



The Mobile Economy
Latin
America
2021



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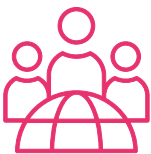
Executive summary



Mobile industry continues to support Covid-19 response and recovery

The mobile industry in Latin America continues to play a crucial role in the response to Covid-19. Mobile networks have enabled social and economic activities to continue. People have relied on the internet to stay connected to friends and family, access educational and health services, and work remotely. This has driven mobile data traffic to new levels. Networks have held up well, reflecting sustained investment from operators over the past few years.

Mobile operators have implemented a range of measures to support communities throughout the pandemic. Efforts during the early stages concentrated on providing targeted support for vulnerable individuals. For instance, operators offered discounts on mobile tariffs and provided digital content and tools to help people get online. More recently, operators have adopted measures to help society recover, including the use of mobile big data (MBD) analytics and AI expertise to inform government response measures.



Growth in subscriber penetration and smartphone adoption remains strong

The number of unique mobile subscribers in Latin America will reach nearly 450 million by the end of 2021, increasing to 485 million by 2025 (73% of the population). Around half of new subscribers will come from Brazil and Mexico during this period. There will also be strong growth in underpenetrated markets such as Guatemala and Honduras.

Smartphone connections in Latin America will reach 500 million at the end of 2021 – an adoption rate of 74%. The next four

years will see almost 100 million additional smartphone connections in the region, taking adoption above 80%. This will spur mobile internet adoption, enabling more people to access digital services for the first time. These achievements will be underpinned by operators' continued investment in network infrastructure. Between 2020 and 2025, mobile operators in Latin America will invest more than \$73 billion in their networks, with an increasing share of this 5G-related.



4G continues to dominate, as 5G momentum builds

4G will remain the foundation of the mobile industry in Latin America over the near term, accounting for almost 70% of total connections at the end of 2025. That said, 5G momentum is building, with further commercial 5G services launched in 2021. While mobile operators wait for access to new spectrum, they are laying the groundwork for the 5G era through investments in accompanying infrastructure, such as fibre, and partnerships to trial and develop new applications.

Early open RAN trials and deployments are underway in Argentina, Brazil and Colombia, as operators look to reduce capex and extend network coverage. Virtualisation investments are also a high priority. Operators have been moving to virtualised core functions for years, but 5G represents an opportunity to move this transformation further forward. Latin American mobile operators have announced partnerships with cloud players to support this, reflecting a global trend in cloud-telecoms co-opetition.



Mobile industry drives economic growth and social development

In 2020, mobile technologies and services generated 7.1% of GDP in Latin America – a contribution that amounted to more than \$340 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 more than \$29 billion raised through taxes on the sector in 2020. By 2025, the economic contribution of the Latin American mobile ecosystem will grow by more than \$30 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.

Operators are also making significant contributions to the welfare of society more broadly. For instance, several operators have set science-based targets to cut their carbon emissions rapidly over the next decade. Furthermore, operators in the region are making renewables commitments. The mobile industry is also supporting progress towards the UN's Sustainable Development Goals (SDGs). In Latin America, the mobile industry achieved its highest impact on SDG 9: Industry, Innovation and Infrastructure and SDG 4: Quality Education in 2020.



Policy decisions can help shape the connected society

The pandemic has emphasised the need for connectivity and the critical role of mobile technology. Now is the time for governments to reassess the business and regulatory environment for mobile services in order to accelerate investment and innovation for a connected society. Specifically, policymakers should take steps to:

- establish effective spectrum policy, focusing on digital inclusion, innovation and investment
- build fiscal policy that creates incentives for sustainable investment
- evolve to smarter regulation that accomplishes its objectives in the most efficient manner, eliminating regulatory asymmetries
- foster dialogue between congress members, regulatory authorities and sectoral policymakers, and the private sector.

Mobile Economy Latin America

UNIQUE MOBILE SUBSCRIBERS



↑ 2020-2025
CAGR: 2.1%

2020 437m
2025 485m



SIM CONNECTIONS

(excluding licensed cellular IoT)



↑ 2020-2025
CAGR: 2.5%

2020 644m
2025 730m



MOBILE INTERNET USERS



↑ 2020-2025
CAGR: 3.4%

2020 358m
2025 423m



OPERATOR REVENUES AND INVESTMENT

Total revenues

2020 \$61bn

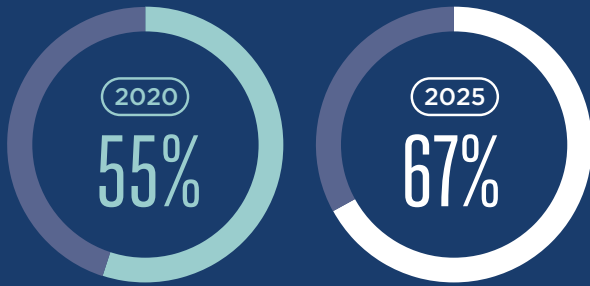
2025 \$67bn



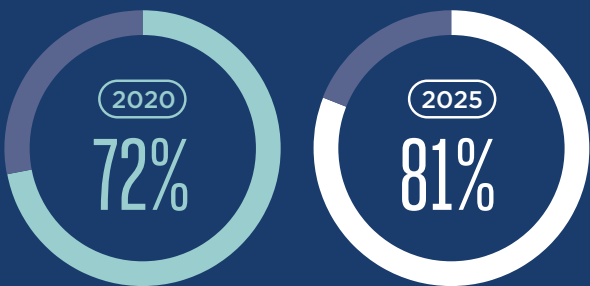
Operator capex of \$73 billion for the period 2020-2025

4G

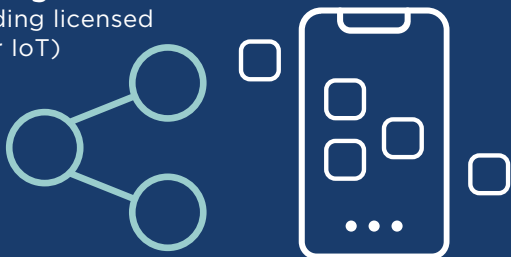
Percentage of connections
(excluding licensed cellular IoT)



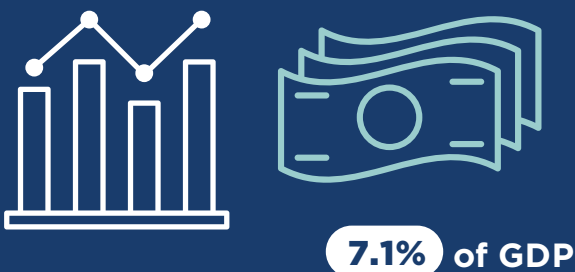
SMARTPHONES



Percentage of connections
(excluding licensed cellular IoT)



MOBILE INDUSTRY CONTRIBUTION TO GDP



2020

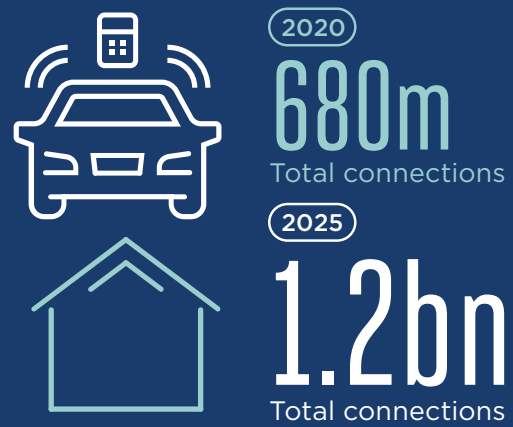
\$340bn

5G

Percentage of connections
(excluding licensed cellular IoT)



INTERNET OF THINGS



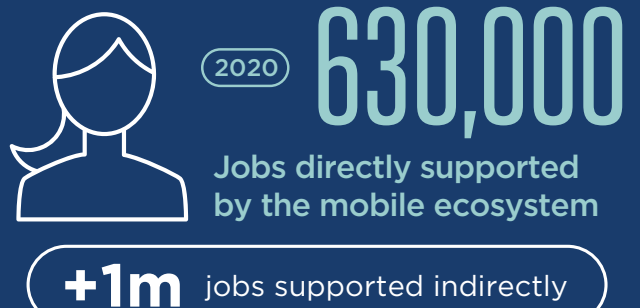
PUBLIC FUNDING



Mobile ecosystem contribution to public funding

(before regulatory and spectrum fees)

EMPLOYMENT



2020

630,000

Jobs directly supported
by the mobile ecosystem

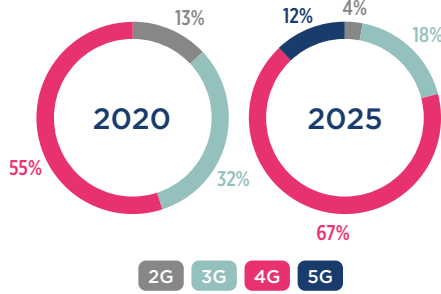
+1m jobs supported indirectly

Subscriber and technology trends for key markets

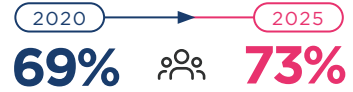
Latin America



TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



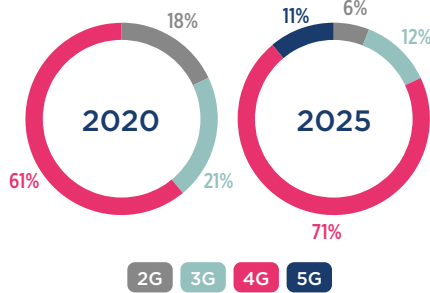
SMARTPHONE ADOPTION



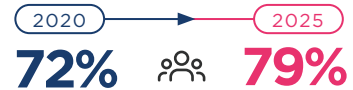
Argentina



TECHNOLOGY MIX*



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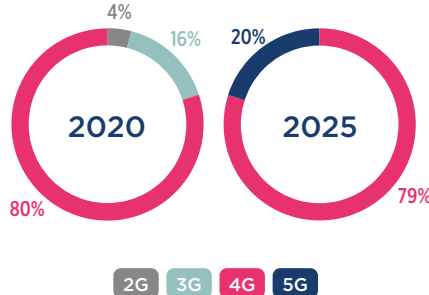
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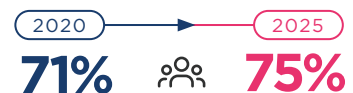
Brazil



TECHNOLOGY MIX*



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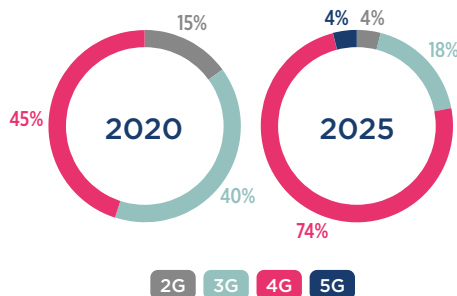
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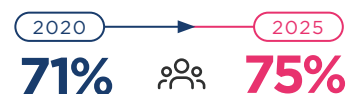
Colombia



TECHNOLOGY MIX*



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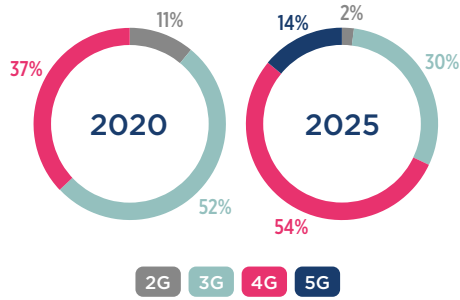
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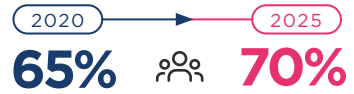
Mexico



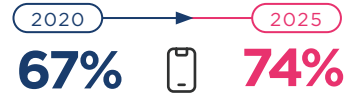
TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



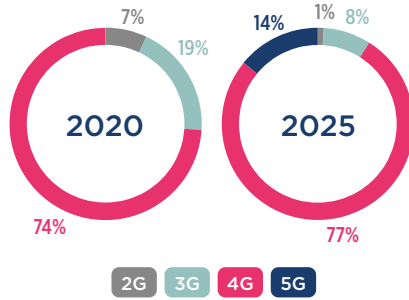
SMARTPHONE ADOPTION



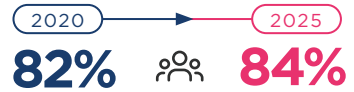
Chile



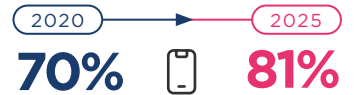
TECHNOLOGY MIX*



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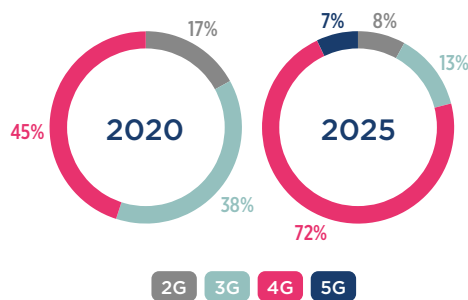
SMARTPHONE ADOPTION



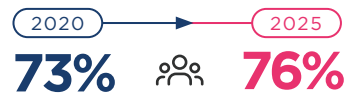
Peru



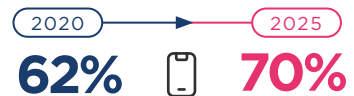
TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



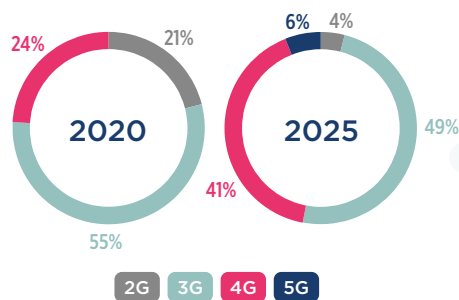
SMARTPHONE ADOPTION



Costa Rica



TECHNOLOGY MIX*



SUBSCRIBER PENETRATION



SMARTPHONE ADOPTION



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

A middle-aged man with a grey beard, wearing a dark blue suit, white shirt, and red striped tie, is looking down at a smartphone in his hands. He is sitting at a desk in an office environment. The background is slightly blurred, showing office furniture and windows. A large, stylized graphic of a red and blue polka-dot pattern is overlaid on the bottom right of the image.

