



The Mobile Economy **Latin America** 2022



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 [gsma.com](https://www.gsma.com)
Follow the GSMA on Twitter: [@GSMA](https://twitter.com/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

Contents

| | | |
|----------|---|----|
| | Executive summary | 2 |
| 1 | The mobile market in numbers | 10 |
| 1.1 | Subscriber growth remains strong | 11 |
| 1.2 | 5G grows as 4G begins to plateau | 12 |
| 1.3 | Smartphone adoption and data traffic on the rise | 13 |
| 1.4 | Revenue growth outlook remains strong | 15 |
| 2 | Key trends shaping the digital landscape | 16 |
| 2.1 | The 5G era starts to take shape | 17 |
| 2.2 | The telco of the future: operators shift to renewable energy | 21 |
| 2.3 | The metaverse takes root in Latin America | 24 |
| 2.4 | Digital disruption sparks investments in tech start-ups | 26 |
| 3 | Mobile contributing to economic growth and social progress | 28 |
| 3.1 | Mobile's contribution to economic growth | 29 |
| 3.2 | Mobile enhancing digital inclusion | 32 |
| 3.3 | The mobile industry's impact on the SDGs | 34 |
| 4 | Policies to accelerate Latin America's digital future | 36 |
| 4.1 | Universal access to connectivity | 37 |
| 4.2 | Spectrum management and pricing | 39 |

Executive summary



Addressing the usage gap is crucial to closing the digital divide

At the end of 2021, the number of mobile internet users in Latin America exceeded 380 million, equating to 60% of the population.

As the world emerges from the pandemic and many social and economic activities adapt to a 'new normal', digital connectivity is underpinning innovative applications for consumers and new business models for enterprises. A priority for governments in Latin America and elsewhere is to drive economic recovery and promote sustainable development. Digital services and technologies are crucial to realising this objective, by stimulating economic growth, mobilising the workforce and enabling industrial efficiencies.

In Latin America, mobile connectivity remains the main form of internet connectivity, particularly as – for many – it is the only form of connectivity. At the end of 2021, the number of mobile internet users in Latin America exceeded 380 million, equating to 60% of the population. However, another 36% live in areas covered by mobile broadband networks but do not use mobile internet services (known as the usage gap). Addressing the main barriers to mobile internet adoption, including affordability, safety and security, and knowledge and digital skills, will extend the benefits of the internet and digital technology to more people in society. This requires a concerted effort by the mobile industry and its partners.



4G dominates, but 5G's footprint is expanding

4G is Latin America's leading mobile technology, with more than 410 million connections at the end of 2021. Take-up has more than doubled over the past five years, driven by network expansion and efforts by mobile operators to transition users away from legacy networks. 4G adoption is projected to peak in 2024, as consumers increasingly migrate to 5G plans.

5G is currently at a nascent stage in Latin America. By the end of June 2022, seven countries in the region had launched commercial 5G services. The current adoption rate is around 1% of total connections; this is expected to grow to 11% by 2025. Mobile operators are leveraging 5G to pursue new opportunities. For example, 5G fixed wireless access (FWA) is being used to drive first-time home broadband adoption in markets such as Brazil, Colombia and Peru. Additionally, an increasing number of enterprises across various sectors are attracted to the possibility of using customised private 5G networks, with several companies announcing plans in 2022 for commercial deployments.



New opportunities point to Latin America's digital future

The Covid-19 pandemic highlighted the huge opportunity for digital technology to disrupt legacy business processes. This, in turn, is driving investments in the tech start-up ecosystem. In 2021, Latin American start-ups raised a record \$19.5 billion in funding – more than three times the amount raised in 2019.¹ This resulted in 18 start-ups in the region achieving ‘unicorn’ status (start-ups with a market value of \$1 billion before going public). Fintech remains a significant driver, but several other sectors, including education and e-commerce, are seeing a growing share of investments.

The concept of the metaverse, a parallel virtual world populated with avatars, has gained significant mindshare in Latin America. As such, the region is attracting the attention of global metaverse ecosystem players, such as Meta. In addition, a growing number of local ecosystem players, including government agencies, have announced activities across the metaverse value chain. Mobile operators will play a central role in the future development of the metaverse in Latin America. Mobile networks, particularly 5G, will provide the required connectivity for the metaverse in the region. There are also opportunities to participate in other parts of the value chain, as has been demonstrated by operators in other regions around the world.

1. “Here’s What’s Driving Latin America’s Rank As The World’s Fastest-Growing Region For Venture Funding”, Crunchbase, January 2022



Mobile continues to make a significant contribution to the economy and wider society

In 2021, mobile technologies and services generated 7.4% of GDP in Latin America – a contribution that amounted to more than \$345 billion of economic value added. The mobile ecosystem also supported more than 1.6 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector, with almost \$30 billion raised through taxes on the sector. Over the period to 2025, mobile's contribution will grow by around \$20 billion, as countries in the region increasingly benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services.

Beyond economic impacts, mobile operators are making significant contributions to the welfare of society more broadly, as demonstrated by efforts to support the achievement of the UN Sustainable Development Goals (SDGs). Operators continue to deliver the connectivity that enables the growth of small businesses and digital transformation of enterprises, and provide access to life-enhancing services and tools for citizens. Education is one example, with operators in Latin America offering a range of digital tools and platforms to enable students to learn from any location, helping to meet SDG 4: Quality Education.



Policy decisions are key to accelerating Latin America's digital future

Unlocking the potential of mobile connectivity requires policy measures to support network investments and improve the affordability of digital services

The pandemic has increased the profile and political awareness of the advantages of digitisation. However, as more activities move online, unconnected populations will be at greater risk of exclusion from life-enhancing services. This underlines the importance of accelerating progress towards universal access to connectivity to drive social inclusion, economic recovery and future crisis resilience.

Unlocking the potential of mobile connectivity requires policy measures to support network investments and improve the affordability of digital services for consumers. Policy priorities should be based on a country's local context and level of digital development, which requires granular and reliable data. There is also a need to promote digital skills and education across all parts of society.

Fully realising the mobile opportunity will require forward-looking policymaking, particularly with respect to spectrum. The high cost of spectrum in the region is preventing millions of people from gaining access to mobile broadband services or experiencing high-quality networks. High prices are not exclusively justified by supply and demand; some governments have prioritised tax revenue generation goals, with clear consequences for the industry and users.

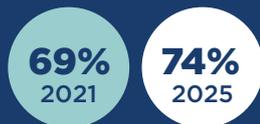
The Mobile Economy Latin America



Unique mobile subscribers

2021
2025

439m
487m



Penetration rate
Percentage of population



CAGR
2021-2025

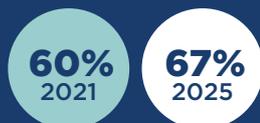
2.6%



Mobile internet users

2021
2025

384m
440m



Penetration rate
Percentage of population



CAGR
2021-2025

3.5%



SIM connections

(excluding licensed cellular IoT)

2021
2025

694m
812m

Penetration rate
Percentage of population

109% 2021 | 123% 2025



4G

Percentage of connections
(excluding licensed cellular IoT)

2021 59% → 2025 70%



5G

Percentage of connections
(excluding licensed cellular IoT)



2025
11%



CAGR
2021-2025
4.0%



Smartphones

Percentage of connections
(excluding licensed cellular IoT)

2021

76%



2025

83%



Licensed cellular IoT connections

2021

44m



2025

78m



Operator revenues and investment

2021

\$60bn



2025

\$74bn

Total revenues

Operator capex

\$60bn

2021 — 2025



Mobile industry contribution to GDP

2021

\$345bn 7.4% of GDP

2025

\$365bn



Public funding

2021

\$30bn



Mobile ecosystem contribution to public funding (before regulatory and spectrum fees)



Employment

650,000 jobs



970,000 jobs supported indirectly



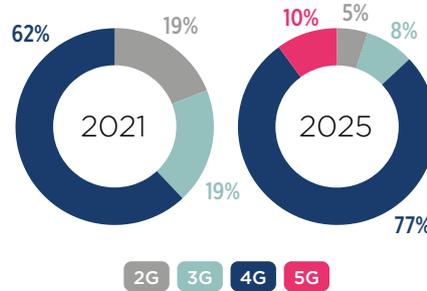
Directly supported by the mobile ecosystem in 2021

