

FTTH Panorama for Latin America 2022

December, 2022

Report produced for the Fiber Broadband Association Latam Chapter during 2022 by Diego Ros Rooney, Mauricio Fernández, Samuel Beltrán and Sebastián Cabello. The numbers shown were surveyed to individual players, taken by public reports and estimated by the authors.

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Introduction: Connectivity in Latin America and the Caribbean

The Latin American and Caribbean regions have experienced an increased demand in data traffic due to new dynamics shaping a new economy and creating new best practices. This will result in an increased need for infrastructure deployments where fiber, for both mobile and fixed connectivity, is going to play a key role.

Connectivity infrastructure has played an essential role in the regional economic and social recovery

There is a strong connection between broadband infrastructure deployment and GDP growth. According to CAF¹ (Connect America Fund), broadband deployment will boost service availability and generate new employment, leading to improved productivity. International Telecommunication Union (ITU)² confirmed that if broadband penetration increases by 10% in mobile and fixed technologies in Latin America, the GDP will increase by 1.7% and 1.6% respectively.

Broadband penetration results in three types of economic effects:

- Direct: related to the deployment of network infrastructure job creation.
- Indirect: productivity improvement thanks to the adoption of more efficient processes.
- Induced: generates new business activities and encourages entrepreneurship due to greater access to information and deployment of technology.

Certainly, connectivity has played a key role during COVID-19 pandemic. New methods of work, health, education, and commerce have been required to avoid social contact due to quarantines imposed by the local governments. In this sense, Internet access has been an essential condition for continued growth to safeguard supply chains, public services, businesses, and education.

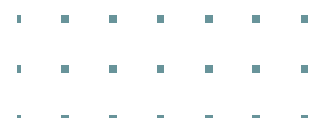
Around 23 million people work remotely in Latin America after COVID-19, according to ILO, which is an increase of 20% to 30% in numbers prior to the pandemic. This represents an increase of 20% to 40% of traffic from fixed residential networks and an increase of up to 90% of traffic in Wi-Fi calls where the duration of the voice call increases 20% to 70%³.

These new data demands require infrastructure access for all citizens in the region. In this sense, lack of infrastructure makes digital exclusion more evident, especially when comparing urban versus rural and remote areas coverage.

¹ CAF "Expansión de la BA".

² UIT Digital Trends 2020.

³ SmC+ based on Ericsson "The Lockdown Effect" (June 2020) and Latin American authorities and by Ericsson Mobile Traffic Data Outlook June 2022.



Fiber plays a fundamental role enabling households' connectivity and support mobile devices.

New services and final user demands require higher symmetric (upload and download) speed and lower latency. FTTH⁴ is positioned as the best technology to address the new demands and, although a couple of years behind developed markets, the region is quickly moving forward with adoption.

Greater broadband coverage needs to be addressed with technologies that can satisfy current and future data bandwidth requirements. Fiber is a technology that has been globally adopted to fulfill these data demands and is where players focus new investments to reach new areas not yet covered by other technologies.

5G will allow a greater mobile transmission capacity and low latency requirements in different verticals such as smart cities, health, industrial production, remote working, learning, and living, and automotive solutions. However, this will only be possible if the antennas and cells are connected to a fiber network therefore guaranteeing the standard of this technology.

Objectives and methodology of the study

The main objective of the study is to track and update FTTH deployments in Latin America and the Caribbean region.

This study is based on data and information gathered from local regulators in each country (when available), information from public reports of operators and on primary research obtained by interviews and direct contacts with operators throughout the region.

The scope of the study has included 18 countries in the region, named as LATAM-18⁵ in this report.

⁴ FTTH: Fiber to the Home. FTTH includes fiber-optic access solutions designed for residential deployments. In FTTH networks, fiber is connected to individual homes or multitenant buildings. The FTTx concept includes different hybrid models in which the fiber network does not reach the home but reaches points prior to entering the home, where they end up arriving with copper networks (FTTB is up to the building, FTTC up to the cabinet, FTTN up to the node). The terms FTTH and FTTH/B are used indistinctly in this study.