01

The mobile market in numbers

1.1 A maturing mobile market

Figure 1

Source: GSMA Intelligence

Key milestones over the next five years in Latin America

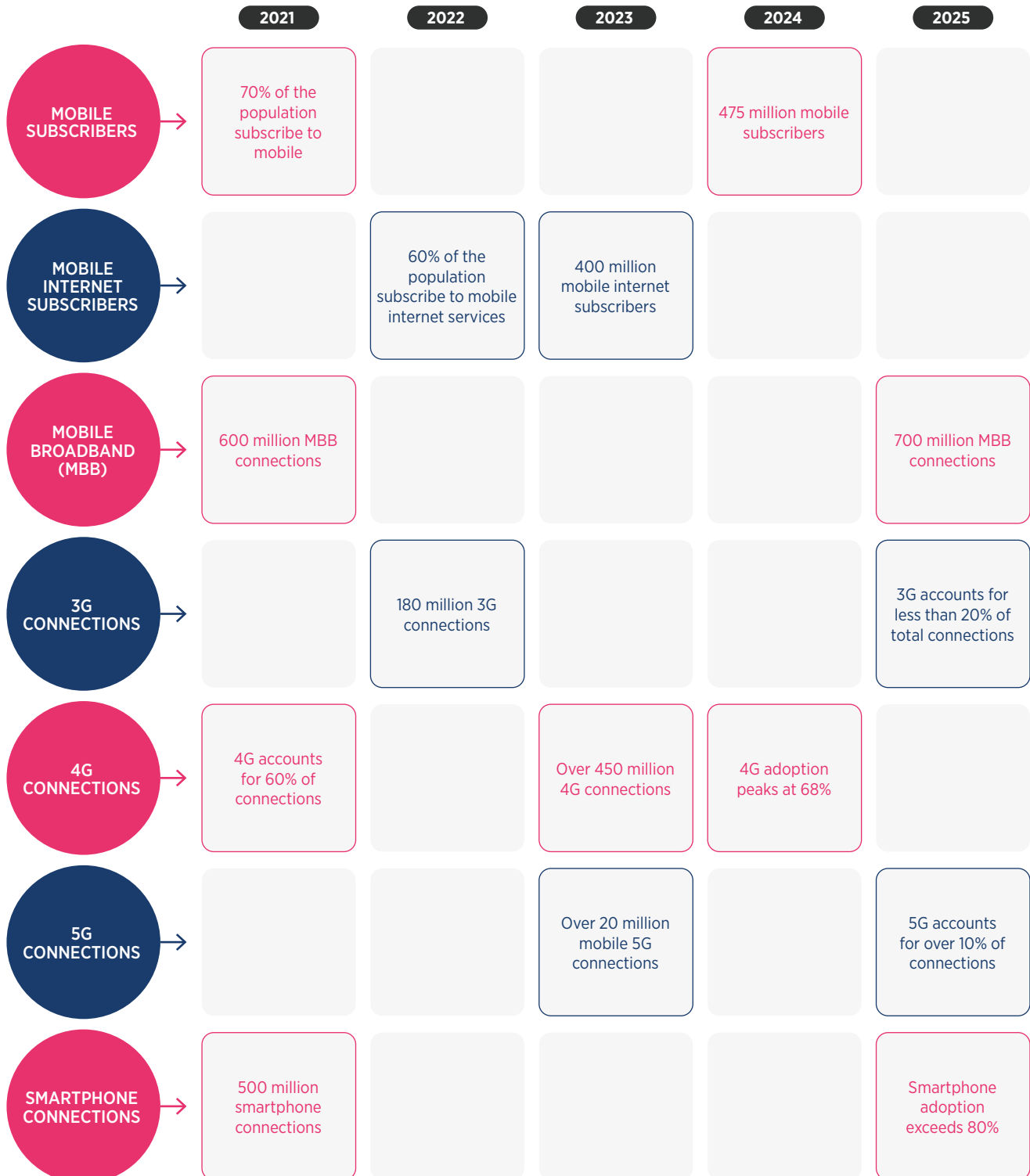


Figure 2

Subscriber penetration to reach 70% by 2021 and 485 million unique subscribers by 2025

Million

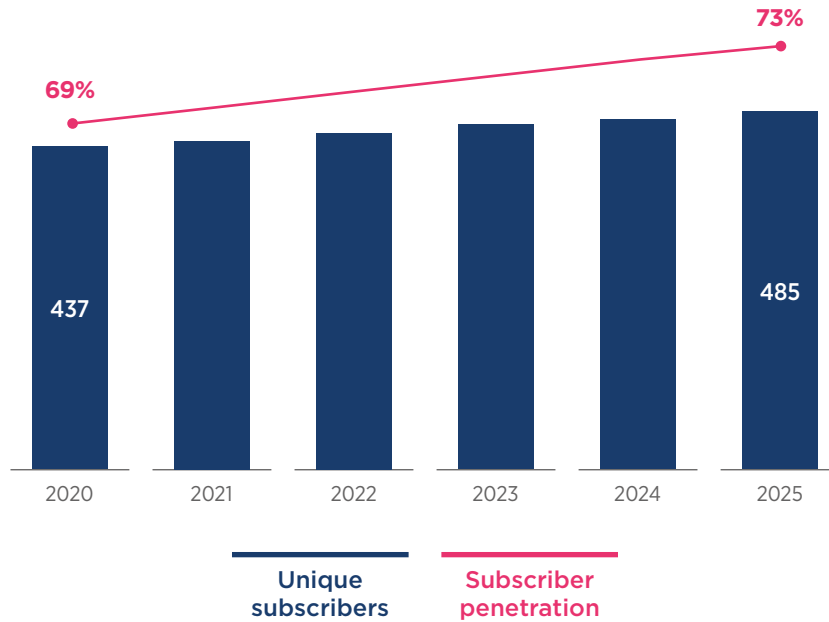


Figure 3

Around half of new subscribers in the region between 2020 and 2025 will come from Brazil and Mexico

Million



1.2 4G remains the foundation of the mobile industry

New mobile traffic demands and use cases will continue to fuel 4G's growth in Latin America, underpinned by the following market dynamics:

- **2G/3G migration** – With 2G and 3G accounting for around 40% of connections (excluding licensed cellular IoT) in Latin America, retiring networks that support 2G or 3G services might seem some way off. However, with 2G expected to account for only 4% of connections by 2025, operators in the region are likely to soon begin advancing plans to refarm spectrum to expand 4G and 5G coverage and capacity.
- **Voice over LTE (VoLTE) support** – VoLTE represents the default voice solution for 5G. In Latin America, 19 operators have launched VoLTE

services, including most recently América Móvil in Chile and Ecuador in May 2020. To be successful, VoLTE requires all parties to adhere to a single, common implementation of interfaces between every device and network, which helps facilitate interconnection and roaming.

- **IoT and digital transformation** – Between 2020 and 2025, GSMA Intelligence forecasts IoT connections to grow by 1.8x in Latin America. While 5G will deliver critical IoT capabilities, such as massive machine-type communications and ultra-reliable low-latency communication (URLLC), much of this will require 5G standalone (SA) deployments. In the meantime, LTE-M and NB-IoT will be expected to do the heavy lifting.

Source: GSMA Intelligence

Figure 4

4G adoption will continue to rise to 2024, despite impending 5G launches

Percentage of total connections (excluding licensed cellular IoT)

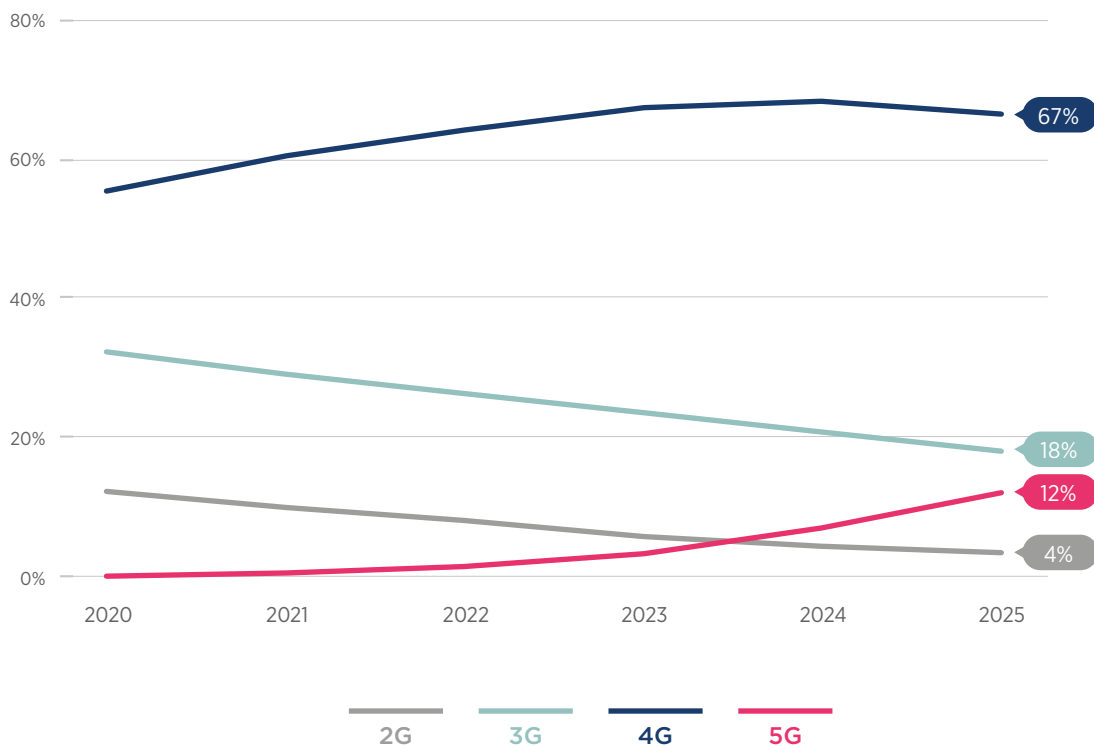
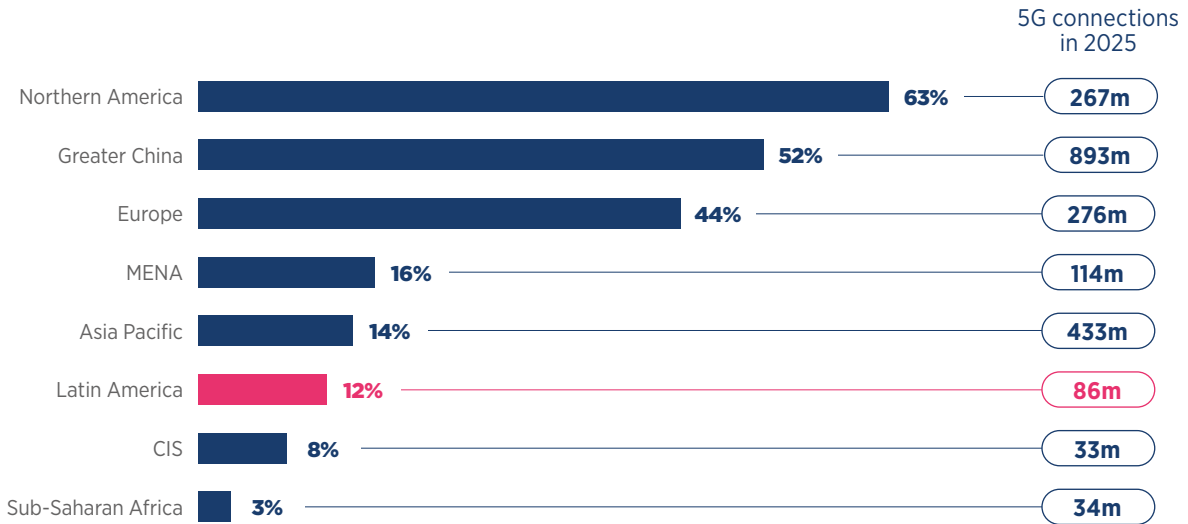