Subscriber and technology trends for key markets

Argentina



TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



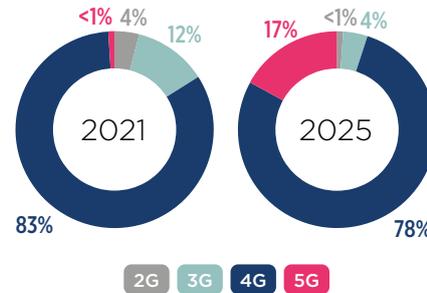
SMARTPHONE ADOPTION



Brazil



TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



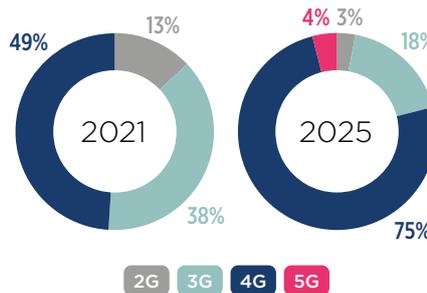
SMARTPHONE ADOPTION



Colombia



TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



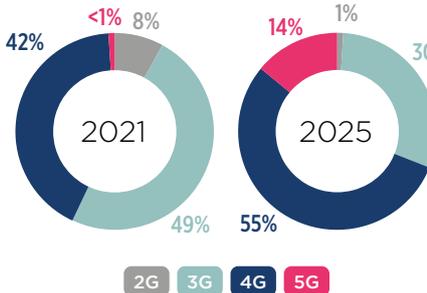
SMARTPHONE ADOPTION



Mexico



TECHNOLOGY MIX*

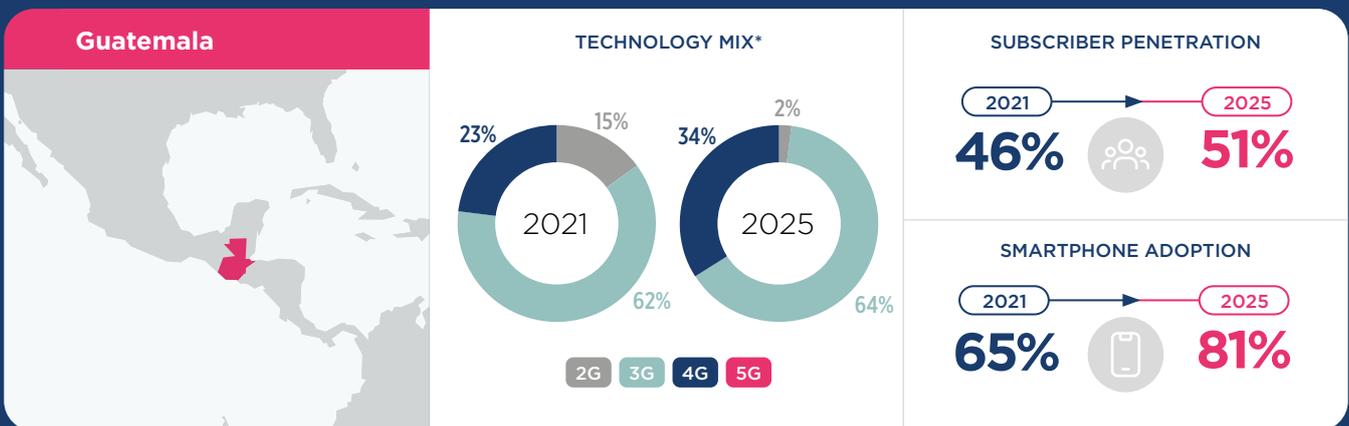
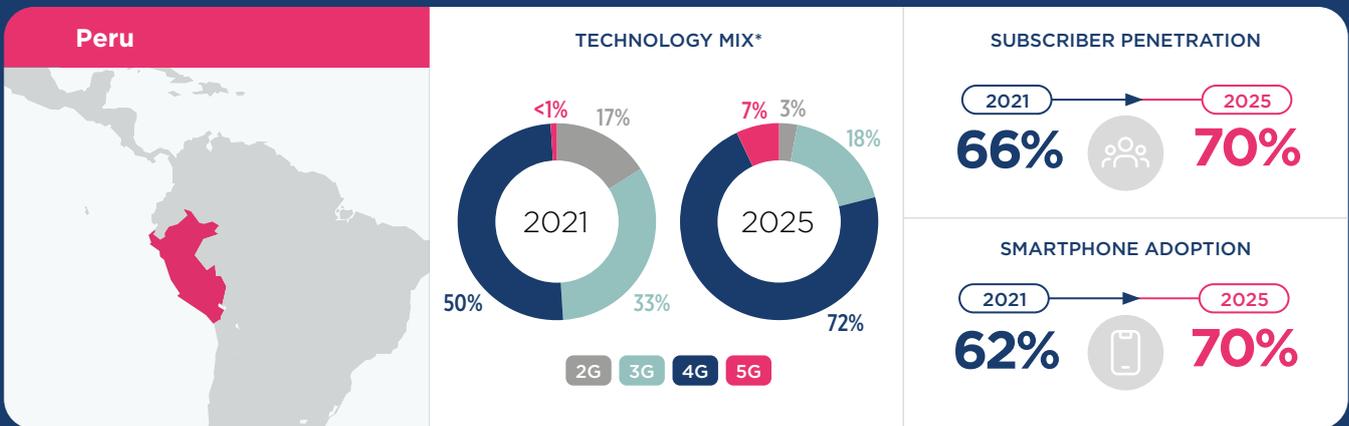
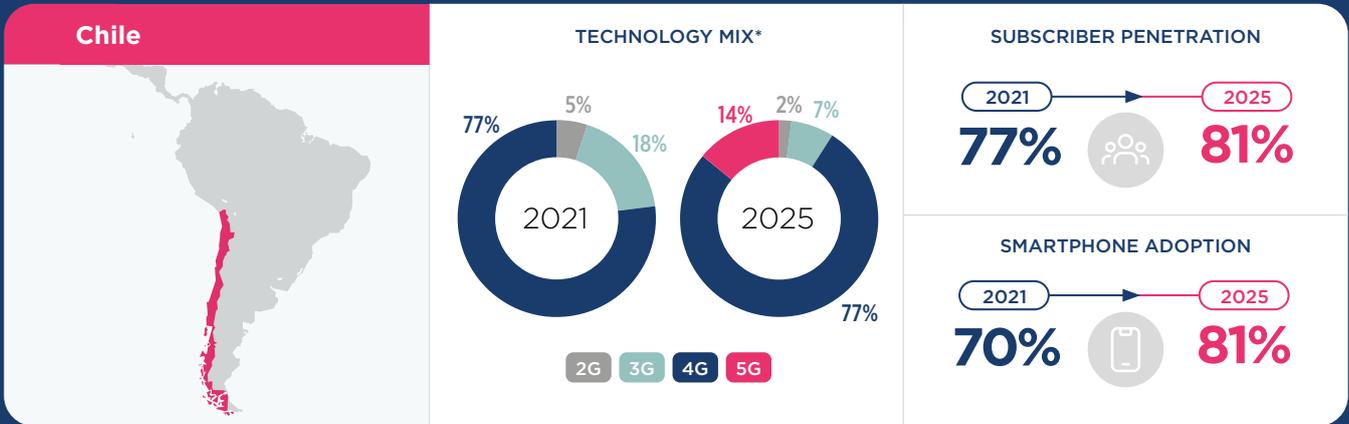


SUBSCRIBER PENETRATION



SMARTPHONE ADOPTION





* Percentage of total connections
 Note: Totals may not add up due to rounding



01

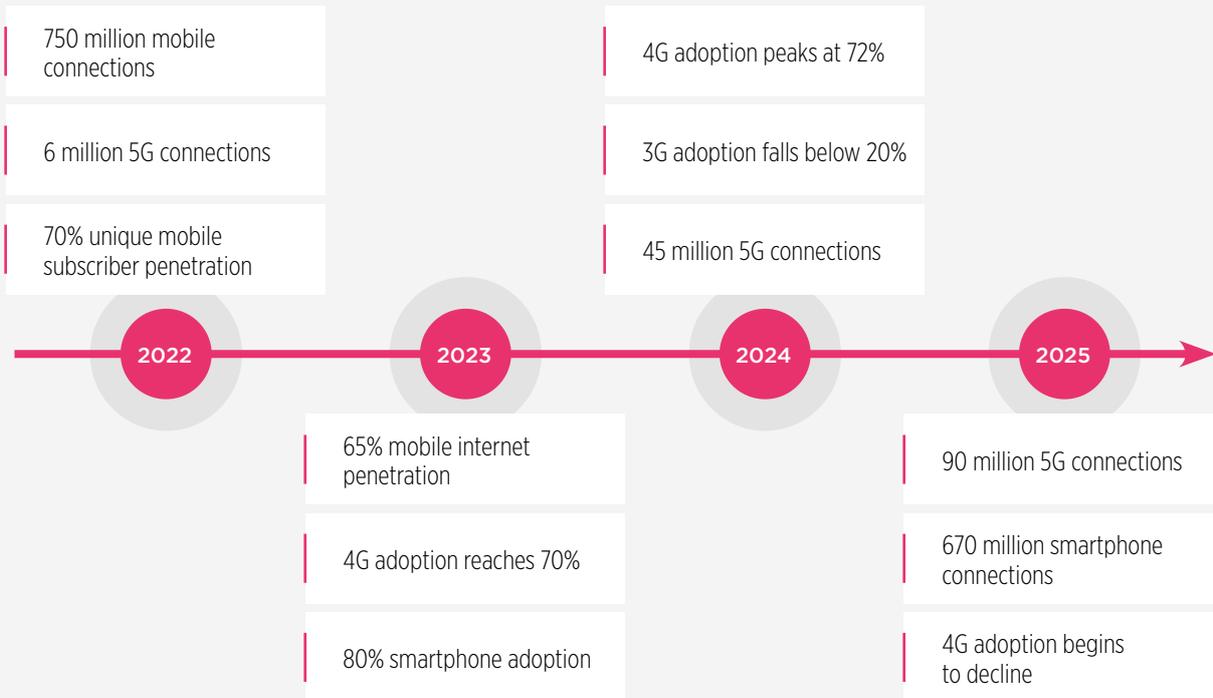
The mobile market in numbers



1.1 Subscriber growth remains strong

Figure 1

Key milestones for the mobile industry in Latin America to 2025

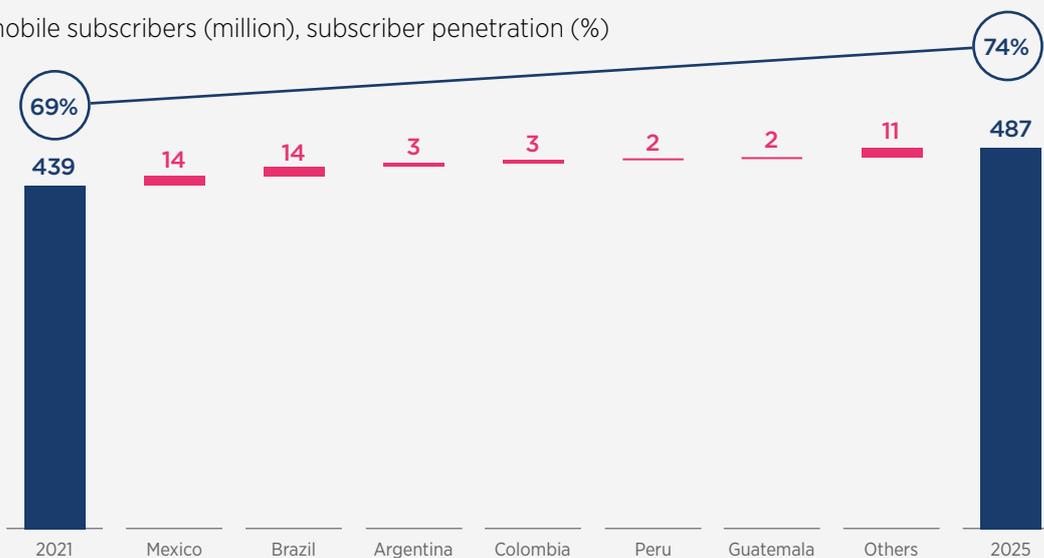


Source: GSMA Intelligence

Figure 2

There will be nearly 50 million additional mobile subscribers in Latin America by 2025; Brazil and Mexico combined will account for over half

New mobile subscribers (million), subscriber penetration (%)



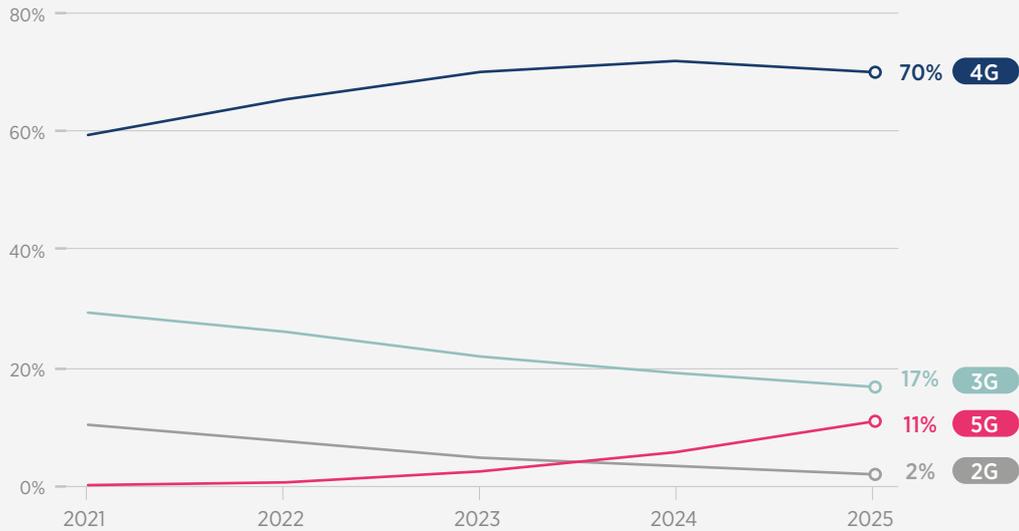
Source: GSMA Intelligence

1.2 5G grows as 4G begins to plateau

Figure 3

5G adoption in Latin America will overtake 2G in 2024, as 4G reaches its peak

Percentage of total connections (excluding licensed cellular IoT)