⁵ LATAM-18: Argentina, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Jamaica, Mexico, Panama, Paraguay, Peru, Puerto Rico, Trinidad & Tobago and Uruguay.

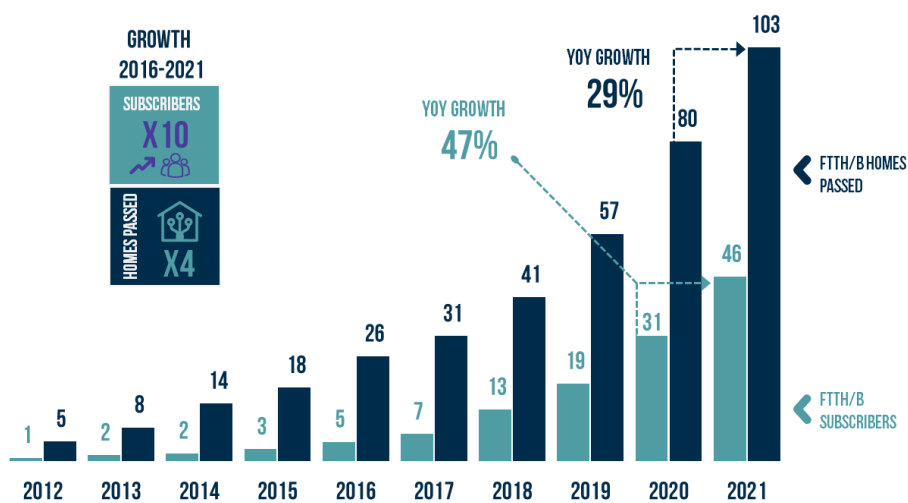


FTTH Evolution in LATAM-18 by End of 2021

FTTH homes passed increases and subscriptions have grown by 29% and 47% respectively.

The LATAM-18 region has experienced a fast FTTH evolution in the last decade. During the last five years, the number of FTTH homes passed in the region has grown by four times and by ten times in the number of FTTH subscribers.

Illustration 1. FTTH/B subscribers & homes passed in LATAM-18 (in millions)



Source: SmC+ based on authorities' and operators' public information and on primary research
Note: from 2013 to 2018, the information in previous studies was collected by Q3, the rest of the years by Q4.

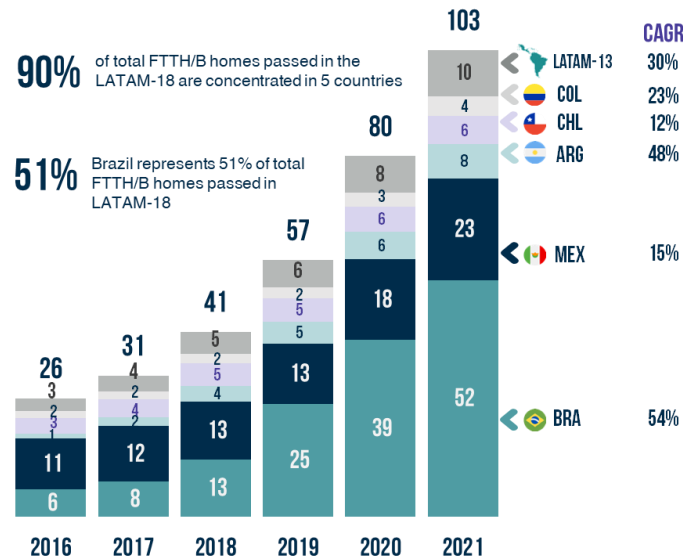
By the end of 2021, the region reported 103 million homes passed with FTTH/B as compared to the 80 million homes passed by the end of 2020 (+29% YoY⁶ growth). In terms of subscribers, 46 million FTTH/B subscribers had adopted this technology by year end 2021, compared to 31 million by the end of 2020 (+47% YoY growth). FTTH/B take-up rates have reached a rate of 44.6% (+5.4pp vs. 2020) as the technology adopted in areas where it is present by end 2021.