Figure 5

Commercial 5G networks have launched in Latin America, but 5G remains in the longer term for most operators

5G adoption in 2025 (percentage of total connections)



1.3 Consumers go digital

Figure 6

Mobile internet adoption will surpass 60% in nine Latin American countries by 2025

Mobile internet users as a percentage of population

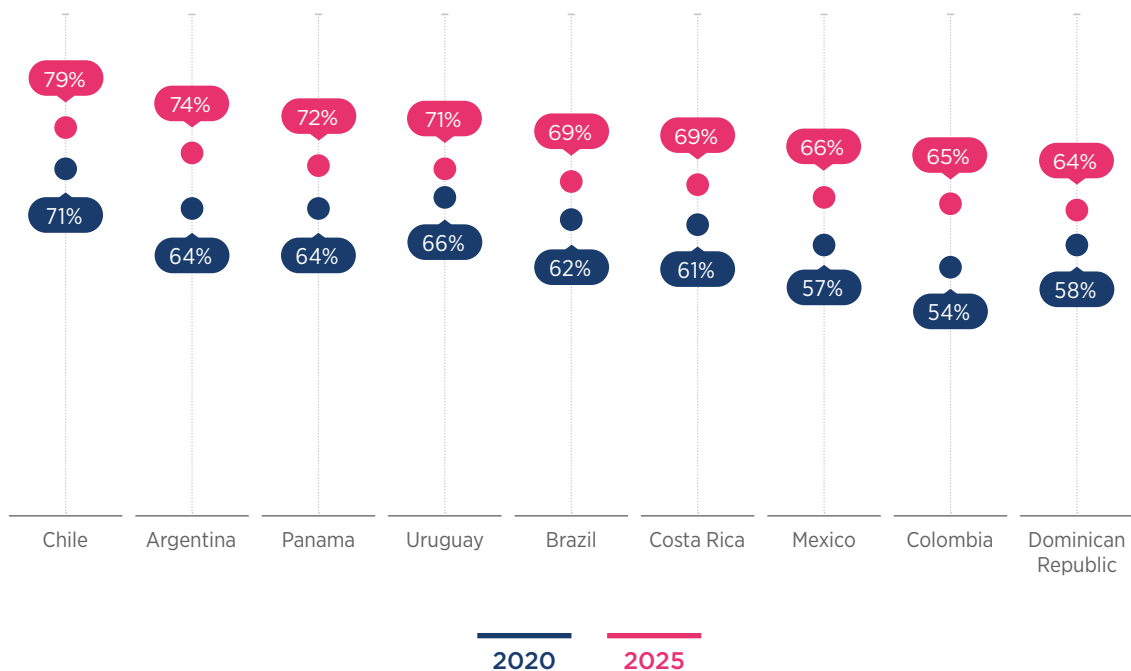
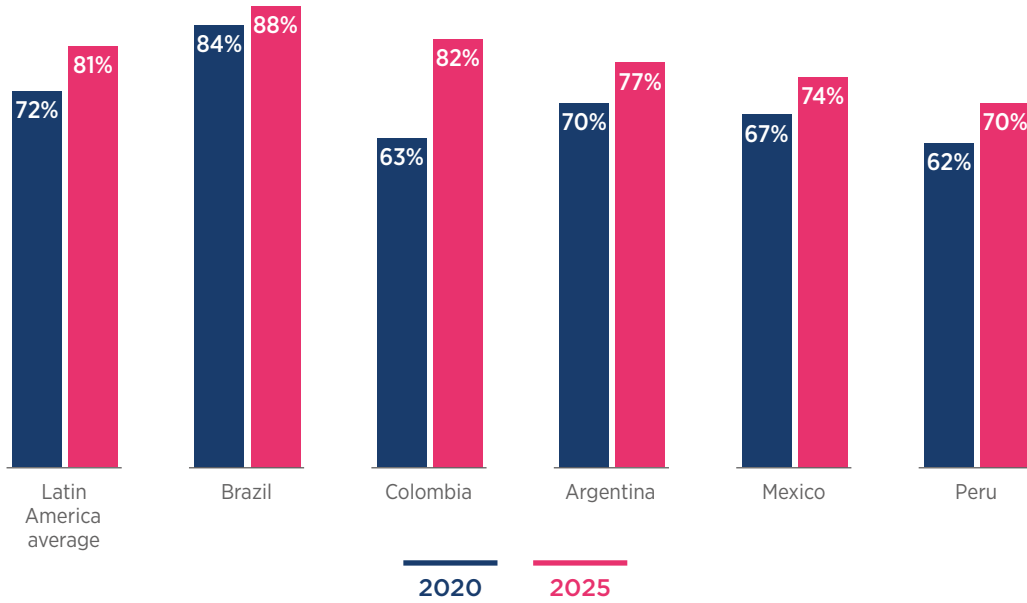


Figure 7

Source: GSMA Intelligence

Significant variation in adoption persists among Latin America’s largest smartphone markets

Smartphones as a percentage of total connections (excluding licensed cellular IoT)



Top five smartphone markets in Latin America (smartphone connections, 2025)



Brazil
218 million



Mexico
94 million



Colombia
56 million



Argentina
45 million



Peru
29 million

Supporting the world to go digital

User engagement in mobile services grew significantly during the pandemic, as people relied on mobile networks to stay connected and access vital services. In 2020, 82% of subscribers in Mexico used mobile phones to make video calls at least once per month, up from 58% a year earlier.¹ This helped friends and family stay in touch, while also improving interactions across online activities, including remote working, e-learning and telehealth.

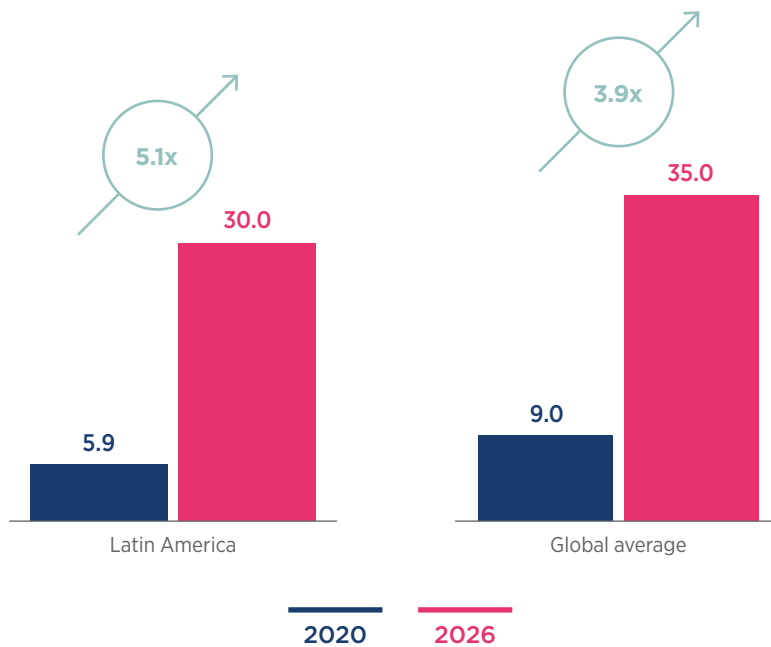
Subscribers also turned to mobile to watch free online video. According to the GSMA Intelligence Consumers in Focus Survey, around four in five smartphone users in Brazil watch free online video content on their phones on a monthly basis. This was a key driver of the 51% increase in data traffic per smartphone in 2020, as average usage increased from 3.9 GB to 5.9 GB in Latin America. Mobile networks held up well to the rise in data traffic, reflecting the sustained investment levels of operators over the past few years.

Figure 8

Source: Ericsson

Growth in mobile data traffic per smartphone in Latin America will exceed the global average

Data traffic per smartphone (GB/month)



1. GSMA Intelligence Consumers in Focus Survey 2020

1.4 Mobile sector financials begin to recover from Covid-19 impact

The pandemic introduced a significant financial challenge, impacting revenues across several areas. Lower handset upgrades (due to retail store closures) affected equipment revenues, while a reduction in consumer spend (due to increased unemployment) and increased business uncertainty

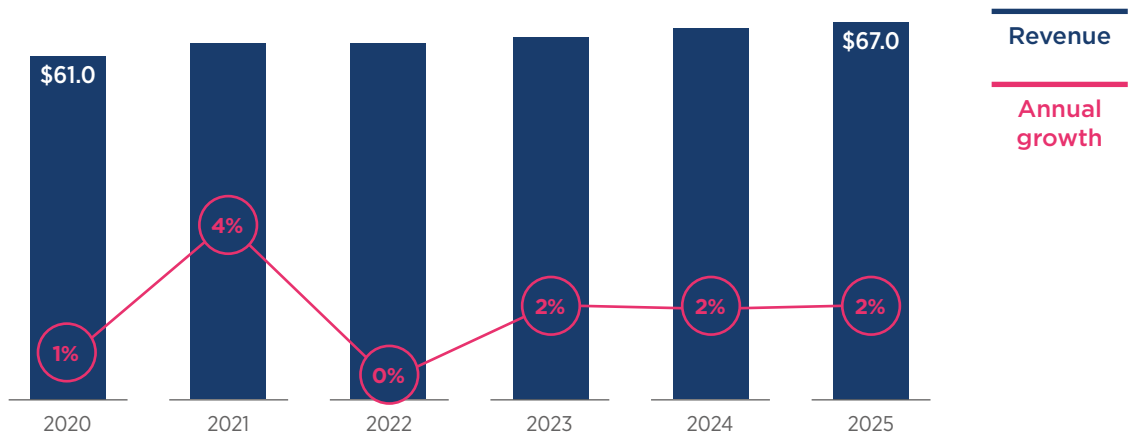
affected service revenue. Revenue growth should rebound in 2021, helped by the annualisation of the Covid-19 impact. However, economies will continue to grapple with the fallout of the pandemic, meaning revenue growth to 2025 is likely to be modest.²

Source: GSMA Intelligence

Figure 9

A steady operator revenue outlook in Latin America following the Covid-19 impact in 2020

Billion



Mobile operators in Latin America will invest more than \$70 billion in their networks between 2020 and 2025. The rollout of 5G networks will be a key driver of this spend, accounting for almost two

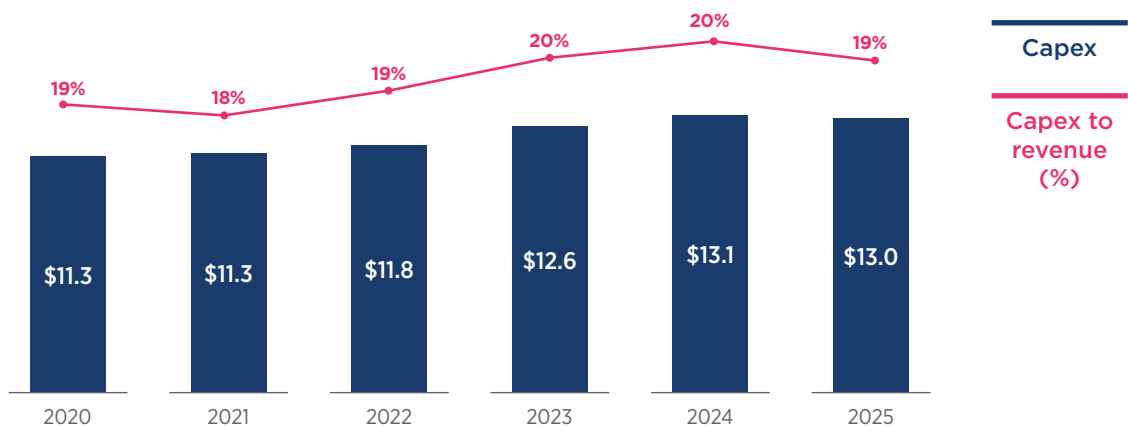
thirds of network capex over the period. This will be supported by efforts to upgrade existing LTE infrastructure with technologies such as carrier aggregation and 4x4 MIMO.

Source: GSMA Intelligence

Figure 10

Operator capex to peak in 2024 in Latin America as 5G rollouts gather pace

Capex (billion)



2. For more detail, see [Region in Focus: Latin America, Q1 2021](#), GSMA Intelligence, 2021



02

Key trends shaping the digital landscape

2.1 5G: laying the groundwork

The transition to 5G is progressing rapidly, driven by the continued rollout of new networks, the expansion of the device ecosystem, and the development of new applications for consumers and enterprises. As of September 2021, there were more than 170 live 5G networks, including fixed wireless access (FWA), in 69 countries around the world. Meanwhile, commercialisation of 5G standalone (SA) networks is starting to ramp up; 14 operators globally now offer commercial 5G services on SA networks, with an additional 10 operators expected to follow suit by the end of 2021.