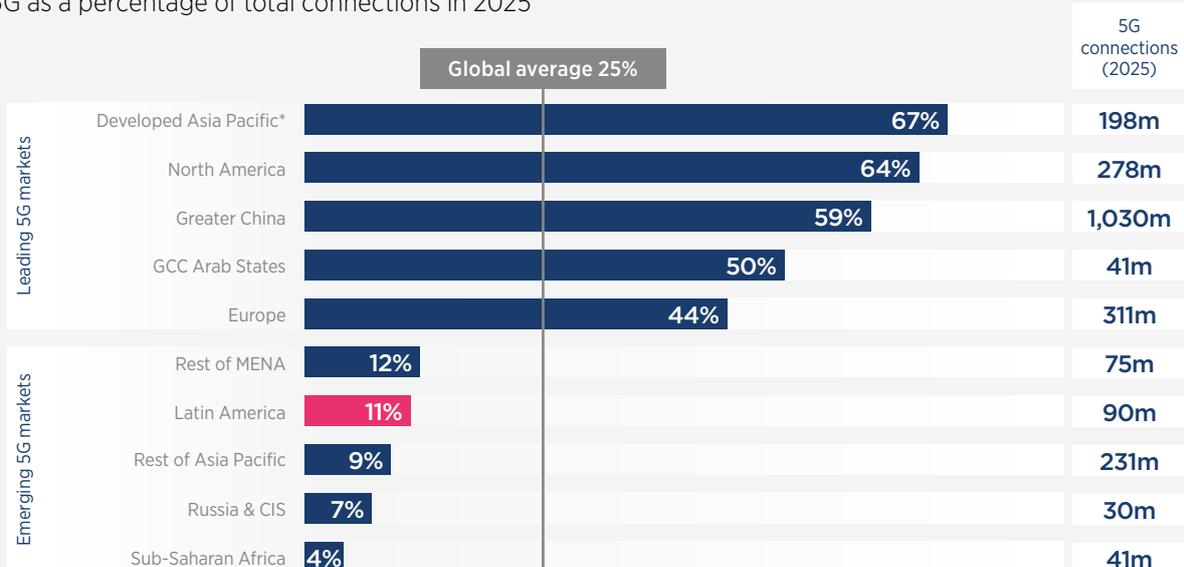


Source: GSMA Intelligence

Figure 4

By 2025, 5G adoption will reach double digits in Latin America but will lag the global average

5G as a percentage of total connections in 2025



Source: GSMA Intelligence

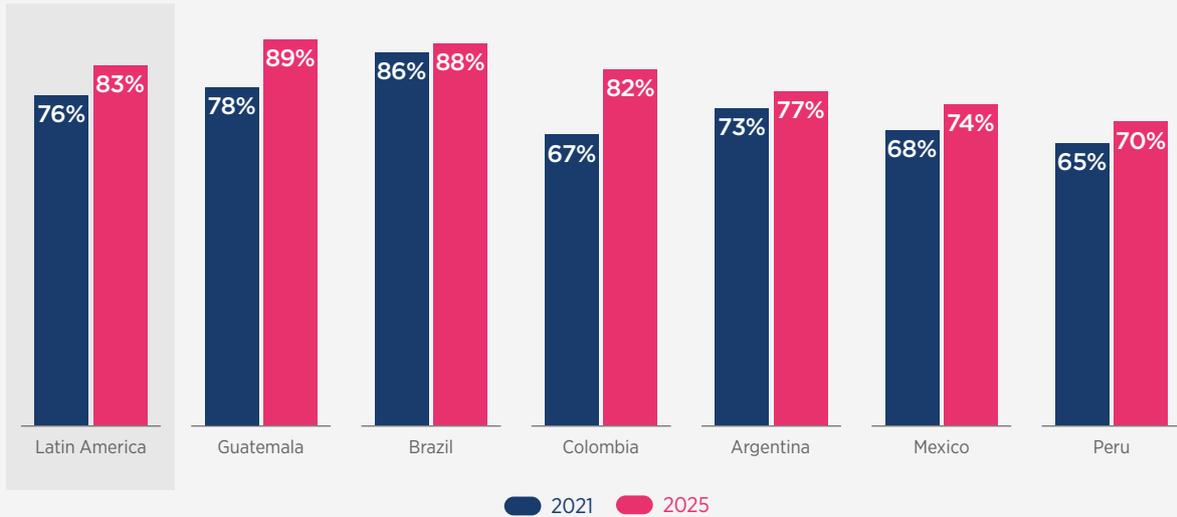
* Australia, Japan, Singapore and South Korea

1.3 Smartphone adoption and data traffic on the rise

Figure 5

By 2025, smartphones will on average account for 83% of total connections in Latin America

Smartphones as a percentage of total connections in selected markets in Latin America

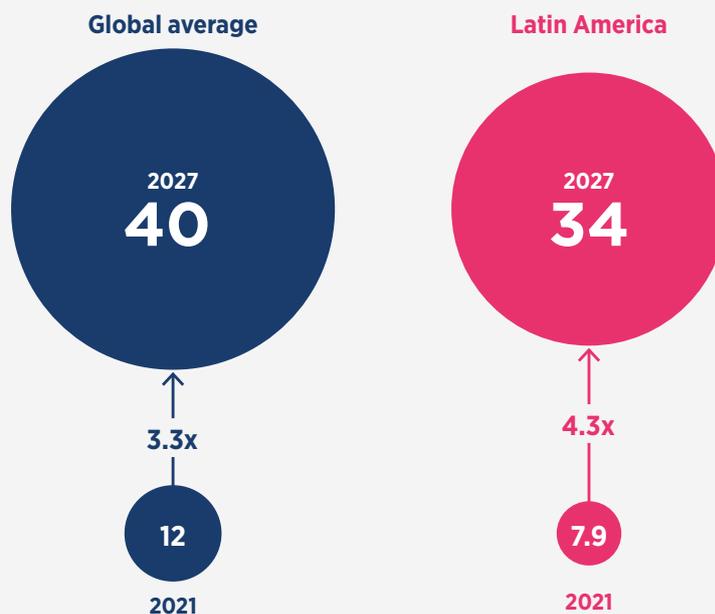


Source: GSMA Intelligence

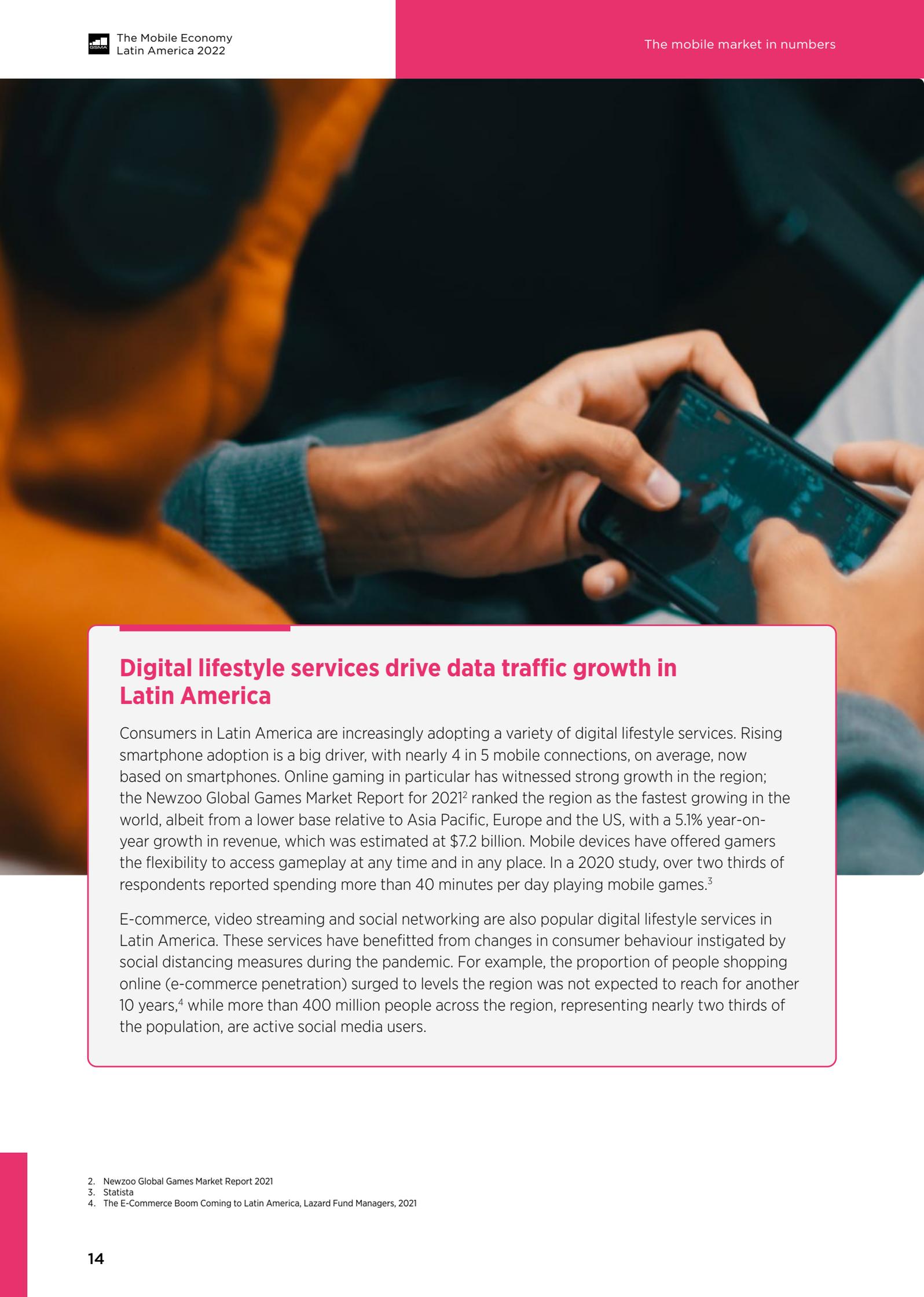
Figure 6

Mobile data consumption in Latin America will quadruple by 2027, growing faster than the global average

Mobile data traffic per smartphone (GB per month)



Source: Ericsson



Digital lifestyle services drive data traffic growth in Latin America

Consumers in Latin America are increasingly adopting a variety of digital lifestyle services. Rising smartphone adoption is a big driver, with nearly 4 in 5 mobile connections, on average, now based on smartphones. Online gaming in particular has witnessed strong growth in the region; the Newzoo Global Games Market Report for 2021² ranked the region as the fastest growing in the world, albeit from a lower base relative to Asia Pacific, Europe and the US, with a 5.1% year-on-year growth in revenue, which was estimated at \$7.2 billion. Mobile devices have offered gamers the flexibility to access gameplay at any time and in any place. In a 2020 study, over two thirds of respondents reported spending more than 40 minutes per day playing mobile games.³

E-commerce, video streaming and social networking are also popular digital lifestyle services in Latin America. These services have benefitted from changes in consumer behaviour instigated by social distancing measures during the pandemic. For example, the proportion of people shopping online (e-commerce penetration) surged to levels the region was not expected to reach for another 10 years,⁴ while more than 400 million people across the region, representing nearly two thirds of the population, are active social media users.