FTTH adoption in the region has been led by Brazil and Mexico. For these countries, the FTTH/B homes passed by year end 2021 were about 52 million and 23 million with a 54% CAGR and 15% CAGR, respectively. In terms of FTTH/B subscribers, Brazil and Mexico reported 26 million (99% CAGR) and 9 million (31% CAGR) respectively in the same period.

⁶ YoY: year-on-year growth rates are rates of change expressed over the corresponding period of the previous year.



Illustration 2. FTTH/B homes passed in LATAM-18 per country (in millions)



Source: SmC+ based on authorities' and operators' public information and on primary research

During 2021, Brazil and Mexico together accounted for more than 17.8 million additional homes with FTTH/B. However, strong efforts have been also observed in Puerto Rico, Peru, Bahamas, and Colombia with a growth rate in term of homes passed of 229%, 49%, 40%, and 38% respectively.

Currently, the LATAM-18 region is demanding higher bandwidth rates with lower latencies. Legacy networks based on cable and copper are not able to fulfill these conditions and, therefore, existing players have started to migrate towards full fiber networks to address this data demand.

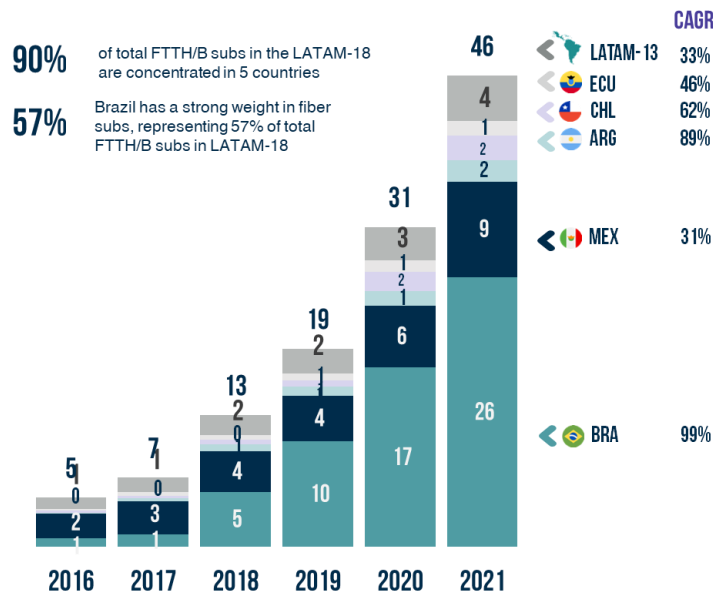
Governments in the region have understood their role in fiber deployments to reduce digital exclusion. They are in the process of creating digital agendas and defining country targets set by regulators and governments.

Many strategies from private players have increased FTTH/B homes passed within the region. However, it can be also observed there are more public initiatives involved in fiber deployments in countries such as in Brazil and Chile.

FTTH/B subscribers represent how well customers are adopting FTTH/B networks. The region has reached 46 million subscribers by the end of 2021. This represents 27% of FTTH penetration over total homes with a 57% p.a. growth rate between 2016 and 2021.



Illustration 3. FTTH/B homes passed in LATAM-18 per country (in millions)



Source: SmC+ based on authorities' and operators' public information and on primary research

In terms of FTTH/B subscribers, five countries are leading the market: Brazil, Mexico, Argentina, Chile, and Ecuador. Together they represented 90% of total LATAM-18 subscribers by December 2021.

In 2021 Brazil and Mexico added more than 12.1 million FTTH/B subscribers in the region, followed by Argentina, Chile, and Colombia. However, other countries such as Bahamas, Costa Rica, and Bolivia, all with a smaller number of subscribers, have started to add more FTTH/B subscribers as evidenced by efforts to promote fiber adoption.