In Latin America, 5G is still at a nascent stage of development as operators have largely focused on migrating 2G and 3G customers to 4G networks. 4G adoption is still rising in the region and is not expected to peak until 2024. That said, operators in a handful of countries have rolled out 5G services, including FWA, using existing spectrum. In Brazil, Claro and Telefónica's 5G networks now serve 15 cities and 8 cities, respectively, while Claro Peru has expanded its 5G coverage to 19 districts in the Lima metropolitan area and two other provinces.

Figure 11

Source: GSMA Intelligence

5G state of play



Commercial 5G network:

LIVE

- Brazil
- Colombia
- Peru

PLANNED

- Argentina
- Chile
- Dominican Republic
- Mexico
- Uruguay

Note: Data correct to September 2021. Includes 5G FWA services.



There will be a significant uptick in 5G activities in the coming years as spectrum auctions in major markets (notably Argentina, Brazil, Colombia and Mexico) begin to take place. In the meantime, mobile operators, governments, network vendors and other ecosystem players have begun laying the groundwork for the 5G era through investments in accompanying infrastructure, such as fibre, and partnerships to trial and develop new applications. Examples include the following:

- Centro de Pesquisa e Desenvolvimento em Telecomunicações (CPQD), one of the largest telecoms and IT R&D centres in Latin America, has opened a new space for tests related to communication networks, with an emphasis on 5G, in Brazil.
- Brazil's Ministry of Communications has launched a website offering users information on the impact that 5G will have on their lives and the country's economy.
- Huawei has opened a test centre for 5G solutions in Brazil, bringing together stakeholders to develop 5G applications for key sectors, including agriculture, mining and manufacturing.
- Vivo is conducting a 5G trial in Rio de Janeiro using 26 GHz mmWave frequencies, focusing on FWA services and solutions for enterprise customers.
- Colombian mobile operators Claro, Movistar and Tigo have conducted 5G trials using spectrum in the 3500 MHz band.
- Mexico's telecoms regulator plans to launch a dedicated committee to discuss industrial use cases of 5G technology.
- In Uruguay, Claro has conducted 5G trials using the 28 GHz band, with a focus on coordinating the interoperability of its networks with those of Movistar and Antel.

Private networks: exploring the 5G opportunity

There has been a surge in activity around private networks in recent years. These allow enterprises to have more control over their connectivity and can help fulfil their evolving requirements in terms of latency, coverage, edge or security. The majority of commercial deployments have been on LTE technology and span several sectors, such as agriculture, manufacturing and mining.

A number of LTE-based private networks have been deployed in Latin America in recent years. For example, Brazil's Neoenergia deployed a private LTE network connecting smart electric meters to the utility company's operations centre; Telefónica Peru deployed a private LTE network at Las Bambas copper mine in the Apurímac region; and US tractor company John Deere deployed a private network for farmers in Brazil.

Building on private LTE installations, 5G networks have emerged as a solution to address issues around latency, reliability and density, among other enterprise requirements. This has been reflected in recent developments:

- TIM has deployed three antennas for the testing of a private 5G SA network in São Paulo, Brazil. The test involves technical evaluations of the network itself and its functionality, such as frequency aggregation, network sharing and data connection with very low latency.
- Claro, Embratel and SLC Agrícola have partnered to deploy 5G SA systems from Huawei at farm locations in Brazil. SLC Agrícola will use the technology for transmission of high-resolution images, which can be collected in the field and processed in real time.
- A number of companies, including Tigo Colombia and Nokia, have teamed up with AngloGold Ashanti Colombia, to conduct the first 5G trial in mining in Jericó, Colombia. The trial shows it is possible to safely, sustainably and efficiently enable mining use cases for a private 5G SA network in a challenging underground environment.

Private networks and mobile edge compute (MEC) capabilities are likely to converge, allowing enterprises to better allocate network resources, according to use-case requirements, and personalise services locally where they are consumed. Moving intelligence to the edge can dramatically improve the end-user experience and improve the economics associated with hosting and managing a network. In May 2021, Telefónica Tech partnered with Microsoft to offer private 5G and on-premise edge computing to address the Industry 4.0 opportunity and related use cases.

2.2 Digital transformation of the enterprise accelerates

The slump in economic activity and disruption to supply chains due to the Covid-19 pandemic affected IoT sales volumes across multiple sectors, including connected vehicles, smart cities and smart buildings.

However, deploying IoT as part of a wider digital transformation agenda is a top priority to modernise processes and boost productivity, with almost two

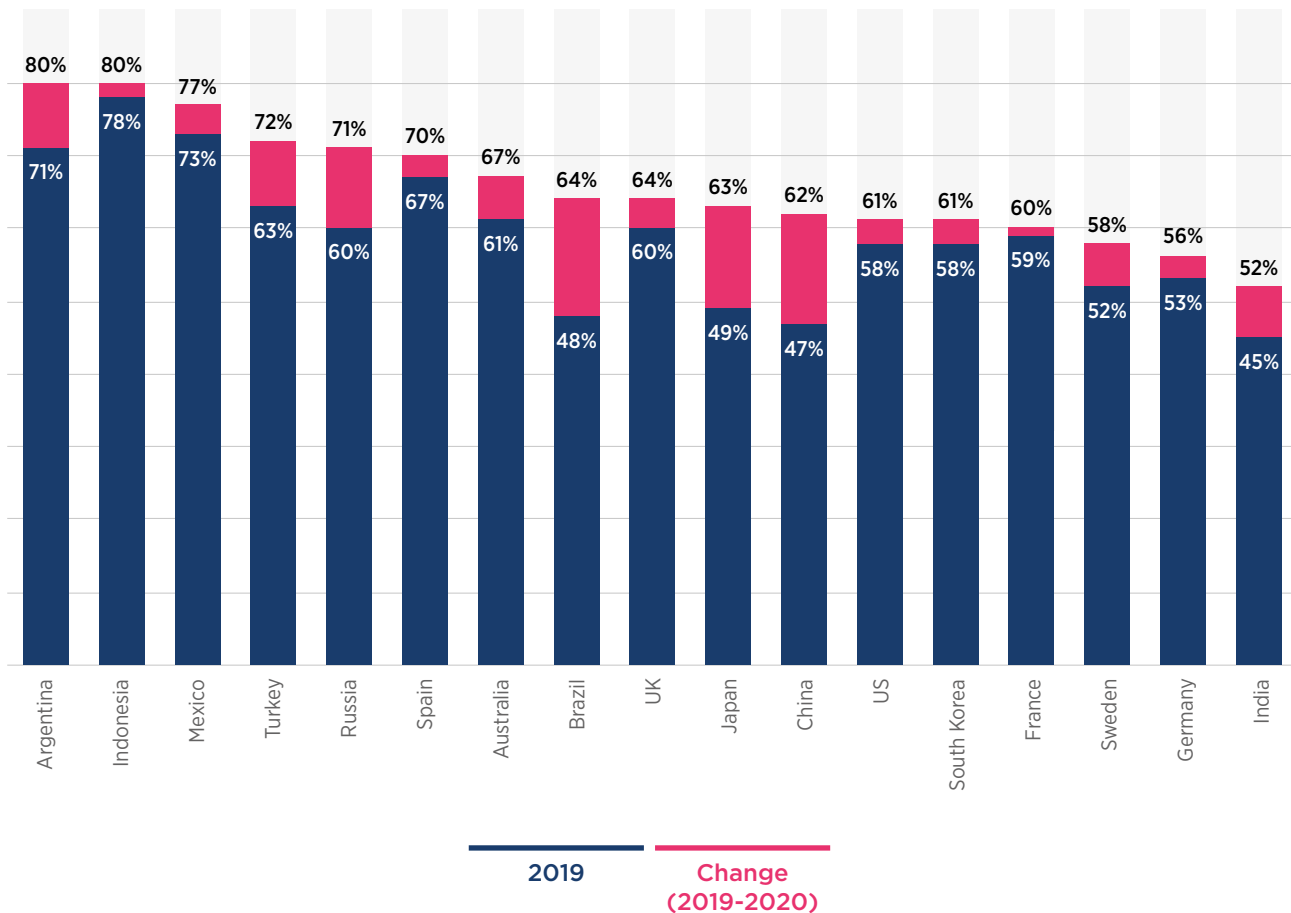
thirds (63%) of enterprises globally rolling out IoT in this way, rather than as a standalone initiative. This figure is even higher in Latin American markets such as Argentina (80%) and Mexico (77%). Moreover, the urgency to deploy IoT solutions as part of digital transformation initiatives is rising rapidly across several markets, such as Brazil.³

Figure 12

Source: GSMA Intelligence Enterprise in Focus Survey 2020

IoT is increasingly deployed as part of a wider enterprise transformation agenda in Latin America

Percentage of companies that agree IoT is being deployed as part of a wider transformation agenda rather than a standalone initiative, by country



3. GSMA Intelligence Enterprise in Focus Survey 2020

Operators will continue to play a central role in deploying mobile IoT networks and scaling IoT solutions that underpin consumer-focused solutions and enterprise digitisation programmes. For example, Claro and Telefónica have rolled out narrowband IoT (NB-IoT) and LTE-M networks in both Argentina and Colombia,⁴ and Telecom Argentina now offers IoT solutions, including asset tracking, fleet management, geo localisation and cold chain control, to multiple verticals.⁵

The use of IoT technologies in Latin America extends across the consumer and enterprise sectors – from heavy industrial applications in mining and manufacturing, to health services for consumers. In Brazil, TIM is supporting the digitisation of fledgling agribusinesses, providing them with access to its 700 MHz network and portfolio of affiliate companies.

Policymakers will also be an enabling factor in IoT's development across Latin America. In March 2021, Argentina's Ministry of Public Innovation established a National IoT Board (Mesa Nacional de Internet de las Cosas) comprising private companies, universities and government bodies, subsequently launching a stakeholder survey to understand ongoing IoT projects in the country. Partnerships will also be key to the region's burgeoning IoT ecosystem, fostering innovation and industrialisation:

- Claro, Embratel, Ericsson and the São José dos Campos Technological Park have signed a cooperation agreement to develop, validate and test 5G and IoT solutions for corporate market segments, such as health, education and smart cities. The agreement is supported by beON Claro (the operator's innovation hub), which will encourage collaboration between companies, startups, investors and research institutions.
- In March 2021, Movistar announced the first implementation of IoT technologies in a public services company in Argentina. It launched a six-month NB-IoT network pilot in partnership with electricity provider Edenor, enabling remote smart meter reading and remote detection of faults, clandestine connections and cuts in power lines.
- Amazon Web Services (AWS) has announced partnerships with two Latin American operators, reflecting a global trend in cloud-telecoms co-opetition. Tigo will be able to offer AWS cloud services as part of its multi-cloud managed services portfolio, which aims to facilitate enterprise digitisation across multiple regional markets. Meanwhile, Claro's partnership with AWS will accelerate its adoption of cloud-based applications, while helping to improve IoT services to serve a range of industry verticals.

Telefónica: keeping cars safe and secure

Connected cars are becoming the norm in developed and developing markets. Four out of five models in General Motors' vehicle portfolio in Mexico, for example, now have IoT connectivity, enabling its customers to benefit from various services. Its OnStar subsidiary is using an IoT platform (Kite) and LTE connectivity from Telefónica to help safeguard drivers and enhance their in-vehicle experience. The telematics solution supports a range of services, such as subscription-based communications, infotainment, turn-by-turn navigation (with optimised routes), a system that calls the emergency services automatically in the event of a crash, roadside breakdown assistance, stolen vehicle assistance and remote fault-diagnostic systems in real-time.

Telefónica's Kite platform manages the cellular connectivity, providing a secure solution that enables constant communication between vehicles and OnStar's data centres. The analytics capabilities in the Kite platform structure the information obtained from the connectivity data to help improve security and operational efficiency, using dashboards to show real-time information.⁶

4. <https://www.gsma.com/iot/deployment-map/>

5. "Nokia selected by Telecom Argentina to help enable new enterprise IoT services", Nokia, February 2020

6. For more information, see [IoT Beyond Connectivity Case Study, By Telefónica: Keeping Cars Safe and Secure](#), GSMA, 2020

As a result of mobile operator activity and partnerships, total IoT connections in Latin America will amass at a hastening pace, reaching close to 1.2 billion in 2025.⁷ Growth will be relatively faster in the enterprise IoT market, with a notable increase in the adoption of smart buildings solutions (forecast to record a CAGR of 24% between 2020 and 2025). Here, IoT applications have the power to make a meaningful contribution to the UN's Sustainable

Development Goals (SDGs) by facilitating carbon emissions reductions, while improving safety and supporting economic development.