2. Newzoo Global Games Market Report 2021

3. Statista

4. The E-Commerce Boom Coming to Latin America, Lazard Fund Managers, 2021

1.4 Revenue growth outlook remains strong

Figure 7

Mobile operator revenue in Latin America will grow steadily to 2025

Mobile revenue (billion)

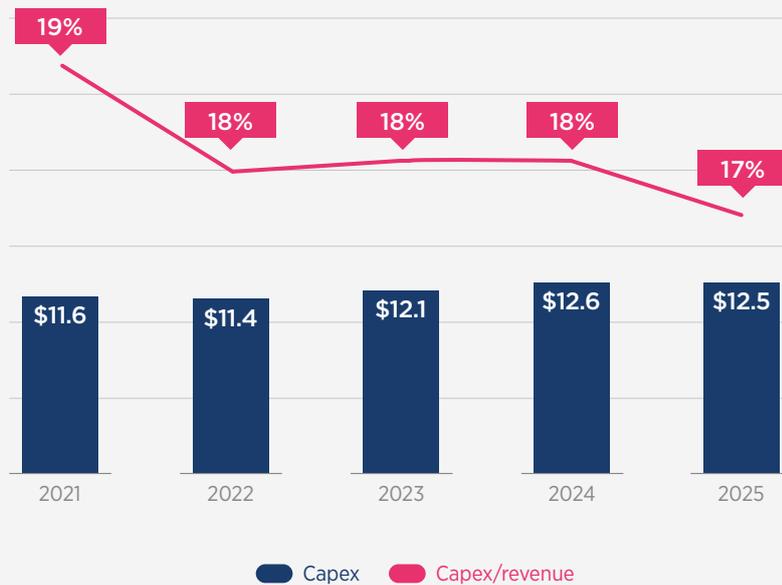


Source: GSMA Intelligence

Figure 8

5G rollouts to sustain capex growth over the next five years in Latin America

Operator capex (billion)



Source: GSMA Intelligence

02

Key trends shaping the digital landscape



2.1 The 5G era starts to take shape

5G continues to make inroads in Latin America. As of mid-2022, seven countries in the region had launched commercial 5G services. Operators in Uruguay have publicly announced plans to launch commercial 5G services in the coming years, with more announcements expected to follow soon.

5G coverage in the region is still mostly limited to major cities, but there is growing evidence

that deployments are ramping up. 5G coverage is available in 22 cities across Brazil and in all districts of Chile. Furthermore, at the end of June 2022, 5G networks were live in 40 Mexican cities, offering coverage to around 56 million people. With coverage expanding, 5G adoption is steadily rising across the region and is forecast to reach 6.3 million connections at the end of 2022.

Figure 9
5G deployments across Latin America



Source: GSMA Intelligence
*Launched commercial 5G FWA services but not 5G mobile

As is the case globally, most initial 5G deployments in Latin America began with a non-standalone (NSA) architecture, leveraging the 5G radio access network (RAN) equipment for connectivity and a 4G core for control functions. This allowed operators to launch 5G services more quickly and cost-effectively, with greater levels of coverage than if they opted for the standalone (SA) alternative.

To date, 5G SA is only available in Brazil and Colombia in the region, with the former home to a much larger rollout of 5G SA networks. This has been driven by the demands of Brazil's telecoms regulator, which issued obligations for 5G SA rollout as part of the recent spectrum auction. Such actions could help accelerate the development of new applications and

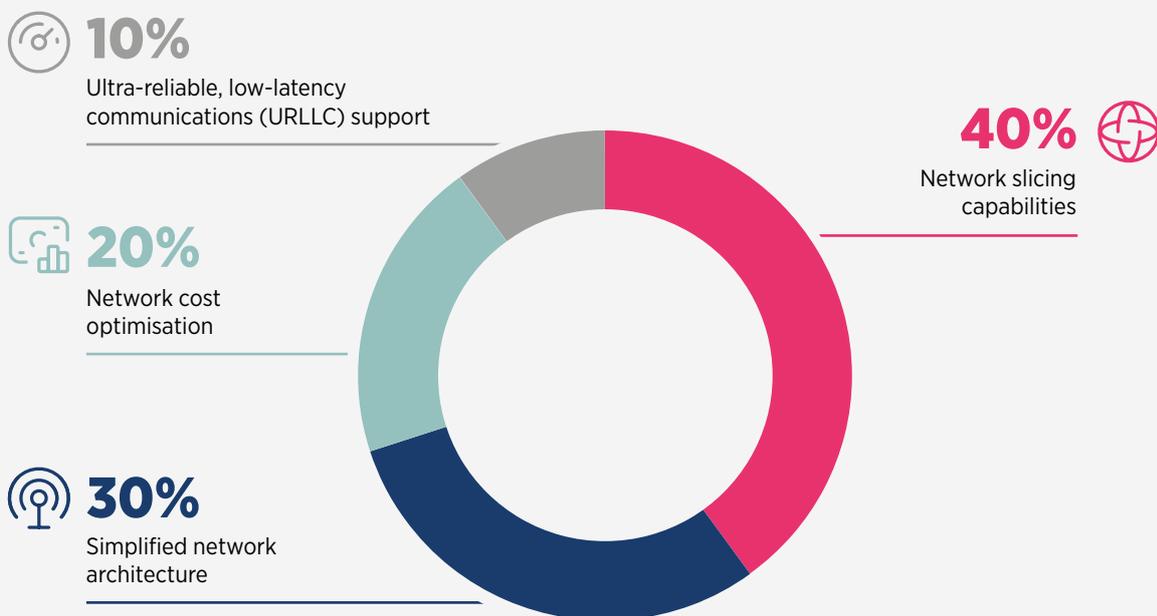
use cases that rely on 5G's improved functionality. In March 2022, TIM Brazil said it has completed the implementation of its 5G core SA network in the country.

The rollout of 5G SA networks will drive interest in the customised network capabilities that network slicing can create. While slicing has use cases in the consumer segment (e.g. gaming), it is the enterprise market (e.g. IoT applications across vertical sectors) that is attracting more attention. That the industry is still conducting network slicing trials indicates there is work to be done to execute on its commercialisation, but those trials are critical to ensure that dedicated on-demand slicing solutions can deliver on their promise.

Figure 10

Developing network slicing capabilities remains a priority for operators in Latin America

Top benefit of 5G SA (percentage of operators)



Note: massive machine-type communications (MMTC) scored 0%
Source: GSMA Intelligence Operators in Focus: Network Transformation Survey 2022

5G FWA builds momentum, while operators look to develop further 5G use cases

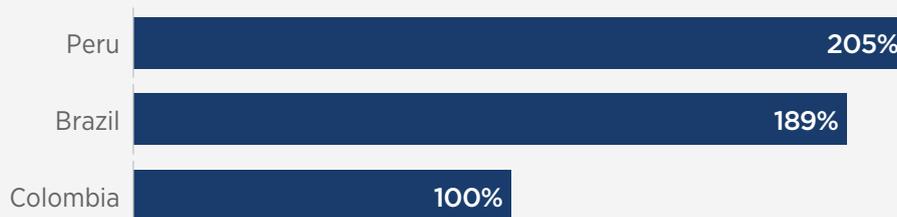
5G FWA is being used to drive first-time home broadband adoption in markets such as Brazil, Colombia and Peru. A common target market is the urban, middle-income segment. 5G FWA has a lower time-to-market than FTTH, while GSMA Intelligence research shows that it can be cost-effective versus FTTH in several scenarios.⁵ This is particularly the case where new fibre infrastructure needs to be built, so it represents a suitable and timely tool for tackling the digital divide in emerging markets.

Over the next four years, 5G FWA connections are expected to grow by around 90% per annum (on average, across the 52 countries which have either launched or announced a 5G FWA service as of June 2022). Although this figure is boosted by the small 5G FWA base currently, it still shows clear momentum behind 5G FWA. By 2025, the total number of 5G FWA connections across the 52 countries is expected to reach around 40 million, up from 4 million connections in 2021. Around a fifth of the 52 markets, including Brazil, are forecast to record more than 1 million 5G FWA subscribers by 2025.

Figure 11

Peru and Brazil lead the way for 5G FWA in Latin America

5G FWA connections growth forecast (CAGR), 2021–2025



Source: GSMA Intelligence

Beyond FWA, mobile operators are acutely aware of the need to develop further compelling use cases that leverage 5G's unique capabilities. These will require the right blend of partnerships, with a combination of capabilities key to creating value. As such, operators and equipment vendors have invested in 5G labs dedicated to co-creating solutions with partners to address specific needs. Recent examples include the following:

- September 2022:** Costa Rica's telecoms development plan will include the creation of 5G laboratories. Universities, operators and other private companies have all signalled their interest in the initiative.
- July 2022:** Nokia and AT&T Mexico announced that they are collaborating to accelerate the development of the 5G ecosystem in Mexico. As part of this, Nokia has been selected as a strategic partner for AT&T Mexico's recently inaugurated 5G Innovation Lab.
- June 2022:** Movistar Chile, Huawei and Universidad de Chile announced a partnership to develop a 5G laboratory in the Carén campus. The initiative is part of the Movistar inter-regional circuit, which comprises 10 technological laboratories in five regions of Chile.

5. [The 5G FWA opportunity: A TCO model for a 5G mmWave FWA network](#), GSMA Intelligence, 2022

Demand for private networks continues to grow

For enterprises, the introduction of 5G means many different use cases are possible within a common standard. 5G technology can be used to bring significant improvements to existing use cases (e.g. reliable indoor coverage in warehouses or remote sites in oil extraction or mining) or to enable new use cases (e.g. embedding video and object recognition into quality inspections of manufactured parts).

An increasing number of enterprises across vertical sectors are attracted to the possibility of using customised private 5G networks. In this way, they can effectively control who can access the network and the data flowing within it, while also ensuring reliability, privacy and resilience. 2022 saw growing momentum behind private networks in Latin America, with a number of significant announcements.

Figure 12

Factories, mines and ports emerge as popular private network use cases



Brazil

In September 2022, Nestlé announced it had commissioned Claro and Embratel, both subsidiaries of América Móvil, to build a private 5G network at its factory in São Paulo. Ericsson will supply network equipment. Nestlé cited the ability to connect a larger number of devices to the same network as a key reason for opting for private 5G.



Chile

Nokia revealed in March 2022 that it had won a contract to provide an industrial-grade private 5G network in one of the four copper mines run by Antofagasta Minerals in Chile. The network will provide high-capacity, low-latency connectivity for sensors and vehicles, including a fleet of autonomous trucks.

In October 2022, Entel and Ericsson announced a partnership to accelerate the digital transformation of businesses in Chile. As part of this, Entel Chile will integrate Ericsson's Private 5G solution within its enterprise offering.



Mexico

In August 2022, AT&T and Nokia announced they will deploy a private LTE network at APM Terminals port in Yucatán, Mexico. APM Terminals said the installation will support future applications, including remote and autonomous crane operations at the piers and yards. Private 5G can build on existing LTE networks, which often use 5G-compatible equipment.

Source: GSMA Intelligence

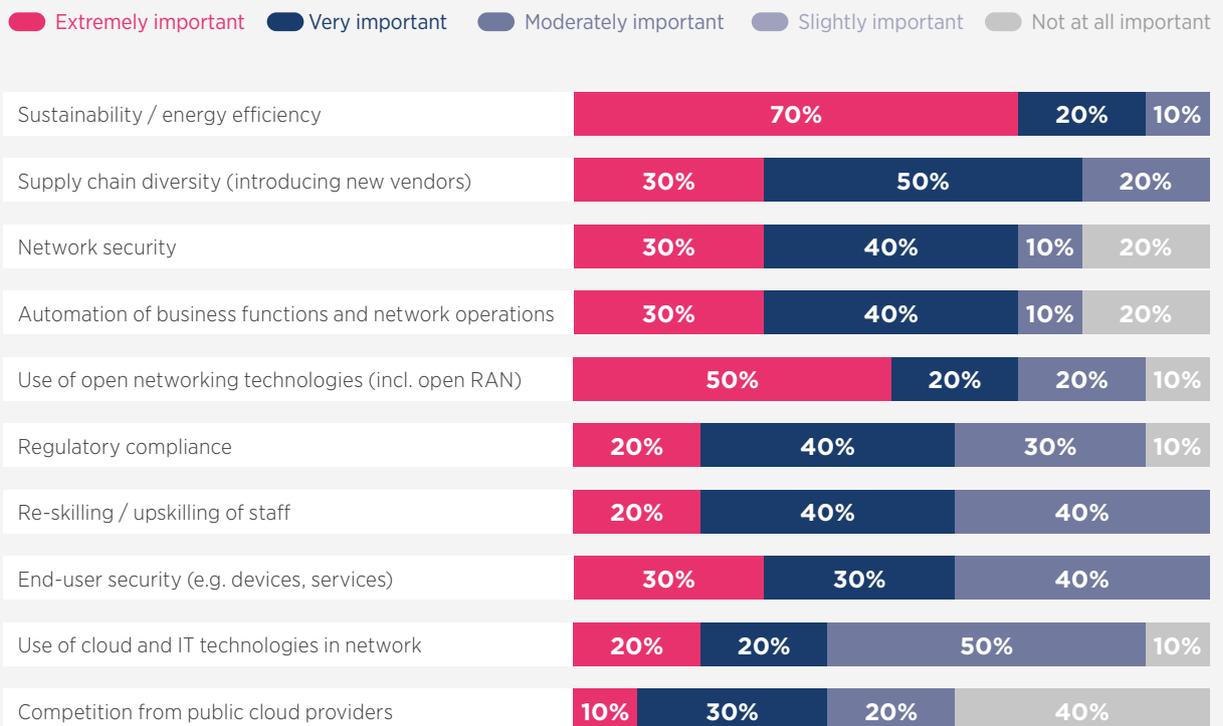
2.2 The telco of the future: operators shift to renewable energy

Sustainability in telco operations is expanding across Latin America, with operators at the forefront of green transformation and the transition to cleaner energy sources. This is with a view to meeting government commitments to climate action and securing access to sustainable energy sources at a time of increasing uncertainty around international energy costs. Operators in Latin America have committed to ambitious net-zero targets, taking steps to reduce carbon emissions within their operations and across their supply chains.