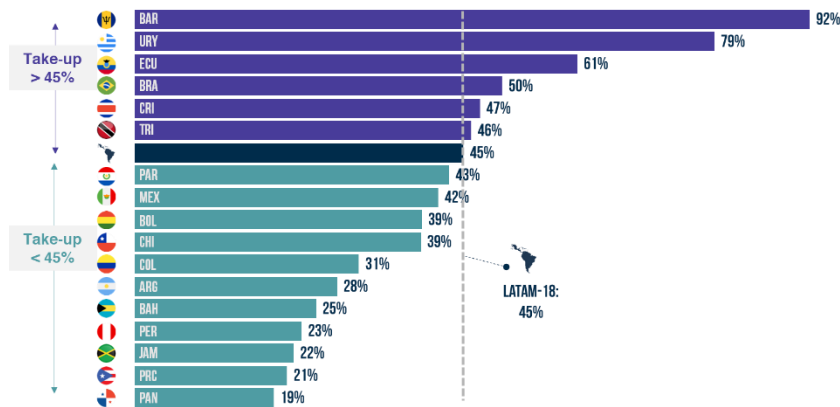
Fiber Adoption: 6 out of 18 Countries in Latam-18 Are Above the Regional Average Take Up Rate of 45%

Take up rate considers the number of FTTH/B subscribers over total FTTH/B homes passed.

By year end 2021, LATAM-18 had an average take up rate of 45%, which is lower compared to a 52% take up rate from EU27+UK. This indicates that commercial efforts are still required to migrate end users from legacy technologies toward FTTH/B. It also implies potential subscriber growth with little to no additional investment.



Illustration 4. Take-up rate (December 2021). Subscribers vs. homes passed.



Source: SmC+ based on authorities' and operators' public Information and on primary research

By December 2021, six countries were above the average regional FTTH/B take up rate. Barbados and Uruguay are the leaders with take up rates of 92% and 79% respectively. These countries have taken advantage of their country's size and demographics to deploy fiber faster to reach more houses and migrate subscribers toward this technology.

Brazil shows a 50% FTTH/B take-up rate which, given the country's size, is a remarkable achievement that is almost in line with European standards. Indeed, Brazil's take-up rate has been pushed by efforts from local ISPs (Internet Service Providers), which have deployed fiber in isolated areas throughout the country.

Twelve countries from LATAM-18 are still below the FTTH/B take up rate average of the region. This implies an opportunity window to strengthen commercial efforts to adopt fiber.

Mexico is one of the FTTH/B leaders in the region, but still has a 42% take up rate, which means there is a significant commercial opportunity for FTTH/B in the country. Chile has already reached almost 90% of homes with FTTH/B in the country, but the take up rate is only 39%, indicating that commercial efforts are needed to move end users toward fiber. Colombia and Argentina have the challenge to persuade users to migrate toward fiber in a market where cable operators have a strong dominance in service quality and price.

While 60% of Homes count with FTTH/B Networks, Just a Quarter of Them Have Adopted This Technology

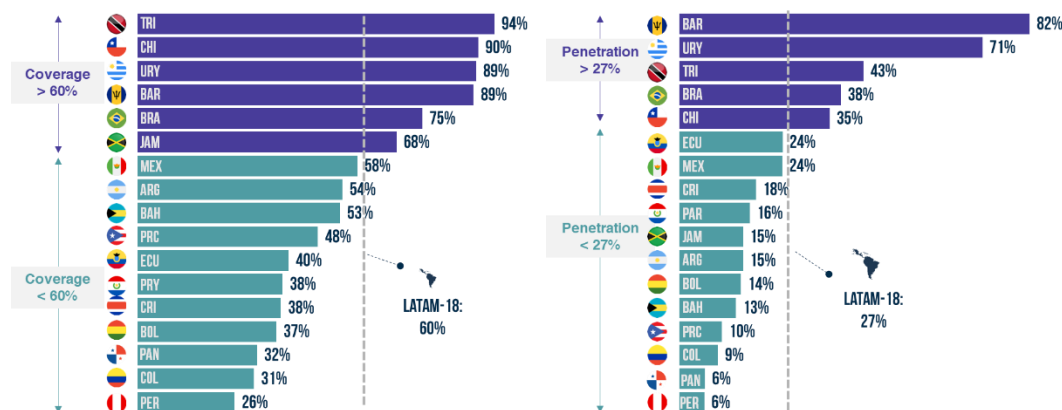
Coverage measures the ratio between the number of homes passed and the total households in a country. This ratio gives a clear indication of investments and efforts to deploy fiber infrastructure. On average, LATAM-18 presents a 60% coverage ratio.