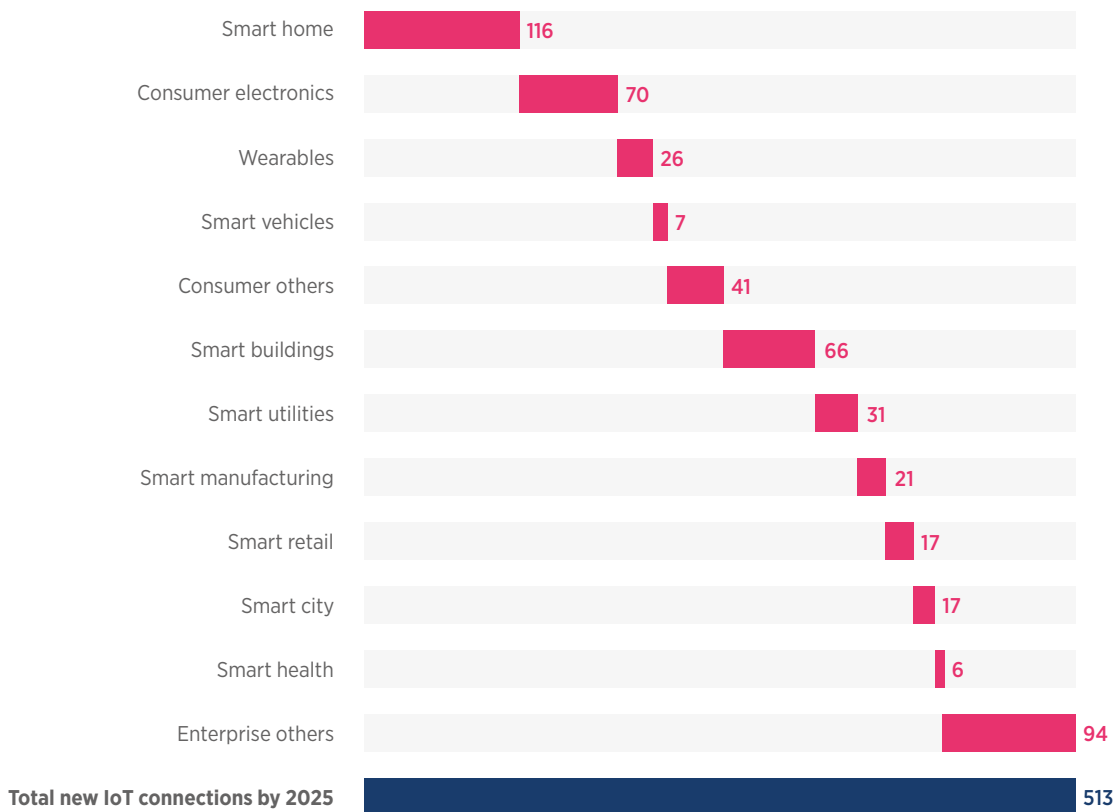
Despite the short-term turbulence caused by the pandemic, regional IoT revenue will reach \$31.5 billion by 2025. The professional services segment (comprising consulting, managed services and systems integration) is expected to see the highest growth rate over the period.⁸

Source: GSMA Intelligence

Figure 13

Latin America will see more than 500 million new IoT connections between 2020 and 2025

Millions



7. IoT connections forecast: the impact of Covid-19, GSMA Intelligence, 2020

8. IoT revenue: state of the market 2020, GSMA Intelligence, 2020

2.3 Telco of the future: operators advance their network transformation strategies

With the commercialisation of 5G and introduction of mobile network innovations such as open RAN, edge networking and network automation, we are beginning to see what the telco of the future could look like. Operators’ decisions on network transformation strategies are more important than ever. Such decision-making is crucial to the operators, their network infrastructure suppliers and the customers who will rely on the networks of tomorrow.

In Latin America, revenue generation, efficiency and customer experience are driving operators’ network transformation efforts. This is in line with

their counterparts in other regions, signalling that operators globally are optimistic about options for driving profitability rather than cost cutting. However, the goals of Latin American operators’ network transformation strategies deviate from those in other regions when it comes to cost savings: no Latin American operator surveyed by GSMA Intelligence ranked saving on capex as their primary goal, whereas 12% of operators globally listed capex savings as a top priority. The focus on opex in Latin America reflects operating costs remaining stubbornly high and the potential for network automation, network sharing and other initiatives to drive them down.

Source: GSMA Intelligence Operators in Focus: Network Transformation Survey 2021

Figure 14

Revenue generation and customer experience remain top priorities for operators in Latin America

What is the primary goal driving your network transformation strategy?
Percentage of operators in Latin America

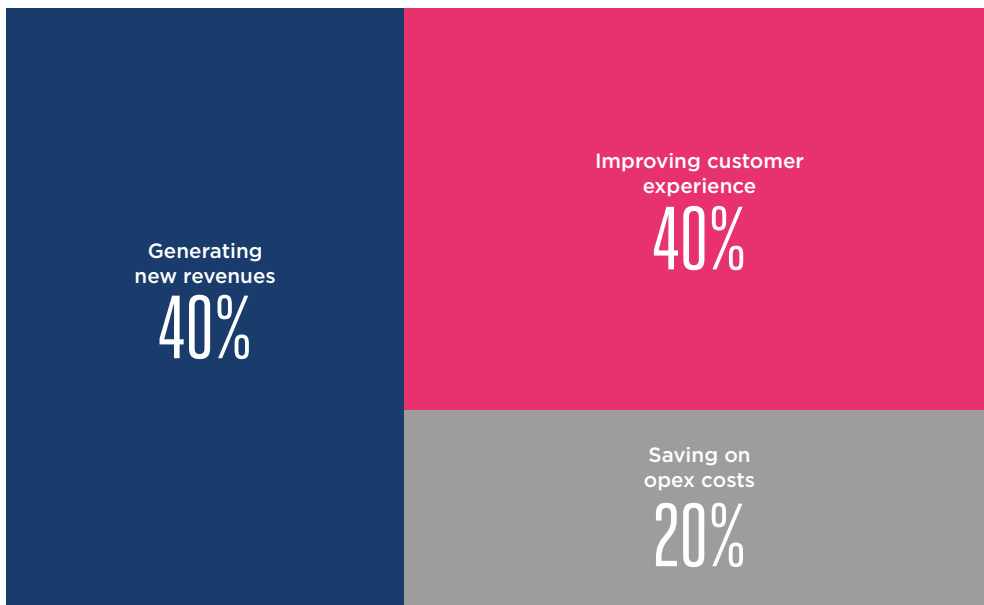


Figure 15

5G coverage and open RAN are top RAN priorities, while OSS/BSS upgrades and virtualisation investments are crucial for the core network

Considering your 5G radio access network/5G core and service network, which areas of investment are most important for delivering successful 5G services? (Operators in Latin America)

Top ranked priorities for 5G investment

RAN

1. Wide-area 5G coverage
2. Open RAN
3. New spectrum allocations

CORE

1. OSS/BSS upgrades
2. Virtualisation investments
3. Next-generation core network (service-based architecture)

Wide-area coverage is the top 5G RAN investment priority. As is the case in other regions, operators in Latin America plan to invest heavily to ensure broad coverage, which is critical to making 5G available to as many potential users as possible.

Notably, Latin America was the only region where open RAN featured in the top-two 5G RAN priorities. This is partly a result of differences in 5G timelines between Latin America and some other regions.

In North America and developed Asia Pacific, for instance, most operators were advanced with their 5G deployment plans before open RAN started to gain traction. The high level of interest in 5G open RAN also reflects a growing commitment from operators in Latin America to use standardised interfaces and interchangeable networking components to lower capex, as evidenced by recent announcements. See Figure 16.



Figure 16

Source: GSMA Intelligence

Open RAN is making progress in Latin America



Argentina

Telefónica and IBM deployed an open RAN proof-of-concept covering 81,000 people in Puerto Madryn. It uses components and systems from the likes of Altiostar and Red Hat.



Brazil

Telefónica and NEC Corporation have agreed to conduct pre-commercial open RAN trials in Brazil, Germany, Spain and the UK. The operator is aiming for open RAN to account for up to 50% of its 4G and 5G RAN growth in number of deployments between 2022 and 2025.



Colombia

Tigo and Parallel Wireless announced plans to introduce open RAN at 362 rural sites in Colombia to deliver 4G coverage. The solutions will utilise 700 MHz spectrum.

OSS/BSS upgrades rank as the top priority when it comes to 5G core networks, demonstrating the focus of Latin American operators on monetising the latest network generation. OSS/BSS upgrades can help operators launch new services more quickly, facilitate new partnership agreements with content providers and enable customers to pay in new ways.

Virtualisation investments are also a high priority. Operators have been moving to virtualised core functions for several years, but 5G represents a further opportunity to move this transformation forward. This is important as operators have yet to fully realise the promised benefits of virtualisation, such as reduced costs and accelerated service innovation. Closer collaboration with cloud providers could help change this.

Telefónica and AWS demonstrate 5G SA deployment over AWS Outposts

In May 2021, Telefónica Brasil (Vivo) announced it had achieved a key milestone in deploying cloud-native 5G networks, as it had finished validating AWS Outposts as an “effective infrastructure option” for deploying the 5G core technology required to offer 5G SA services. The operator has not yet publicly committed to using AWS Outposts in its 5G rollout, but the announcement is further evidence of the growing intersection between mobile operators and public cloud providers.

Previous tie-ups between mobile operators and cloud providers have largely concentrated on moving IT and back-office functions to the public cloud. Telefónica’s decision to test core network technology on AWS Outposts is therefore another step towards running mobile networks on public cloud technology. However, there are still obstacles to overcome, such as fitting the use of virtualised technologies around existing platforms and systems. As a result, the transition to public cloud will be a multi-year journey, with operators requiring support from a range of vendors.

2.4 Telco of the future: mobile financial services gain traction

The pandemic has accelerated the shift to digital for consumers and enterprises, fuelling further interest in mobile financial services. This is supporting the emergence of a vibrant fintech market in Latin America. Local players C6 Bank, Nubank, dLocal, AlphaCredit and Clip have all completed funding

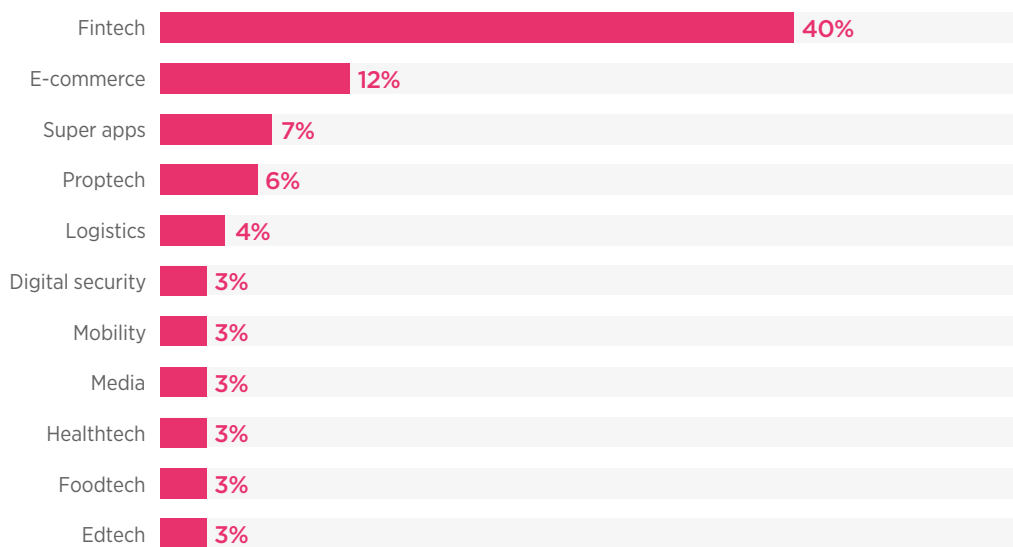
rounds worth more than \$100 million since the beginning of 2020. The latest report from LAVCA (the Association for Private Capital Investment in Latin America) estimates that fintech accounted for 40% of the total venture capital invested across Latin America in 2020.⁹

Source: LAVCA

Figure 17

In 2020, fintech was the main driver of venture-capital investments in Latin America

Percentage of total capital invested



Against this backdrop, a growing number of operators in Latin America are making new moves in financial services. For example, Telefônica Brasil recently announced the launch of Vivo Pay – a digital wallet that enables users to pay bills, transfer money and top up their mobile plans. Other mobile operators are forming partnerships with banks and/or specialist fintech players to expand their presence in the financial services market:

- Claro Brasil and Banco Inbursa, which share the same parent company, have launched Claro Pay – a service that lets users make payments, send and receive money, recharge airtime and withdraw cash.
- AT&T Mexico has teamed up with payments company Broxel to launch AT&T ReMo – an app that lets users pay for items online and in stores, transfer money and recharge airtime.
- Movistar Mexico and Banco Sabadell have partnered to trial Movistar Money – a service that lets Movistar subscribers obtain credit of up to MXN45,000.