According to the GSMA Intelligence Network Transformation Survey 2022, most operators (90%) in Latin America see sustainability as a very or extremely important network transformation priority. This was 10 percentage points higher than supply chain diversity (introducing new vendors), in second place. With supply chain diversity and automation of business functions and network operations both towards the top of network transformation priorities in Latin America, efficiency and cost reduction are clearly high on the agenda for operators.

Figure 13
Sustainability leads the agenda in Latin America

How important are the following priorities as a part of your network transformation strategy?
(Percentage of respondents, Latin America)



Source: GSMA Intelligence Operators in Focus: Network Transformation Survey 2022

The sustainability theme also links to customer and shareholder interest in operators being good stewards of the environment and the expectation of savings from great energy efficiency. As a result, all the major operators in Latin America have now set ambitious green transformation plans.

In practice, this involves energy efficiency in network operations and increasing the share of renewable energy in the energy mix. The use of renewable energy sources is a quick and effective way to reduce environmental footprints while not requiring heavy investments. Countries in Latin America are particularly well positioned for the use of renewable energy, particularly solar, given the high sunshine duration ratio and the potential to serve cell sites in off-grid and hard-to-reach locations. This can be achieved through solar panels within cell sites or by building large, centralised solar farms.

Biomass, bioethanol and renewable electricity are widely available in some countries in Latin America. Bioenergy production in Brazil reached around 58.7 terawatt hours in 2020, up by more than 80% compared to 2011, when production amounted to approximately 32.6 terawatt hours.⁶ The contribution of biofuels to Brazil's energy matrix is expected to reach 18% by 2030.⁷

Operators in Latin America are also part of a growing global trend among operators to develop power purchase agreements (PPAs) with local energy suppliers. PPAs, whereby an operator (or company from any industry) invests capital with a renewable energy provider to fund capacity at a specific generation facility, such as a solar or wind farm, will represent a vital part of efforts to reduce carbon emissions.

Operator efforts to transition to renewable energy sources in Latin America

America Movil (Claro)

- Claro Colombia upgraded 62 of its cell sites to solar power through photovoltaic panels. The initiative is expected to lead to a reduction of about 3,109t of CO₂ per year.
- In Brazil, 55% of Claro's cell sites already use renewable energy, with 38% from solar. In several states, over 90% of cell sites are solar-powered.
- In 2021, Claro Brazil started using a distributed generation biogas plant capable of generating 4.65 MWh. The plant was built and operated by RZK Energia and generates power from landfill waste.
- In its 2021 sustainability report, America Movil said that its global energy consumption was 6.4 million MWh, of which 21% was from renewable energy. The group also claimed that, during 2021, 46% of its subsidiaries had formed PPAs with power providers.

Tigo (Millicom)

- Tigo (Millicom) has made progress signing PPAs for renewable energy in Panama and has carried out a successful pilot in Honduras to deploy solar and smart power management systems under an energy-as-a-service (EaaS) model.
- In its 2021 sustainability report, the operator said it expected to roll out three more EaaS operations in more than 2,700 sites over the next five years.

6. Renewable Energy Statistics 2022, IRENA 2022

7. "Biofuels to reach 18% of Brazil's energy matrix", gov.br, January 2022



AT&T

- AT&T is a leader in the drive to reduce carbon emissions and has been recognised for its efforts by the Latin American Energy Organization (OLADE).
- In 2019, AT&T began using lithium batteries in most power cabinets for its infrastructure, reducing energy consumption at sites and optimising maintenance costs. In 2021, the operator began research into green energy, aiming to reduce fuel consumption at its cell sites by more than 50%.
- AT&T plans to deploy more green energy solutions in 2023 across its mobile switching offices and cell sites. It expects these initiatives to help achieve carbon neutrality in the near future.

Telefonica

- Telefonica Brasil (Vivo) launched two new solar plants in September 2022 under the distributed generation model in the cities of Itabaiana and Lagarto, Sergipe state, in partnership with Grupo Gera. Under the distributed generation model, the energy produced by the plant is put into the network of the local utility, in this case Energisa Sergipe, and transformed into credit for use by the consuming company.
- In April 2022, Vivo started operations at its first photovoltaic park in Brazil's north region, in Roraima state. Voltxs Energia was responsible for the solar park built in state capital Boa Vista.
- Vivo plans to have 85 distributed generation plants operating in Brazil, mostly solar, supplying around 90% of its low-voltage power demand. Of this total, 33 facilities are currently in operation. Some 13 plants are planned for the northeast, seven of which are already in operation. When all are up and running, the operator's domestic plants are projected to generate a combined 711 GWh per year, serving 30,000 Telefonica consumption units.
- Vivo's goal is to reduce emissions in the value chain by 39% by 2025 and achieve net-zero emissions by 2040.
- Movistar Venezuela plans to supply six local telecoms stations with renewable energy through the use of solar panels. The first of such stations are already up and running in Los Valles del Tuy, Miranda state.
- Movistar Colombia has had a PPA with Sun Colombia since 2020. The aim is to buy renewable energy from the solar generation system at the Celta plant in the capital, Bogota.

TIM

- Telecom Italia Brazil has launched the SkyCoverage project, planning to cover 100% of Bahia's municipalities with 4G by the end of 2022. The initiative utilises solar panels to connect cell towers and antennas. So far, cell sites have been installed and activated in 97 rural locations and another 52 sites in urban areas, in a total of 149 municipalities.
- TIM has also implemented its first wind-powered antenna at a site in the coastal resort of Pipa, in the city of Tibau do Sul, state of Rio Grande do Norte. The solution is installed in the same mast as where telecoms equipment is installed and is designed to blend into the landscape and urban surroundings.
- TIM expects to have 77 plants for its own energy consumption, generating 38.2 GWh per month – enough to supply 19,000 cell sites by the end of 2022.
- TIM has revealed that 83% of its power consumption came from renewable sources as of the end of 2021. It aims to reach more than 90% by the end of 2022, by which time it expects to have 77–85 renewable energy plants.



2.3 The metaverse takes root in Latin America

The Covid-19 pandemic has spurred new ways of working and living, accelerating the shift to digitalisation, including virtual experiences. Unsurprisingly then, the concept of the metaverse, a parallel virtual world populated with avatars, has gained significant attention. In essence, the metaverse allows individuals to consume media content, purchase items, generate tokens or participate in recreational activities without the geographical restrictions, safety concerns and other physical limitations associated with real-life experiences.

The metaverse (which continues to lack a universally agreed definition) is still nascent. However, the significant levels of investment in metaverse initiatives and market-size estimates reflect the opportunities possible from the rapid advancement of the metaverse over the coming years. In the first five months of 2022, over \$120 billion was invested in building out metaverse technology and infrastructure – more than double the \$57 billion invested during the whole of 2021.⁸

The metaverse ecosystem is growing around the world, including in Latin America. Indeed, the region presents significant growth prospects for the metaverse, given its young, tech-savvy population and thriving tech startup ecosystem. This is beginning to attract the attention of global metaverse ecosystem players. For example, the decentralised game world The Sandbox has acquired Uruguayan technology firm Cualit to increase its Web3 and blockchain innovation and development capabilities.

Meta is collaborating with the Organization of American States (OAS) to bring free, augmented reality (AR) online courses to Latin America and the Caribbean. Meta will train more than 10,000 creators through free online AR courses over the next three years, as part of a \$50 million XR Programs and Research Fund to build the metaverse responsibly. Brazil and Mexico also feature in the top 10 most active countries in Spark AR Studio, the augmented reality software used by Facebook apps and devices that allows users to deepen their knowledge on the metaverse.

8. "Meet the metaverse: Creating real value in a virtual world", McKinsey & Company, June 2022



A growing number of local ecosystem players, including government agencies, have announced activities across the metaverse value chain. Examples include the following:

- Brazilian investment platforms **XP and Rico** have launched an investment fund focused on companies that work with the metaverse, with investments starting at BRL100 (\$19). The fund, called Trend Metaverse, is aimed at the general public and is similar to a Bloomberg index, the Bloomberg Metaverse, which includes stocks from tech companies such as Apple, Microsoft, Meta, Disney, Warner Music and Discovery.
- **Streamline**, a global video game and metaverse development company, has opened its first Latin America office in Bogota, Colombia. The company plans to play a key role in advancing gaming technologies, Web3 and the metaverse across Latin America.
- Chilean start-up **Metaverso Limitada** has created Minverso to connect the mining industry to the metaverse, increasing the productivity and safety of workers. The platform features themed showrooms, in which participants can observe mining sites, check machinery, simulate explosions in deposits, and carry out equipment repairs, while working from their offices or remotely.

Leveraging new and existing relationships to create partnerships within the telecoms industry and beyond will be necessary to capitalise on the potential of the metaverse.

The metaverse can be applied across a range of use cases in Latin America, notably work, retail, gaming, education, healthcare and advertising. It could provide a platform to deliver unique virtual experiences, overcoming the physical limitations of many services in the region. That said, the underdevelopment of the metaverse ecosystem in the region – especially with respect to device availability and affordability, content and services, and access to high-speed connectivity – could limit uptake over the short term.

Mobile operators will play a central role in the development of the metaverse in Latin America. Mobile networks, particularly 5G, will primarily provide the required connectivity for the metaverse. Beyond connectivity, operators can also participate in other parts of the value chain, as has been demonstrated in other regions. For example, SK Telecom launched the Ifland platform for users to make digital interactions in a virtual environment, and AT&T has partnered with Quintar, a sports entertainment AR business, to create and deliver in-game AR experiences to sports fans in stadia. These examples highlight the opportunity for operators to capture additional value elsewhere in the value chain, particularly in developing platforms, content and services in the metaverse. Leveraging new and existing relationships to create partnerships within the telecoms industry and beyond will be necessary to capitalise on the potential of the metaverse.

2.4 Digital disruption sparks investments in tech start-ups

The Covid-19 pandemic highlighted the huge opportunity for digital technology to disrupt legacy business processes in many sectors – notably, retail and entertainment. This, in turn, is driving investments in the tech start-up ecosystem in countries across Latin America. Entrepreneurs are creating innovative solutions to address pressing needs in society, against the backdrop of the pandemic’s long-term impact on how people socialise and how businesses operate.

