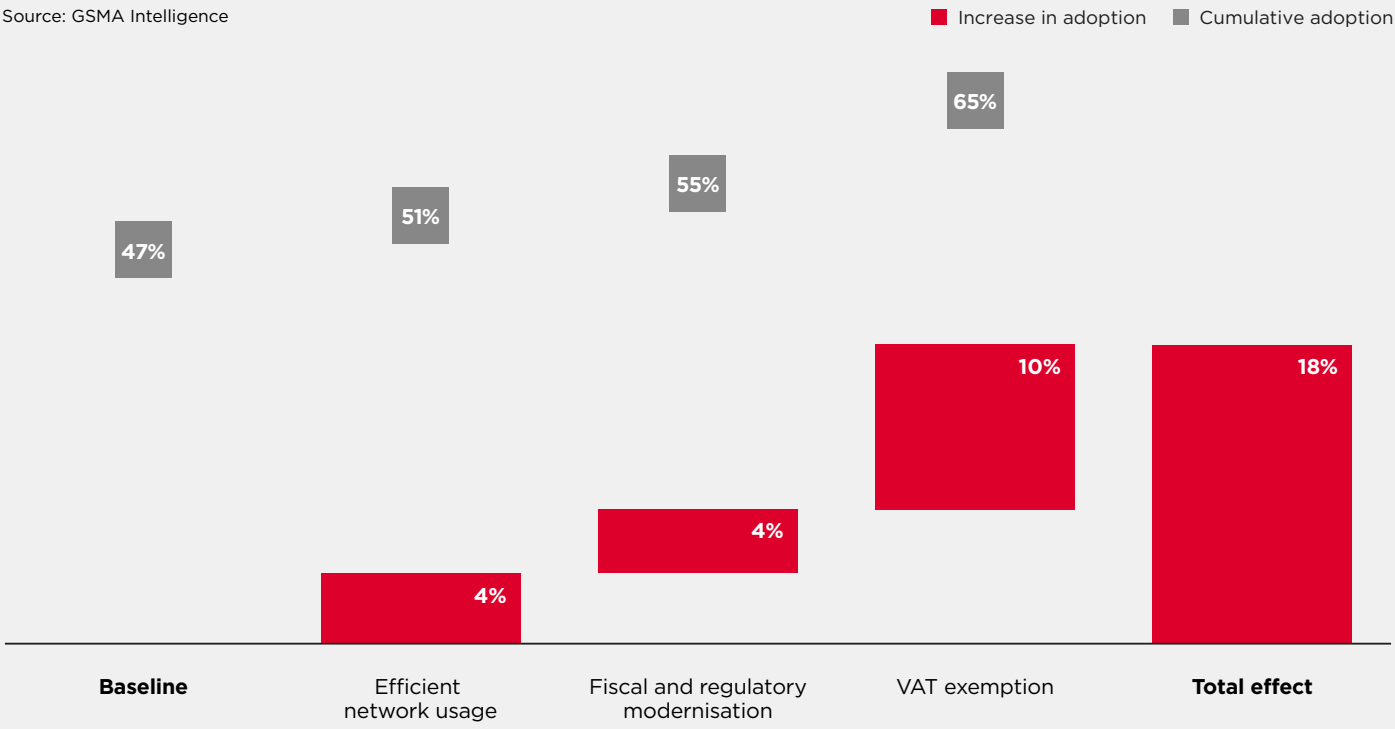
When combined, market reforms have a huge potential to reduce the overall 4G investment gap by around $1.4 billion.[33]

Figure 24

Usage gap reduction in the Caribbean islands by policy reform scenario, 2030

Percentage of population

Source: GSMA Intelligence



32 The VAT is the highest rate in the Caribbean islands (15% regional average), increasing not only final prices but also final capex and opex values. This is the reason why its reduction to zero for low-income consumers will generate the greatest impact on adoption, coverage and, subsequently, the expansion of the market frontier. The remaining rates are USF (0.5%); operating and administrative fees (3.4%) and customs duties (6%).

33 Note that these are stylized effects considered at the regional level and therefore might have different relative impacts when considered for individual market reforms at the country level.

Impact on digital transformation: market reforms alone can reduce the 5G investment gap by almost 25%

Public policy alternatives to enhance market conditions also have an impact on the future deployment of 5G, reducing the investment gap that is expected to materialise under current market conditions.