Mobile money also remains an opportunity for operators in the region. In 2020, Latin America and the Caribbean had by far the fastest growth of any region in the number of registered and active mobile money accounts. The region now records 39 million registered accounts, representing 38% year-on-year growth, while active accounts reached 16 million, growing by 67% – the highest rate since 2013.¹⁰

9. LAVCA's 2021 Review of Tech Investment in Latin America, LAVCA, 2021 (see www.lavca.org/research)

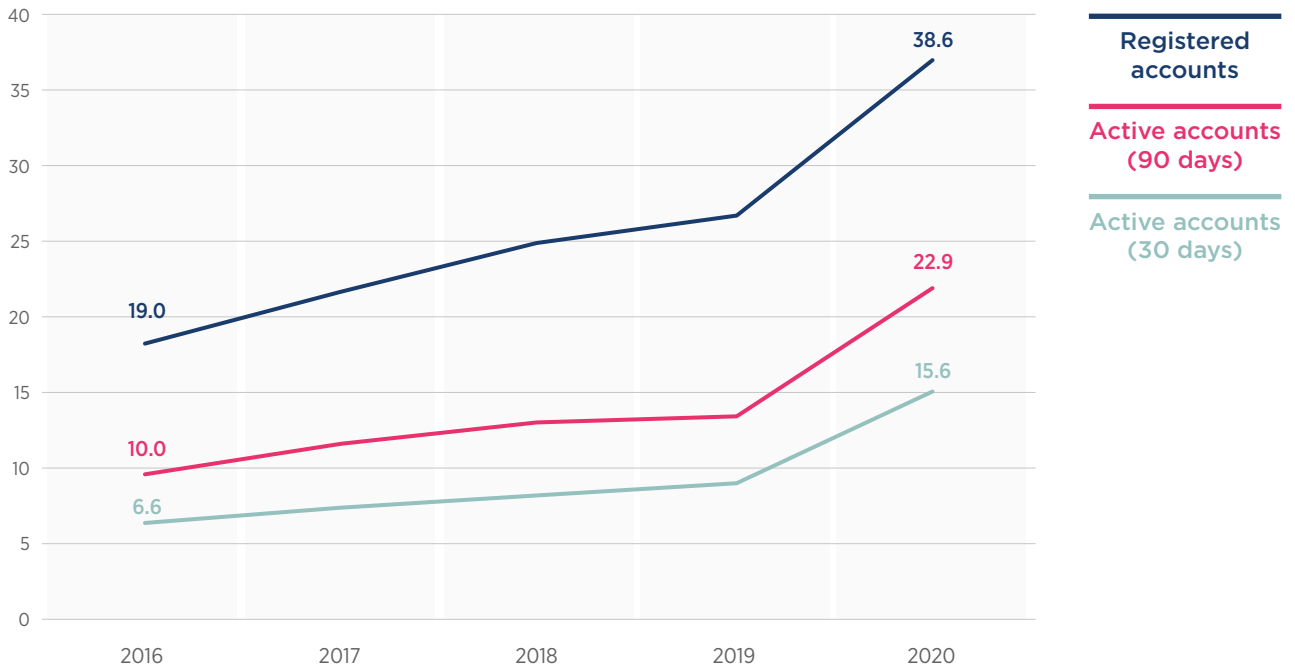
10. Mobile money in 2020 and beyond: exploring the acceleration in Latin America and the Caribbean, GSMA, 2021

Source: GSMA

Figure 18

The pandemic spurred significant growth in the number of registered mobile money accounts in Latin America and the Caribbean

Mobile money accounts, million



Note: An active mobile money account is one which has been used to conduct at least one transaction during a certain period (usually 30 or 90 days).

Mobile operators are making the most of this momentum by investing in expansion plans in a bid to close the financial inclusion gap. Recent examples include Tigo’s commitment to invest \$250 million in Panama, part of which will be dedicated to operating its mobile money platform in the country and creating a new fintech hub to expand mobile financial services in Latin America. As of April 2021, Tigo Money (Millicom’s mobile financial services platform) was available in five markets across Latin America and reached 4.8 million customers.

The move by operators to expand their presence in mobile financial services can be partly explained by the need to grow revenues beyond connectivity, as core telecoms revenues stagnate. Revenue

diversification is a strategic focus for many operator groups. For example, TIM stated the expansion of the Group’s business beyond connectivity was the primary objective of its 2021–2023 strategic plan.¹¹ Meanwhile, Telefónica has created a separate business unit (Telefónica Tech) to bring together digital businesses with high growth potential.

In addition to top-line growth, providing mobile financial services can deliver other benefits to mobile operators. For example, it can provide subscribers with easier ways to top up their mobile plans. Improving access to credit for customers also allows operators to offer device financing products, which can boost take-up of high-end smartphones.

11. “TIM: The Board of Directors has approved TIM’s 2021-2023 Strategic Plan”, TIM, 2021



03

**Mobile
contributing
to economic
growth and
social progress**

3.1 Mobile’s contribution to economic growth

In 2020, mobile technologies and services generated 7.1% of GDP in Latin America – a contribution that amounted to more than \$340 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 more than \$29 billion raised through taxes on the sector. By 2025, mobile’s contribution will grow by more than \$30 billion, as the countries in the region benefit from the improvements in productivity and efficiency brought about by the increased take-up of mobile services.

Figure 19

Source: GSMA Intelligence

The mobile ecosystem in Latin America directly generated more than \$55 billion of economic value in 2020, with mobile operators accounting for the vast majority

Billion, percentage of GDP (2020)

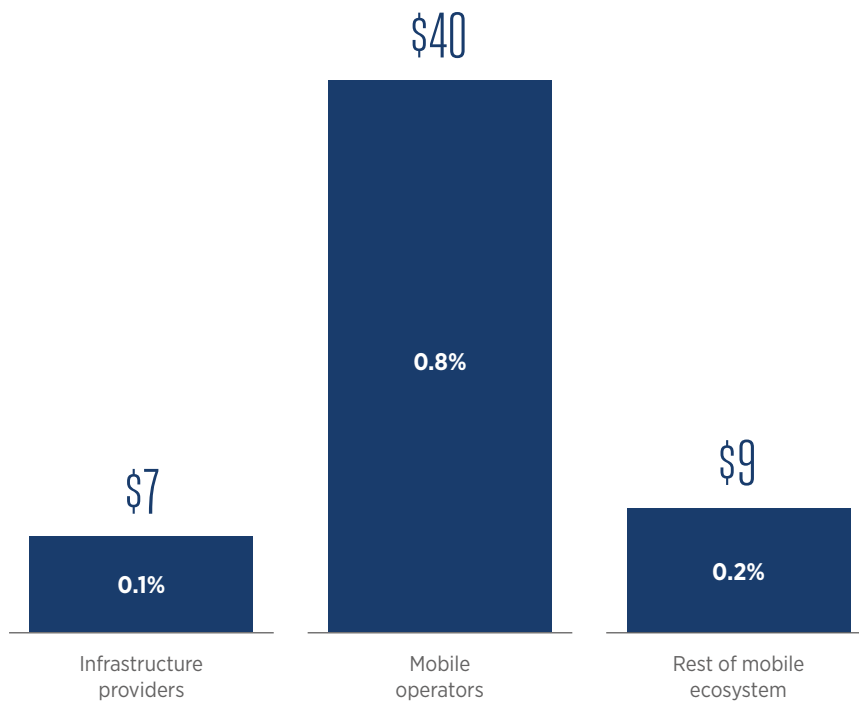
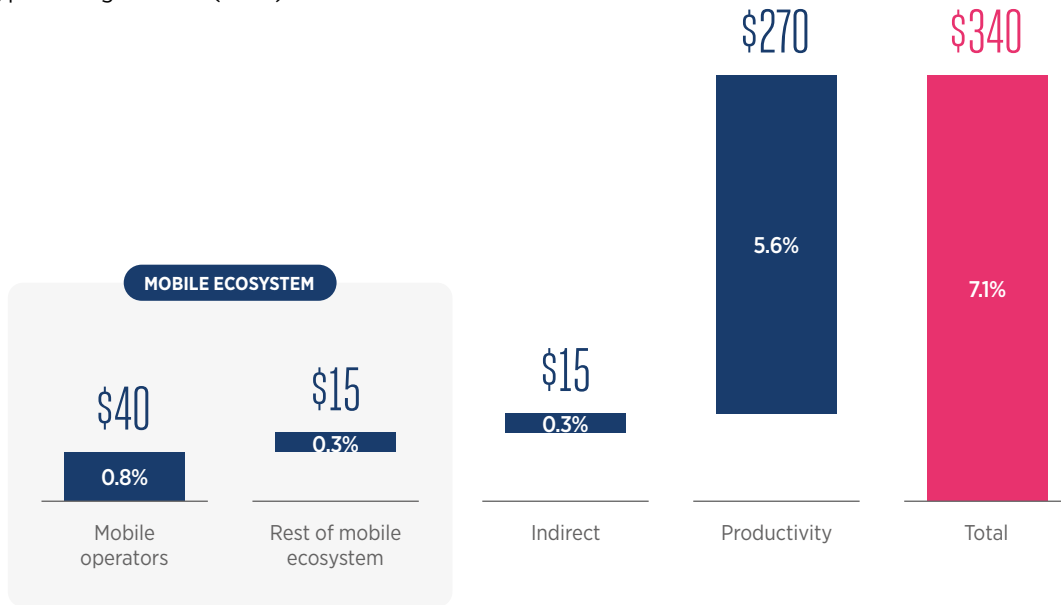


Figure 20

Additional indirect and productivity benefits bring the total contribution of the mobile industry to the regional economy to more than \$340 billion

Billion, percentage of GDP (2020)

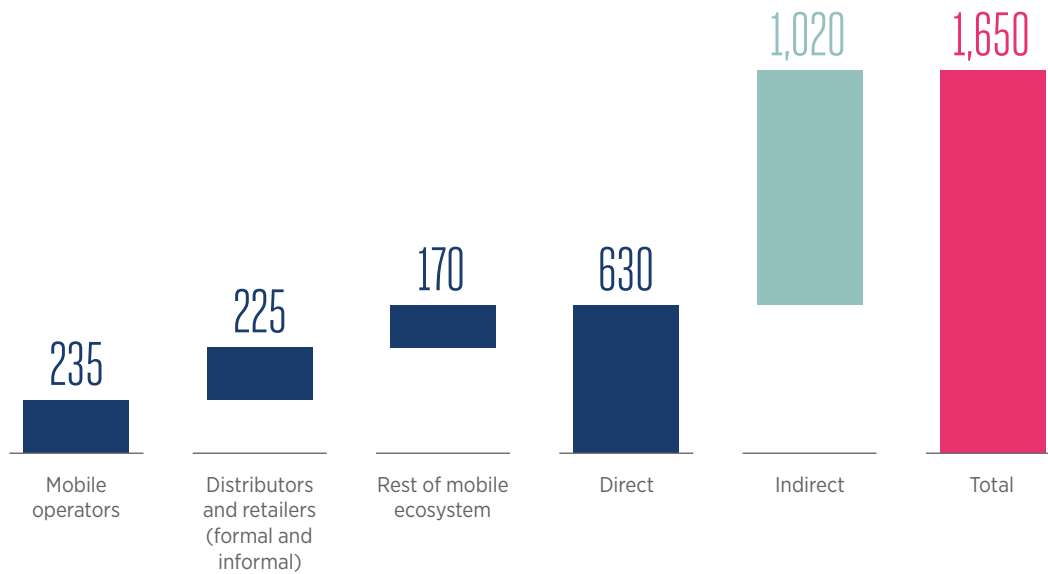


Note: Totals may not add up due to rounding

Figure 21

The mobile ecosystem directly employs more than 600,000 people in Latin America, and supports another 1 million jobs indirectly

Jobs (000s)



Note: Totals may not add up due to rounding

Figure 22

Source: GSMA Intelligence

In 2020, the mobile ecosystem in Latin America contributed more than \$29 billion to the funding of the public sector through consumer and operator taxes