In 2021, Latin America’s start-ups raised a record \$19.5 billion in funding – more than three times the amount raised in 2019.⁹ This resulted in 18 start-ups in the region achieving ‘unicorn’ status (start-ups with a market value of \$1 billion before going public). Fintech remains a big driver, but several other sectors, including education and e-commerce, are seeing a growing share of investments in the region. Figure 14 highlights the 18 start-ups in Latin America that achieved unicorn status in 2021.

Figure 14

Latin America start-ups that achieved unicorn status in 2021

| Country | Company | Description | Amount raised | Selected investors |
|--------------------------|-----------------|---|---|---|
| Brazil | MadeiraMadeira | Marketplace for furniture and home goods | <i>Series E</i> \$190 million | Dynamo Ventures, SoftBank, Brasil Capital |
| Brazil | Hotmart | Digital learning platform | <i>Series C</i> \$132 million | TCV, Alkeon Capital |
| Mexico | Bitso | Fintech platform for cryptocurrency transactions | <i>Series C</i> \$250 million | Coatue, Tiger Global Management, Valor Capital |
| Mexico | Clip | Digital payment and commerce platform | <i>Series D</i> \$250 million | Viking Global Investors, SoftBank |
| Brazil | Mercado Bitcoin | Digital assets platform | <i>Series B</i> \$200 million | SoftBank, Endeavor, Pipo Capital, Tribe Capital |
| Argentina | Mural | Platform that supports enterprise teamwork with guided visual collaboration | <i>Series C</i> \$50 million | Tiger Global Management, Insight Partners, Gradient Ventures |
| Chile | NotCo | Foodtech firm that makes plant-based alternatives to animal-based food products | <i>Series D</i> \$235 million | Tiger Global Management, Endeavor, Bezos Expeditions |
| Argentina | Ualá | Provides an app and other tools for managing personal finances | <i>Series D</i> \$350 million | Tencent, SoftBank, Goldman Sachs, Ribbit Capital, Endeavor |
| Argentina, Brazil | Nuvemshop | E-commerce platform with a range of financial and logistics solutions | <i>Series E</i> \$500 million | Tiger Global Management, Insight Partners, Qualcomm Ventures, Kaszek Ventures, Alkeon Capital |

9. "Here's What's Driving Latin America's Rank As The World's Fastest-Growing Region For Venture Funding", Crunchbase, January 2022



| Country | Company | Description | Amount raised | Selected investors |
|-----------------------|-------------|--|---|---|
| Brazil | Unico | Platform that develops digital identity protection solutions | <i>Series C</i> \$120 million | SoftBank, General Atlantic, Big Bets |
| Mexico | Konfío | Fintech firm for small and medium-sized businesses | <i>Series E</i> \$110 million | QED Investors, Tarsadia Investments, Kaszek Ventures |
| Brazil | CloudWalk | Payments fintech firm | <i>Series C</i> \$150 million | Coatue, DST Global, A-Star, The Hive Brazil |
| Brazil | Olist | E-commerce platform targeting 100,000 merchants by the end of 2022 | <i>Series E</i> \$178 million | Wellington Management, Globo Ventures, Goldman Sachs, SoftBank |
| Brazil, Mexico | Merama | Retail brand with an emphasis on e-commerce | <i>Series B</i> \$60 million | Advent International, SoftBank |
| Mexico | Incode | AI-based platform for identity verification and authentication | <i>Series B</i> \$220 million | General Atlantic, SoftBank, JP Morgan, Capital One Ventures |
| Mexico | Clara | Corporate spend-management fintech firm | <i>Series B</i> \$70 million | Coatue, Global Founders Capital, Alter Global, Avid Ventures |
| Brazil, US | Daki (JOKR) | Instant groceries delivery solution provider | <i>Series B</i> \$260 million | Activant Capital, Balderton, Greycroft, G-Squared, Tiger Global |
| Brazil | Facily | Social commerce startup that allows people to buy products in groups | <i>Series D</i> \$135 million | Goodwater, Prosus, Rise Capital, Emerging Variant, Tru Arrow |

Source: LABS, GSMA Intelligence

2022 saw a slow start, with lower transaction values and volumes in the first nine months of the year compared to 2021. This market correction can be attributed to a number of factors, not least the downbeat economic outlook globally on the back of the conflict in Ukraine. However, the fundamentals of the start-up ecosystem in Latin America and the

growth outlook for digital services in the region remain strong, including rising internet adoption, changing consumer behaviours, and increasingly digitally literate populations. These factors will ultimately sustain innovation and investment in the long term.



03

Mobile contributing to economic growth and social progress



3.1 Mobile’s contribution to economic growth

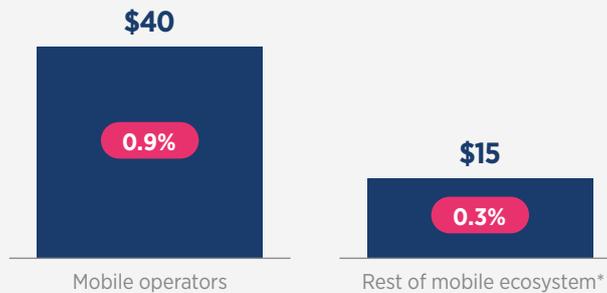
In 2021, mobile technologies and services generated 7.4% of GDP in Latin America – a contribution that amounted to more than \$345 billion of economic value added. The mobile ecosystem also supported more than 1.6 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector, with almost \$30 billion raised through taxes on the sector.

By 2025, mobile’s contribution will grow by around \$20 billion, as countries in the region increasingly benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services.

Figure 15

The Latin America mobile ecosystem directly generated around \$55 billion of economic value in 2021, with mobile operators accounting for the vast majority

Billion, percentage of GDP (2021)

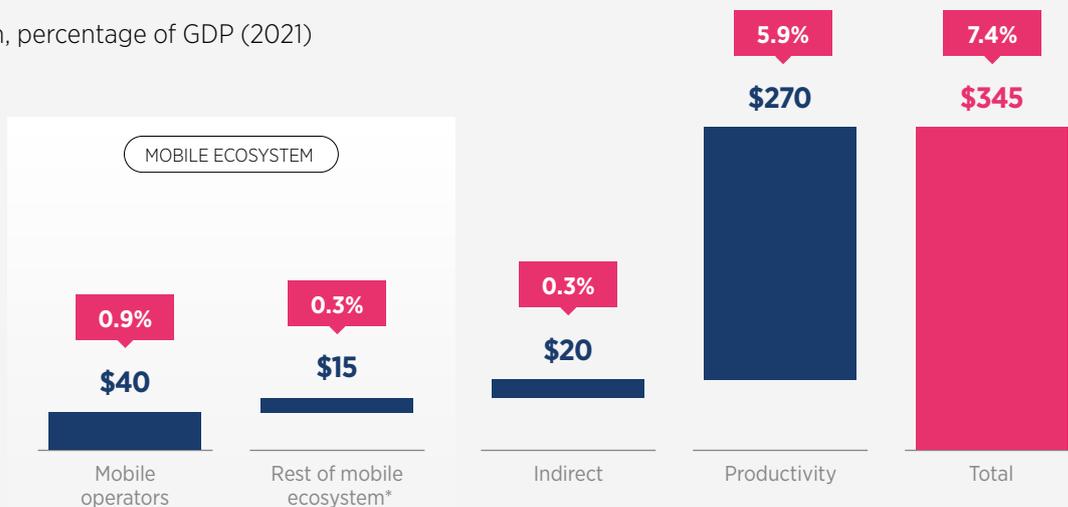


* Rest of mobile ecosystem includes infrastructure providers; device manufacturers; distributors and retailers; and content, apps and service providers. Source: GSMA Intelligence

Figure 16

Additional indirect and productivity benefits bring the total contribution of the mobile industry to the economy in Latin America to more than \$345 billion in 2021

Billion, percentage of GDP (2021)

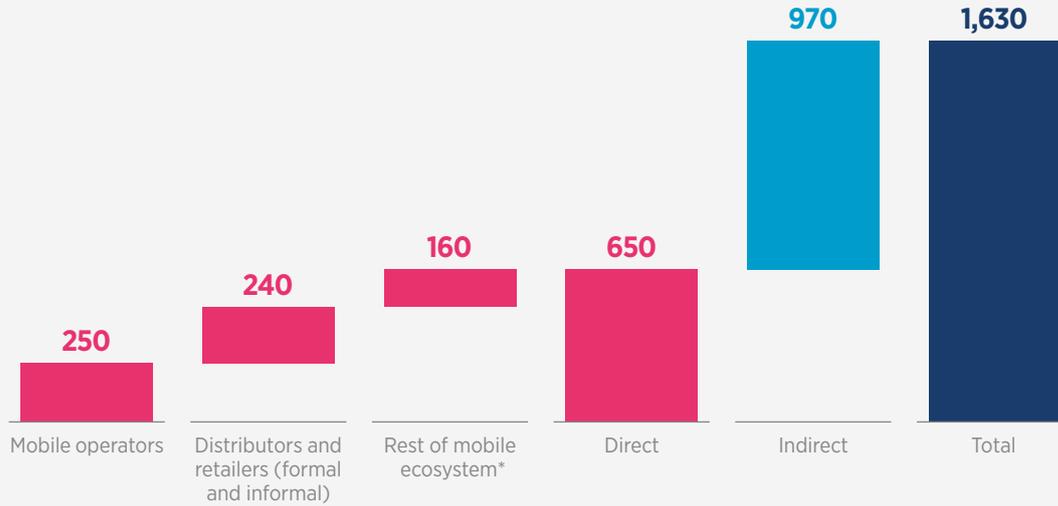


* Rest of mobile ecosystem includes infrastructure providers; device manufacturers; distributors and retailers; and content, apps and service providers. Source: GSMA Intelligence

Figure 17

The mobile ecosystem in Latin America directly employs around 650,000 people and supports almost 1 million jobs indirectly

Jobs (thousands), 2021



* Rest of mobile ecosystem includes infrastructure providers; device manufacturers; and content, apps and service providers.
Note: totals may not add up due to rounding
Source: GSMA Intelligence

Figure 18

In 2021, the mobile ecosystem in Latin America contributed almost \$30 billion to the funding of the public sector through consumer and operator taxes