On the other hand, penetration measures the ratio between the number of subscribers and the number of households in the country. This ratio helps to understand the commercial efforts towards FTTH adoption, its affordability, and customers' willingness to pay for the service, among other things. On average, LATAM-18 presents a 27% penetration ratio.



The take up rate is the ratio between coverage and penetration, and gives an indication of how clients with access to the technology have adopted it.

Illustration 5. Coverage and penetration (December 2021).



Source: SmC+ based on authorities' and operators' public Information and on primary research

By year end 2021, LATAM-18 reached a 60% coverage of total households. Six of the LATAM-18 countries have reached the average FTTH/B coverage. Chile, Uruguay, and Brazil are the leaders in the South Cone, while Trinidad & Tobago, Barbados, and Jamaica are the leaders in the Caribbean.

The region has reached an average FTTH/B penetration of just 27%. Fiber penetration indicates the total FTTH/B subscribers over total households in each country. Only five out of 18 countries have reached a penetration rate over the average. Barbados and Uruguay are the leaders, followed by Trinidad & Tobago, Brazil, and Chile.

FTTH Architecture⁷ Highlights

The trend is to deliver full FTTH solutions (instead of FTTB), with more than 95% of the deployments using the FTTH architecture. FTTB solutions are implemented by some cable operators and legacy copper-based networks to progressively replace old existing technology. Most traditional players in the region have announced their intentions to move toward fiber for their entire network.

In terms of the fiber network deployment, the region has primarily aerial-based fiber deployments (with two-thirds of them being aerial and the remaining underground). While aerial deployment is faster for deployment and less costly, there is a higher risk of fiber cuts that impact quality of service for end users and operational costs for operators. Instead, underground fiber deployment reduces fiber cuts risk and helps to reduce visual pollution in

⁷ Based on a sample representing 25% of homes passed in the region, which replied to the architecture data request.



dense areas. So far, players have preferred to reach more homes in a faster and less costly manner (that is via aerial deployment), sacrificing quality of service and with potentially future higher costs due to frequent repairs.

The LATAM-18 region is diverse in terms of rural/urban households. This fact impacts how fiber is deployed in dwellings. The focus of FTTH/B deployments has been to reach dense areas and buildings which makes fiber deployments in MDU⁸ more common than in SDU⁹. Countries with a high FTTH/B coverage are those with a bigger SDU versus MDU proportion, since the focus is to also reach houses in non-dense areas. On average, the region today has an equal distribution of SDU and MDU architectures.

⁸ MDU: Multiple Dwelling Units.

⁹ SDU: Single Dwelling Units.