Billion

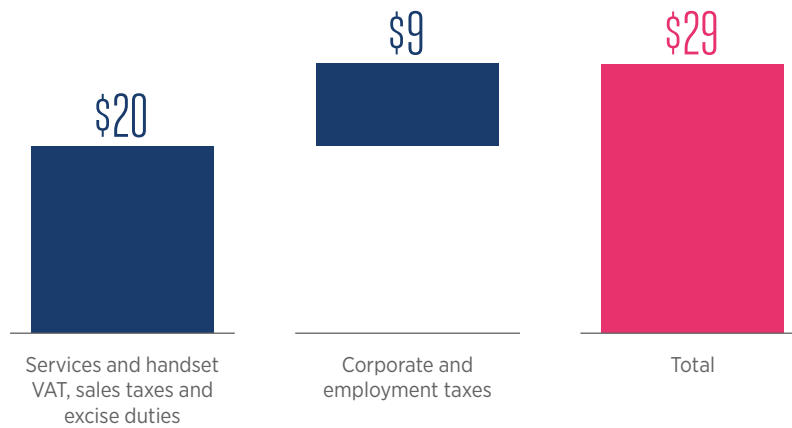
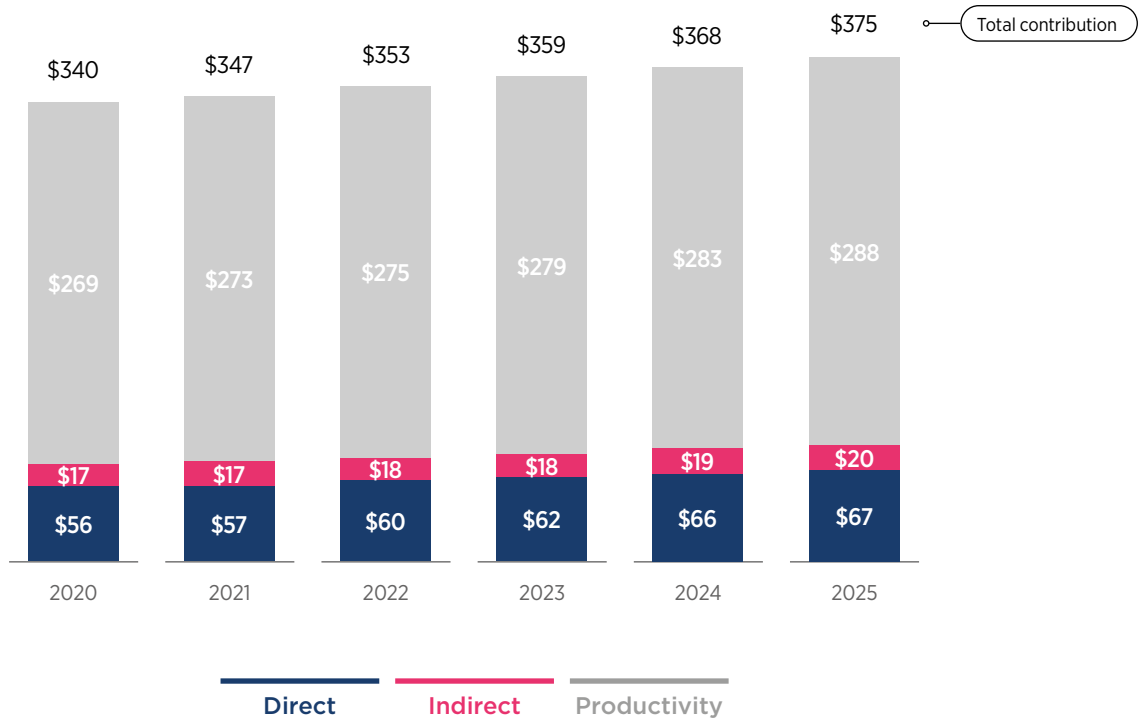


Figure 23

Source: GSMA Intelligence

Driven by continued expansion of the mobile ecosystem and productivity gains, the economic contribution of mobile in Latin America will increase by more than \$30 billion by 2025

Billion



Note: Totals may not add up due to rounding



3.2 The mobile industry's response to the Covid-19 pandemic

As of 27 September 2021, there had been nearly 45 million confirmed Covid-19 cases and almost 1.5 million confirmed deaths in Latin America.¹² To mitigate the spread of the virus and avoid overwhelming public health systems, lockdown restrictions and social-distancing measures have been in place. The subsequent economic and social impacts have been severe, leading to job losses and a rise in extreme poverty, among other negative repercussions.¹³

Throughout the crisis, digital technologies have played a pivotal role in enabling social and economic activities to continue. People have relied on the internet to stay connected to friends and family, access educational, financial and health services, and work remotely. This underscores the importance of connectivity in our daily lives and, in particular, the value of mobile networks, which remain the only form of internet access for many in Latin America.

Efforts by Latin American operators at the early stages of the pandemic to keep people and enterprises connected, and to provide targeted support for vulnerable individuals and communities, are well documented.¹⁴ Mobile operators offered discounts on tariffs and provided digital content and tools to help people and businesses get online. More

recently, mobile operators have adopted measures to help society recover, such as using their mobile big data (MBD) analytics and AI expertise to inform government response measures, as well as enabling people to use digital technologies to support learning activities in challenging times. Specific examples include the following:

- **America Móvil** and the Carlos Slim Foundation have developed the FCS Monitor App – a tool that allows users to report Covid-19 symptoms and identify when to receive medical treatment.
- **Telefónica Argentina** has partnered with the University of San Martín to develop The Citizen Mobility Index, an MBD and AI solution, to help governments monitor and control mobility flows during lockdown restrictions.
- **TIM Brasil** is offering free educational content on its MOOC (Massive Open Online Courses) platform, to support those who had their education disrupted in the pandemic. TIM has launched new courses addressing subject matters relating to financial education, technology and agriculture.

12. Johns Hopkins CSSE. Note: The CSSE states that its numbers rely upon publicly available data from multiple sources, which do not always agree

13. The Sustainable Development Goals Report, United Nations, 2021

14. [The Mobile Economy Latin America 2020](#), GSMA, 2020

3.3 Mobile supporting digital inclusion

Although the coverage gap¹⁵ has been significantly reduced thanks to operator investments, the Covid-19 crisis has reinforced the impacts of the digital divide, with the unconnected less able to mitigate the economic and social disruption to their lives. Today, most of those without mobile broadband coverage live in rural and remote areas, where the business case for expanding connectivity is most difficult.

At the end of 2020, 358 million people across Latin America were connected to the mobile internet – an

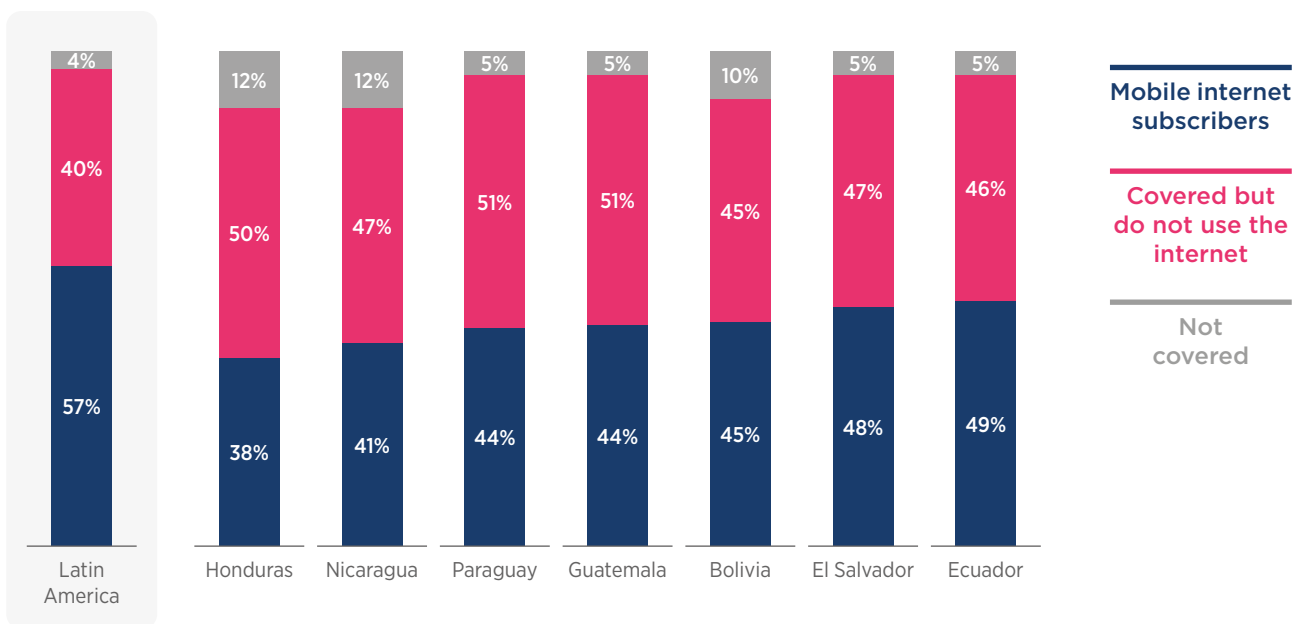
increase of 15 million on 2019. However, around 275 million people remain offline and excluded from the digital economy in the region. Around 96% of the population is covered by a mobile broadband network, reflecting operators’ investments over the last decade. However, around 40% of the population covered but not yet using mobile internet face barriers other than coverage. These include affordability, knowledge and digital skills, relevance, safety and security, and access to enablers (such as electricity and formal IDs).¹⁶

Source: GSMA Intelligence

Figure 24

More than a third of the population in Latin America remains unconnected

Countries with the highest proportion of non-internet users in Latin America



Note: Totals may not add up due to rounding

Affordability remains a major barrier to mobile internet use for many, particularly in light of the economic fall-out from Covid-19. In low- and middle-income countries (LMICs), the median contraction in GDP per capita was 4.2% in 2020, with the largest

losses in Latin America and the Caribbean. The contraction in GDP per capita translates to a sharp drop in labour income, with Latin America estimated to have experienced the steepest drop in working hours among all regions in 2020.¹⁷

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

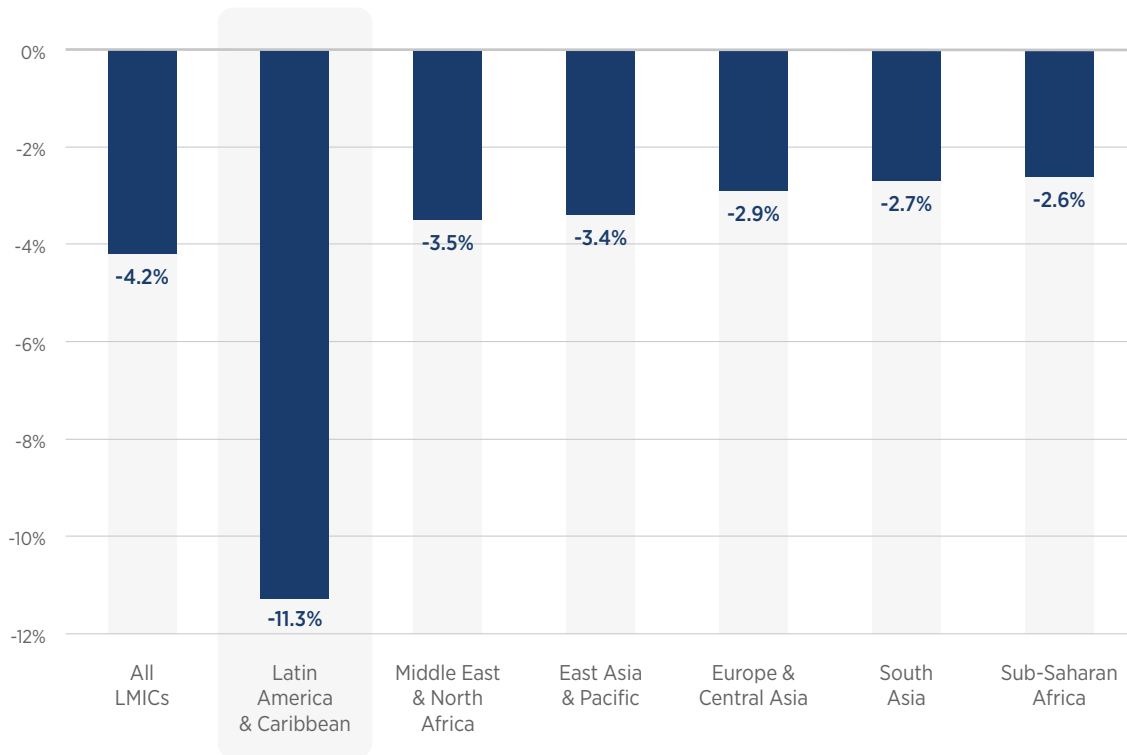
16. For example, see [Accelerating mobile internet adoption: Policy considerations to bridge the digital divide in low- and middle-income countries](#), GSMA, 2021

17. World Employment and Social Outlook: Trends 2021, ILO, 2021

Figure 25

Latin America recorded the highest median contraction in GDP per capita in 2020

Change in GDP per capita (2020)



Although the median cost of entry-level handsets and 1 GB of data fell in 2020, the economic impact of the pandemic meant there was a reduction in the affordability of mobile services in Latin America.¹⁸ To support customers at the beginning of the pandemic, several Latin American operators allowed users who could not afford to pay their telecoms bills to temporarily suspend their regular service charges.

The focus is now on implementing initiatives that are sustainable over the long term. For example, many consumers in Latin America that could not afford to purchase a phone in a single upfront payment have benefitted from mobile operators' asset-financing models, such as payment instalment plans, subsidies, loans, leases and rentals.