Billion



Source: GSMA Intelligence

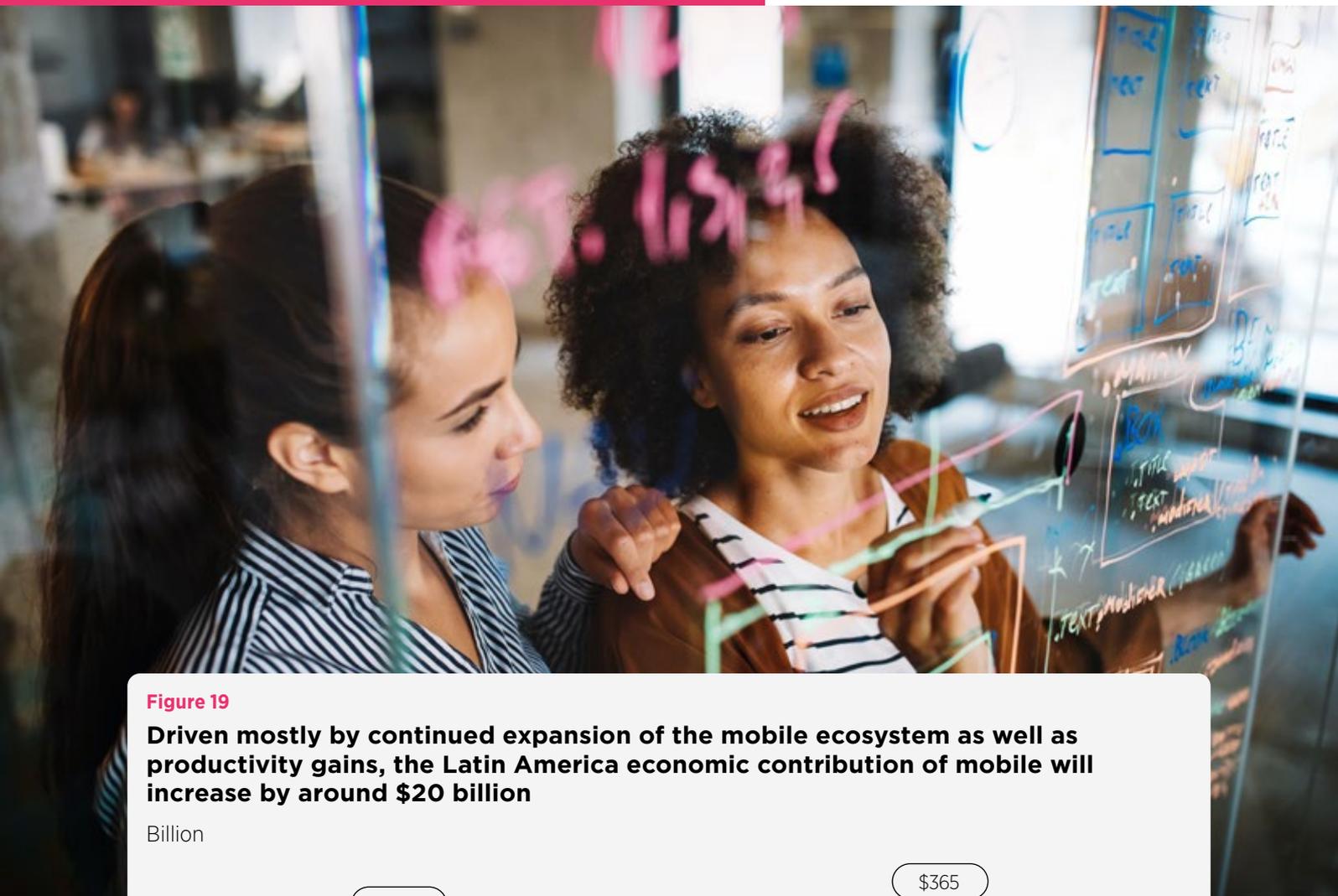
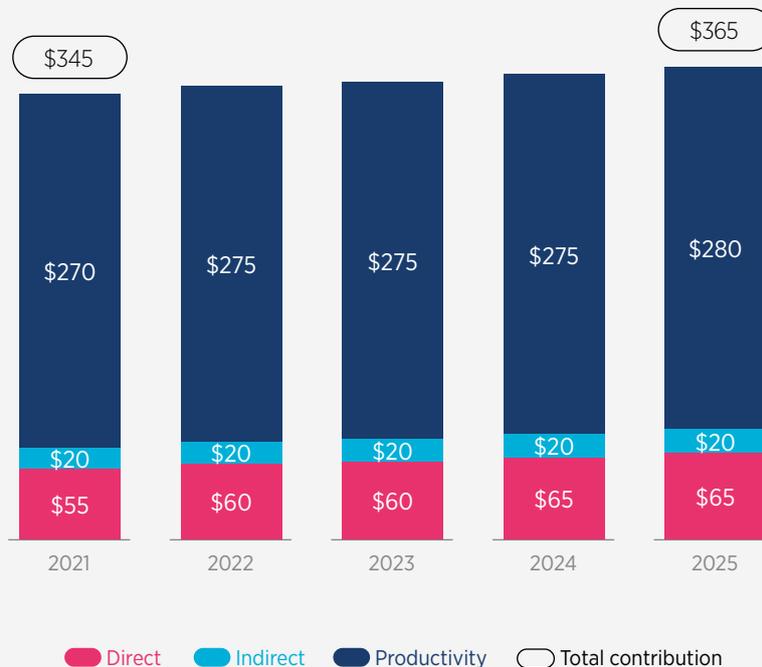


Figure 19

Driven mostly by continued expansion of the mobile ecosystem as well as productivity gains, the Latin America economic contribution of mobile will increase by around \$20 billion

Billion



Source: GSMA Intelligence

3.2 Mobile enhancing digital inclusion

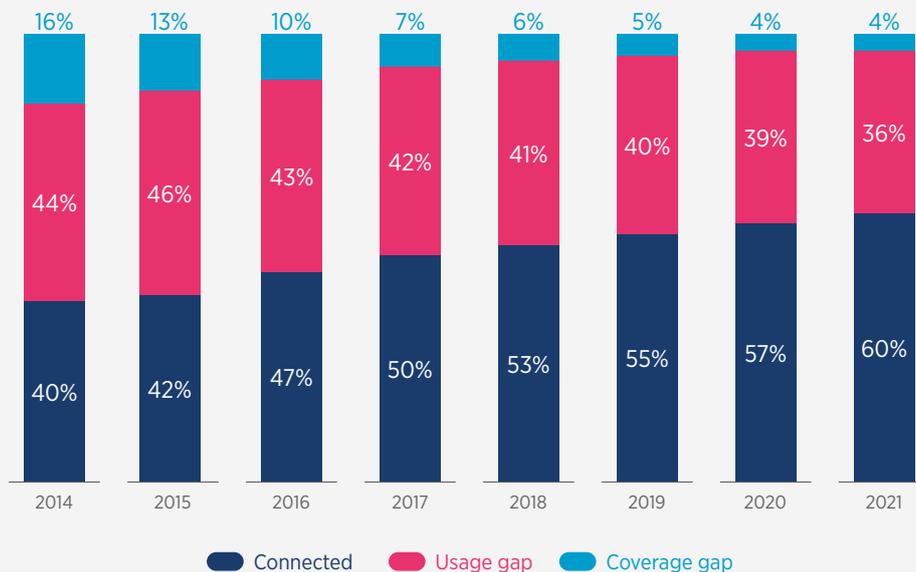
Operator investments in network infrastructure have helped reduce the coverage gap¹⁰ for mobile broadband networks in Latin America from 90 million people in 2014 to 20 million people in 2021. With just 4% of the region's population living outside

of areas covered by mobile broadband networks, the focus is now increasingly on how the mobile industry and its partners can close the usage gap.¹¹ This stands at 230 million, down from 260 million people in 2014.

Figure 20

Latin America continues to make steady progress on closing the usage gap

Percentage of population



Source: GSMA Intelligence

The reasons for the usage gap are multifaceted and vary by country, but they generally relate to the following:



Affordability

The affordability of handsets is the most cited barrier among mobile users who are aware of mobile internet. Mobile operators are trying to rectify this by offering device financing plans and more affordable devices. The mobile industry is also committed to improving the affordability of mobile data. This is particularly important as the continued growth in data consumption means consumers may want (and need) bigger data allowances. In 2021, the cost of a 5 GB data bundle in Latin America was below 3% of monthly income, down from 4% in 2019, enabling users to access more content.¹²

10. The 'coverage gap' refers to those living outside of areas covered by mobile broadband networks.

11. The 'usage gap' refers to those who live in areas covered by mobile broadband networks but remain unconnected.

12. 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 GSMA Mobile Connectivity Index Methodology.



Safety and security

In Mexico and Guatemala, more than 70% of mobile owners not using mobile internet reported safety and security concerns as an important barrier, with 38% in Mexico reporting it as the top barrier.¹³ Mobile operators are educating adults and children on the risks associated with spending time online. For example, in late 2021, AT&T Mexico and the Federal Education Authority in Mexico City (AEFCM) launched a digital citizenship programme that is now part of the 2021/2022 school curriculum for students in Mexico City.



Knowledge and digital skills

Some people lack awareness and understanding of mobile internet and its benefits, or have low levels of literacy and digital skills. In response, operators can promote digital skills and educational initiatives. For example, Tigo Paraguay’s Connecting Communities project has built local hubs in Paraguay to educate students, parents and teachers on digital literacy and tools, while also providing training on more advanced skills such as computer programming.



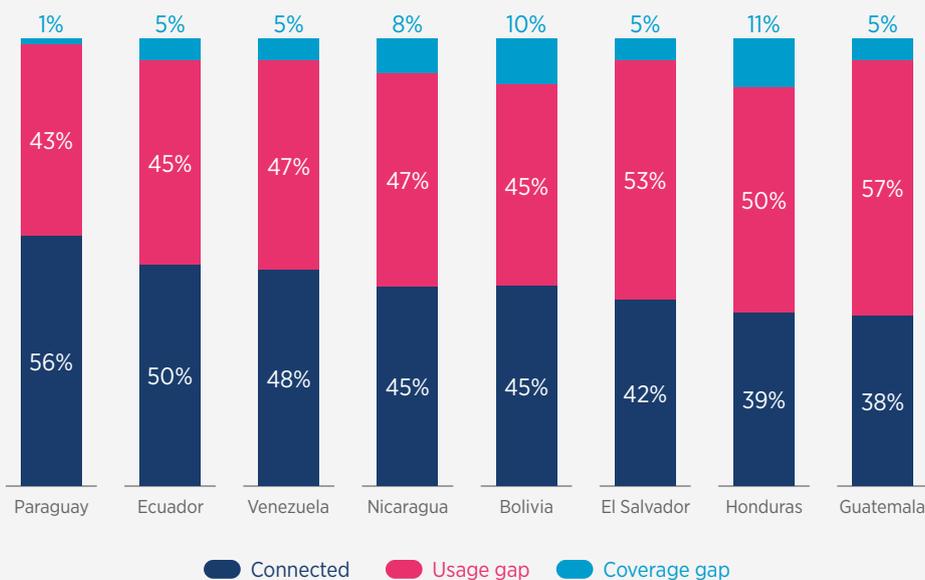
Relevance

The availability 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 the time and financial resources needed to access the internet. This tends to be less of a barrier in Latin America than in other regions, as the vast majority of people in the region can speak and read in a language that is widely catered for online (e.g. Spanish or Portuguese).

Figure 21

The usage gap is above 50% in some Latin American countries

Countries with the highest proportion of non-users of mobile internet in Latin America (percentage of population)



Source: GSMA Intelligence

13. State of Mobile Internet Connectivity 2022, GSMA, 2022

3.3 The mobile industry's impact on the SDGs

Six years ago, the mobile industry became the first industry to commit to the 17 UN Sustainable Development Goals (SDGs). Each year since, the GSMA has measured the impact of the mobile industry across all SDGs. The most recent analysis

shows that the mobile industry increased its impact on all SDGs, with the average year-on-year increase accelerating compared to 2020.¹⁴ Figure 22 provides examples of the contribution from operators in Latin America to key SDGs.