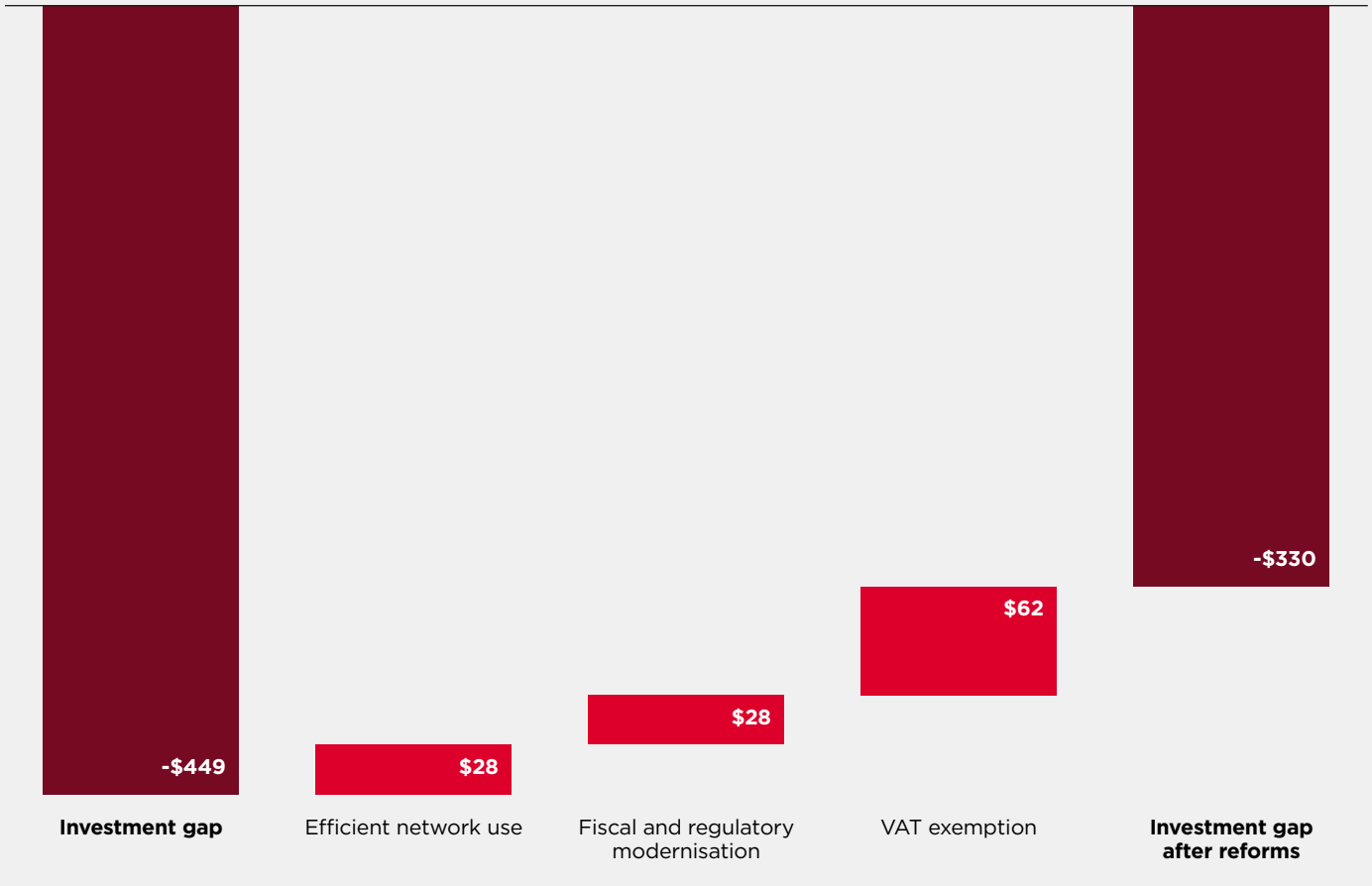
As Figure 25 shows, the overall effect of these measures is to reduce the investment gap by almost $120 million, with the individual contribution of specific measures ranging from $28 million to around $62 million.

Figure 25

NPV reduction in 5G deployment generated by policy reforms

Million

Source: GSMA Intelligence



GSMA Head Office
1 Angel Lane
London EC4R 3AB
United Kingdom

Tel: +44 (0)20 7356 0600
Fax: +44 (0)20 7356 0601