18. [The State of Mobile Internet Connectivity 2021](#). GSMA, 2021

3.4 The industry’s commitment to sustainable development

Six years have passed since the launch of the UN Sustainable Development Goals (SDGs) and the mobile industry stepping forward to commit to the 17 Goals. Each year since, the GSMA has measured the impact of the mobile industry across all SDGs. In Latin America, the sector scored highest on SDG 9: Industry, Innovation and Infrastructure in 2020, while SDG 7: Affordable and Clean Energy was the most improved SDG.¹⁹

Figure 26

Source: GSMA Intelligence

Mobile’s impact on the SDGs in Latin America, 2020

Highest SDG scores



Despite changes in traffic levels and patterns during the pandemic, mobile networks in Latin America showed notable resilience, reflecting the investment in network capacity from operators. Mobile networks continue to play a vital role in providing critical infrastructure to spur inclusive and sustainable development, in addition to greater innovation.



Mobile technology can help with education through the dissemination of online content and support. During the pandemic, mobile operators have supported customers by offering free educational content, zero-rated access or additional data to ensure continued access to vital services.



Many Latin American operators are now disclosing their performance and setting targets for emissions reductions. Leading operators in this field have set science-based targets and disclose information relating to climate risk. For example, America Móvil has committed to reducing absolute Scope 1 and 2 GHG emissions by 52% by 2030 (from a 2019 base year). The operator has also committed to reducing absolute Scope 3 GHG emissions by 14% by 2030 (from a 2019 base year).

Most improved SDG scores



Mobile operators are increasing the proportion of renewable energy used to operate infrastructure such as base stations and data centres. In Mexico, AT&T recently implemented a 40 GWh/year agreement to use renewable energy for approximately 1,200 network sites. This will drive significant reductions in emissions, while supporting hundreds of local jobs.²⁰



Mobile technology contributes to SDG 14 by providing technical platforms that act as channels to capture and enable access to information. Since 2018, Telefónica and the United Nations Food and Agriculture Organization (FAO) have worked together to facilitate the digital transformation of sectors, such as agriculture, fishing and forestry. This includes initiatives that leverage Telefónica’s IoT expertise to support the monitoring and management of coastal marine ecosystems.



The mobile industry provides enabling technologies to support activities such as forest, natural habitat and endangered species monitoring. For example, Entel Ocean (the digital unit of Entel) is using AI and IoT to enable early identification of forest fires in Chile. By detecting a forest fire 12 minutes before traditional methods, Entel’s solution can help reduce the environmental impact of natural disasters.²¹

19. 2020 Mobile Industry Impact Report: Sustainable Development Goals. GSMA, 2021

20. The Power of Connections: AT&T ESG Summary, AT&T, 2021

21. "What would it take to make AI 'greener'?", World Economic Forum, September 2021

Spotlight on SDG 13: Climate Action

Latin American operators are making progress on SDG 13, with mobile at the forefront of efforts to tackle climate change. Mobile became one of the first sectors to set a milestone ambition – to transform the industry to reach net-zero carbon emissions by 2050, at the latest. Following this, the UN's Race to Zero campaign declared the mobile industry had made a critical breakthrough in early 2021, as more than a third of operators by revenue globally had committed to achieving net-zero emissions by 2050 or earlier.²²

Furthermore, at the end of 2020, 80% of operators by revenue worldwide had disclosed their climate impacts, while almost two thirds of operators by revenue had set science-based targets to cut their carbon emissions rapidly over the next decade.²³ America Móvil, AT&T and Telefónica have all set a science-based target of 1.5°C, in line with an ICT sectoral target-setting approach recently developed through collaboration between the Global Enabling Sustainability Initiative (GeSI), the GSMA, the International Telecommunication Union (ITU) and the Science Based Targets initiative (SBTi). These targets support the Paris Agreement's central aim of strengthening the global response to the threat of climate change.

Switching to renewable energy will play an essential role in the mobile industry reaching net-zero carbon emissions. Most emissions within the direct control of operators are from electricity and diesel consumption by power networks. Latin American operators are making renewables commitments. For instance, TIM is aiming to cover 90% of its energy usage with renewable energy by 2025. Telefónica uses 100% renewable energy in Brazil and Peru, and plans for this to be the case in all of its markets by 2030 at the latest.

Moves to set targets and improve disclosure and performance help to drive the industry's impact on SDG 13: Climate Action, as well as other climate-related SDGs, including SDG 7: Affordable and Clean Energy, SDG 11: Sustainable Cities and Communities and SDG 15: Life on Land.

22. "Mobile sector declares climate action breakthrough", Race to Zero, April 2021

23. [Mobile Net Zero – State of the Industry on Climate Action](#), GSMA, 2021





04

Policies for digital advancement

Latin America post pandemic: striving for a more connected society

Over the last two years, the value of high-quality connectivity has become more apparent than ever before. Policymakers and government authorities in Latin America have specifically highlighted the strategic importance of connectivity and how essential it is for citizens. However, the speed of regulatory modernisation has not kept pace with technological change.

To maximise the benefits of a connected society, it is critical that public and private sectors work together on the development of digital skills and the promotion of mobile connectivity for all citizens. They should do this while ensuring industry sustainability and guaranteeing users' privacy and security.

Aligning objectives stated in public discourse with public policy will be the first step in creating a consistent framework with a long-term goal: a digital and connected Latin America.



4.1 Actions to enable a connected society

Establish effective spectrum policies: focusing on digital inclusion, innovation and investment

There is a direct correlation between high spectrum prices and negative consumer outcomes, such as poor coverage, slow network deployment and low-quality services, as highlighted in a previous report by the GSMA.²⁴ This is especially the case in developing countries, where final spectrum prices are, on average, almost three times more expensive than in developed countries. The report indicates that in the countries studied with the highest spectrum prices, the average mobile operator’s 4G network would cover 7.5% more of the population by the end of the study period if they had acquired spectrum at the median spectrum price.

The timing of spectrum allocation has a significant impact on mobile coverage too. For instance,

according to the same study, if an operator had been awarded 4G spectrum at least two years earlier, the operator’s 4G population coverage would on average be 11–16 percentage points higher (provided the other conditions remained the same). In markets with late spectrum allocations, 3G network deployments were significantly delayed too – with 3G coverage levels up to 12% lower during the deployment period.

The study also shows that the amount of spectrum awarded to operators had a major impact on network quality. An additional allocation of 20 MHz would on average increase 4G coverage by 2–4 percentage points and download speeds by 1.0–2.5 Mbps.

Figure 27

Source: GSMA

Enabling a connected society: a recipe for success



Set modest reserve prices and annual fees and rely on the market to determine spectrum prices.



Avoid creating unnecessary risks that put operators’ current or future services in jeopardy.



Issue spectrum licences only when necessary and avoid artificial scarcity.



Publish long-term liberalisation, clearance and award plans that prioritise social well-being over state revenue in the short term.

24. [The Impact of Spectrum Prices on Consumers](#) is a detailed econometric study on spectrum pricing, considering more countries than previous studies (64 in total, including both developed and developing countries), more consumer outcomes (prices, quality and coverage of mobile services), and controls for a wider range of other potential explanations for these outcomes (e.g. market competition, population density and spectrum allocation timing).



Seek tax optimisation: fiscal policy must create incentives for investment sustainability

The increase in productivity and GDP in Latin America largely depends, in the medium and long term, on fiscal policy that stimulates investment and the creation of jobs for economic recovery.

Sector-specific taxes reduce the affordability of services and devices, and discourage investment and consumption. An effective tax policy has to balance a number of potentially competing factors. These include the government's revenue needs, supporting key sectors, the practicalities of enforcement and the desire to minimise any negative impact on a country's economy.²⁵

There are some principles that are generally accepted as contributing to an effective tax system (see Figure 28). These are provided by international organisations such as the World Bank,²⁶ International Monetary Fund (IMF),²⁷ International Telecommunication Union (ITU)²⁸ and Organisation for Economic Co-operation and Development (OECD).²⁹ These principles take into account important practicalities, such as the role of informal activity or limited institutional capabilities, and seek to minimise the potential distortionary impacts caused by taxation.

25. *Taxing Mobile Connectivity in Latin America*, GSMA, 2017

26. *Introduction to Tax Policy Design and Development*, Bird and Zolt, 2003

27. *Taxing Principles*, IMF, 2014

28. *Taxing telecommunication/ICT services: an overview*, ITU, 2013

29. *Addressing the Tax Challenges of the Digital Economy*, OECD, 2014

Figure 28

Source: GSMA Intelligence based on IMF, ITU and OECD

Best-practice principles of taxation³⁰

Concern

Best-practice principle

Efficiency

Taxes raise prices for consumers and costs for companies – hence they may reduce consumption and production levels as well as divert investments.

An efficient tax system should rely on low rates and wide bases to minimise the impact on consumption and production levels while raising the required revenue.

Different taxes across sectors are distortive in that they change the relative prices of goods and services.

Taxation should be broad-based across sectors. Adopting the same tax rates across companies and sectors and minimising the use of tax exemptions allow for fewer distortions on the economy.

Taxes can promote or discourage the generation of negative/positive externalities.

Taxes should account for product and sector externalities, encouraging the consumption and production of goods and services that generate positive broader economic impacts via lower specific tax rates.

Equity

Vertical equity: taxes can be regressive i.e. fall disproportionately on those with lower incomes.

Taxes should take into account income – i.e. they should be designed so that they do not have a regressive impact. Taxes that are fixed or that apply to necessity goods are particularly likely to have regressive effects.

Horizontal equity: taxpayers with the same characteristics are not treated evenly.

Similar taxpayers should have similar tax treatment, particularly across companies in similar or competing sectors.

Simplicity and transparency

Complex and unpredictable tax policies increase compliance costs and mean costlier enforcement for governments.

A simple and transparent tax system involves a reduced number of taxes for companies to comply with. A stable, predictable tax design generates less cost for businesses and creates more certainty for investment.

30. [Taxing Mobile Connectivity in Latin America](#). GSMA, 2017

Eliminate regulatory asymmetries: smart deregulation is the way to enable more access and new services

Over the last few decades, mobile communications and the internet have both had a profound impact on people's lives. While they were originally developed separately, their paths have now converged. Regulatory frameworks should therefore consider the particular dynamics of this ecosystem.

A future-proof regulatory framework should be based on functionality and aim to accomplish its objectives in the most efficient manner. At the same

time, it should be dynamic and able to adapt to constant changes based on ex post performance. This includes analysing legacy frameworks and considering whether specific regulations are needed.

Such frameworks will contribute to a reduction in existing regulatory asymmetries and discrimination. Additionally, they will promote competition and innovation by encouraging investment in the digital ecosystem.

Develop coordination between sectors: dialogue among congress members, regulatory authorities and sectoral policymakers, and the private sector is essential

The relationship between the government, policymakers and the private sector is fundamental to the creation and enforcement of consistent digital policies that contribute to the telecoms sector's long-term sustainability, encourage investment and foster digital inclusion.

Policymakers need to fully understand network operators to formulate public policy that actually boosts connectivity and benefits citizens. Intrusive policies that are formulated for short-term gains, without consulting sector authorities/experts or taking into account the current state of technology advancements, risk having a negative impact on industry sustainability and the capacity to invest in more and better services.

Further, it is important to share knowledge and experience with the internal levels of government (province/state or municipal levels). This can make the difference between creating a comprehensive public policy that is consistent with the objective of connecting citizens and a collection of separate decisions that prevents a country from enjoying the benefits of digitisation.

The success of public policy can be determined by the level of coordination among sector authorities and public administrations when promoting digitisation. For example, coordination with local authorities is critical – and even more so when new technologies are deployed – for obtaining site construction permits and rights of way and making other decisions related to the appropriate expansion of digital infrastructure.

Figure 29

Source: GSMA

Building blocks for Latin America³¹



Network resilience

Stimulate investment with policies that provide certainty, licences that promote the expansion of connectivity and the use of spectrum as a tool for innovation.

Facilitate network deployment and robustness, a role which falls under policy coordination at the different state levels.

Eliminate obsolete regulation by revisiting policy frameworks while creating a future-proof principle-based framework.



Economic recovery

Digitise the economy by starting with e-government and prioritising digital services in public administration and the social benefits derived from the digital economy.

Create and follow spectrum roadmaps to avoid delays and allow companies to make plans for increasingly better connectivity.

Promote digital skills, which will be vital for medium- and long-term policy.



Digital inclusion

Have a comprehensive vision for connectivity, which includes state intervention in areas where private investment is not financially feasible for companies.

Encourage the adoption of mobile internet by expanding e-government services.

Promote the development of digital skills as a fundamental part of digital society.

Make use of spectrum as a tool for inclusion.

Simplify taxation, namely an extensive revision of specific taxes and fees.



User trust

Foster a transparency-based policy model to help users to make informed choices.

Adopt a balanced approach on privacy rules to allow for innovation and accountability.

Deploy a general policy framework that takes into account cybersecurity threats by protecting critical infrastructure and data.

31. [La oportunidad para una América Latina digital y conectada](#). GSMA, 2021

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