Figure 22

Mobile's impact on the Sustainable Development Goals in Latin America

Highest SDG scores

| | |
|---|--|
|  <p>4 QUALITY EDUCATION</p> | <p>Mobile technology contributes to SDG 4 by allowing students, teachers and employees to learn/teach from any location and on the move.</p> <p><i>Operator example</i></p> <p>In partnership with the Carlos Slim Foundation, America Móvil offers Aprende.org, an open and accessible free-of-charge platform that brings together content on training, employment, education, culture and health. The operator offers free browsing on the platform in Mexico, Panama and the Dominican Republic.</p> |
|  <p>5 GENDER EQUALITY</p> | <p>Mobile contributes to SDG 5 by increasing women's access to – and use of – mobile technology to enhance their lives, and growing women's participation and leadership in the technology industry.</p> <p><i>Operator example</i></p> <p>During 2021, Tigo El Salvador provided digital skills training to over 8,400 women, including approximately 400 Salvadoran women from the Tigo value chain (Tigo Money agents and owners of points of sale/activation) who also received entrepreneurship training.</p> |
|  <p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p> | <p>Mobile technology contributes to SDG 9 significantly, as a provider of critical infrastructure and as a catalyst for other sectors.</p> <p><i>Operator example</i></p> <p>Entel is working with Internet for All in Peru to bridge the digital divide. Since 2019, it has delivered 4G mobile internet to more than 7,000 rural communities, benefiting 1 million people. In addition, more than a third of Entel's 6,456 network points of presence in Chile are located in rural or isolated areas, helping to reduce the digital divide.</p> |

14. 2022 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2022



Most improved SDG scores

4 QUALITY EDUCATION



Mobile technology contributes to SDG 4 by allowing students, teachers and employees to learn/teach from any location and on the move.

Operator example

In February 2022, Telefonica made an agreement with Brazilian company Anima Educação to create a joint subsidiary that will operate a digital education platform. It will focus on areas such as technology, business management and tourism to improve the employability of students.

3 GOOD HEALTH AND WELL-BEING



Mobile technology contributes to SDG 3 by helping to optimise healthcare service delivery, providing health workers with enhanced skills and supporting the infrastructure needed for health information systems and early detection of diseases.

Operator example

America Movil estimates that 46 million of its customers in Latin America use mobile to monitor and improve their health. This is often done through wearable devices – an area the operator is focussing more on as part of its IoT offering. America Movil reported a 30% increase in M2M connections in 2021.

2 ZERO HUNGER



Mobile technology contributes to SDG 2 through improvements to agricultural practices, nutritional knowledge and household food security.

Operator example

TIM Brasil is a member of the ConectarAGRO association and actively supports the agricultural sector in the country. In 2021, the operator reached more than 6.2 million hectares of 4G coverage in rural areas and has a partnership with Agtech Garage, a start-up hub for agribusiness in Latin America, to develop 5G use cases for the agricultural sector.



04

Policies to accelerate Latin America's digital future





4.1 Universal access to connectivity

Access to connectivity is essential for citizens to interact with each other. It enhances their employment and educational opportunities and can speed up administrative processes, improving the quality of life for all across Latin America and around the world. The last few years have reminded everyone of the importance of digital inclusion, particularly for vulnerable groups.

To maximise the benefits of a connected society, it is fundamental that the public and private sectors work together to expand access to mobile connectivity and develop digital skills, while ensuring the sustainability of the industry and protecting users' privacy and security.

However, challenges related to legislation updates continue to delay the potential development and expansion of the benefits offered by connectivity.

A comprehensive analysis of the state of connectivity in each country should be the starting point for action. This should be based on clear goals that seek to advance digital development and keep pace with the new (and sometimes disruptive) ways businesses and other organisations create value.

Around 4% of the population in the Latin America region have no mobile coverage (the coverage gap), while 36% (some 230 million people) are not using the mobile internet – despite coverage being available (the usage gap). Policies should be promoted that enable more people to enjoy the benefits of mobile internet. Defining a strategy for the development of digital skills is fundamental.

A taxation structure in tune with the objective of making access to connectivity universal – for consumers and businesses – should be able to balance short-term needs with the cumulative impact on long-term productivity.

Cooperation between the Executive Branch, the presidential agenda and regulators will be more important than ever before. 5G will have an impact on vertical sectors and industries, and will permeate other industries and verticals outside the remit of telecoms policymakers and regulators. Institutional review and discussions within the public sector will be the first step towards a consistent, cross-cutting policy.

Growth in 5G connections will represent a paradigm shift. It will expand the concept of connectivity to include a larger number of connected things, the automation of production processes, digitalisation, and a myriad of services and use cases yet to be realised. A major, radical change in policy frameworks will be necessary to expand 4G and pave the way for this growth in 5G. To enable the right conditions for investment, it is vital to have in place a level playing field and clear regulatory framework over the long term.

Six policy recommendations to enable connectivity for all in Latin America



1. Assess existing policies and regulations related to the traditional telecoms market and the internet value chain as a whole.



2. Understand the following gaps and take action:

The usage gap: To tackle the usage gap, steps should be taken to boost digital literacy among the population, promote locally relevant content, and provide affordable access by avoiding heavy tax burdens.

The coverage gap: While accounting for a small percentage of the population, there are still people who have no coverage. For challenging geographical areas where network deployment is particularly costly, alternative mechanisms can offer expansion opportunities while accepting the market's natural limitations.



3. Remove regulatory barriers that hamper universal access to connectivity, and define long-term public policy with clear goals and the support of the private sector (through the exchange of experiences and technical expertise).



4. Engage in public consultations and open dialogue to share knowledge with the private and international sectors, with the aim of improving understanding of international best practices.



5. Provide structure and autonomy to regulators so they can have the flexibility to revise regulations with ex-post principles to correct market failures. Establish national digital agendas that present a long-term vision.



6. Define regulatory frameworks through the concept of collaborative regulation.

4.2 Spectrum management and pricing

Across a series of studies conducted by the GSMA on Latin America, a consistent theme is that high spectrum prices can have a negative impact on digital inclusion.

The high cost of spectrum in the region is preventing millions of people from gaining access to mobile broadband services or experiencing high-quality networks. High prices are not always being determined by supply and demand; some governments have prioritised tax revenue generation goals, with clear consequences for the industry and users:

- High spectrum prices and a relatively small amount of spectrum assigned to mobile services can lead to more challenging investment conditions.
- A negative environment for 4G network investment has a negative impact on consumers.
- High spectrum prices undermine ability and incentive to invest in new technology generations. The success of 5G therefore largely depends on spectrum pricing decisions.

Adopting an adequate spectrum pricing policy has never been more important. Additional spectrum is fundamental to expanding and improving mobile broadband services. Unlocking the potential of 5G services depends on operators having access to such resources.

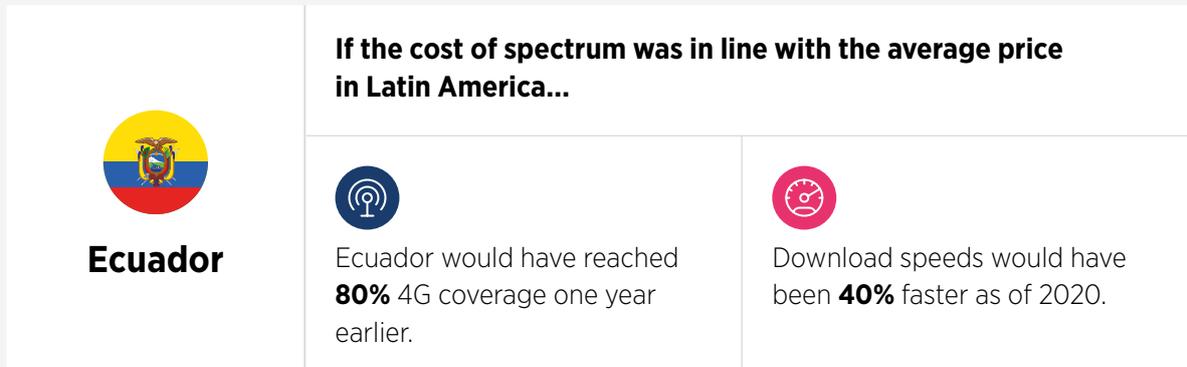
Additional spectrum is fundamental to expanding and improving mobile broadband services.

Along with a spectrum pricing policy aligned with the objective of universal access to connectivity, a series of best practices for spectrum resource management and administration is crucial:

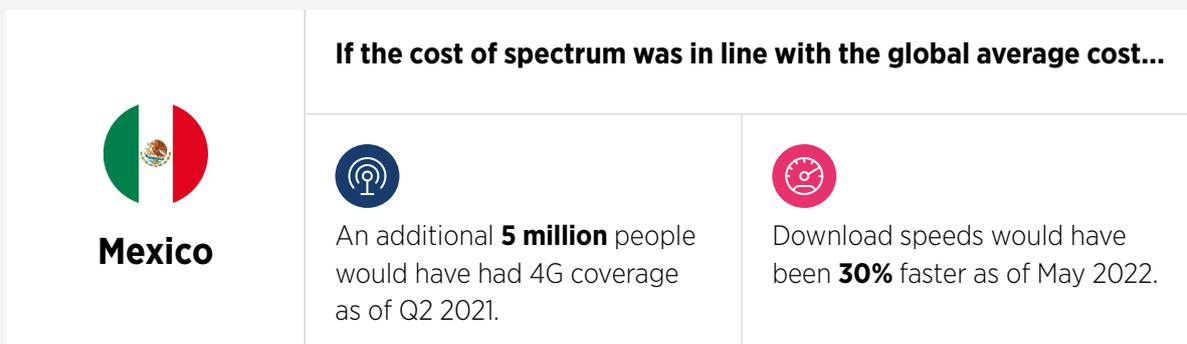
- Governments should prioritise the improvement of mobile broadband services rather than maximising their revenue when allocating spectrum.
- It is important to avoid artificial spectrum scarcity, to publish long-term roadmaps and to carry out open consultations with industry stakeholders.
- Regulations that unnecessarily increase risks for operators and jeopardise current and future services should be avoided.
- Industry stakeholders should be consulted on licensing terms and conditions, with their inputs taken into account when setting prices.
- Auctions must be well designed and implemented to become an efficient allocation mechanism.
- Radio spectrum pricing decisions must be aligned with the public policy objectives pursued.

Figure 23

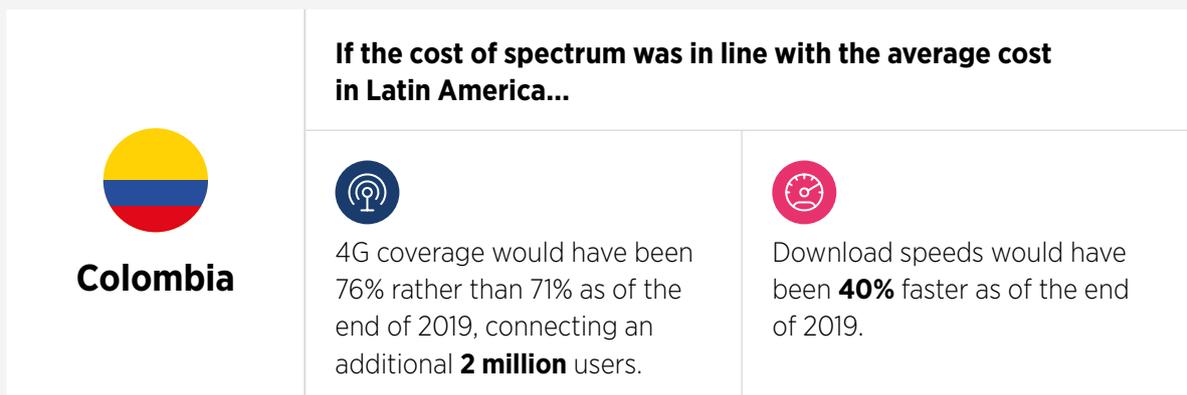
The impact of spectrum pricing



Source: Effective spectrum pricing in Ecuador, GSMA Intelligence, 2021



Source: El impacto de los precios del espectro en México, GSMA Intelligence, 2022



Source: Effective spectrum pricing in Colombia, GSMA Intelligence, 2021

[gsma.com](https://www.gsma.com)



For more information, please visit the
GSMA website at www.gsma.com