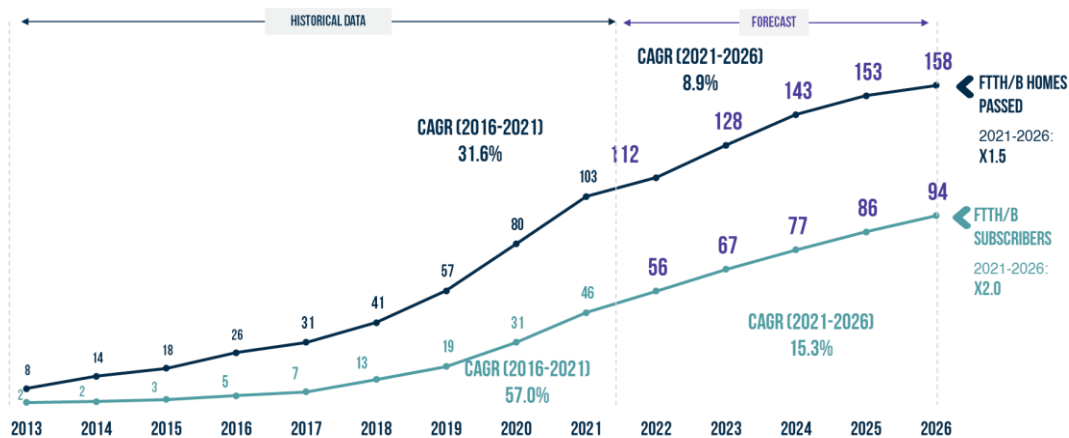


LATAM-18 FTTH and 5G Forecasts Through 2026

FTTH's Footprint Increase and Fiber Adoption Consolidation

The region's market will continue increasing its FTTH footprint and will consolidate fiber's adoption, increasing by 200% the number of subscribers and by 150% the number of homes passed in the period from 2021 to 2026.

Illustration 6. FTTH homes passed and subscribers forecast



Source: SmC+ analysis

The market is expected to reach 158 million homes by year end 2026.

The FTTH market is expected to reach 158 million homes passed by 2026, from 103 million in 2021, representing a 9% compound annual growth rate. Since 2018 there has been a change in the trend of FTTH/B deployments. This has resulted in a quick evolution in the last years towards more homes reached by this technology. Many players, including copper and cable-based operators, have defined major and aggressive FTTH homes passed targets. This will certainly define FTTH as a leading technology in the region for the coming years. Nevertheless, some external factors could limit these deployment goals. It is estimated that during 2022, fiber deployments will be affected by the global supply chain crisis; however, it is expected to ramp up in 2023-2024.

Many new fiber initiatives are highlighted in the telecom ecosystem in LATAM-18; neutral networks and infrastructure companies projects have evolved to reduce CAPEX and to accelerate fiber coverage for digital gap reduction.

94 million FTTH/B subscribers by 2026 in the region

FTTH/B subscribers growth rate started to increase in 2020, reaching 46 million subscribers by the end of 2021. It is estimated that this will double by the end of 2026. Two variables are the main reasons to support this growth: (i) Players will implement aggressive commercial strategies; and (ii) there will be a technology migration performed mainly by cable operators



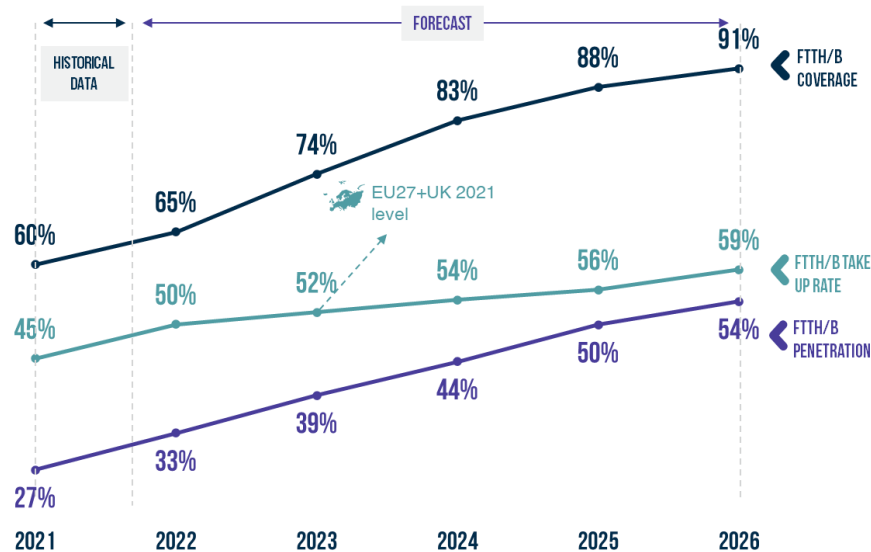
toward full FTTH solutions for their existing customers. Synergies on homes passed will be seen, thus increasing the take up rate.

The region is experiencing governmental changes in regard to industry agendas to reduce digital exclusion, such as in Chile. This will enable new fiber subscribers. Fiber densification will push price commoditization, thereby helping to provide access to more people in the region focused on price rather than quality.

By 2026, FTTH/B networks are expected to be available in 91% of households and to reach a 54% take-up rate.

It is estimated that the FTTH/B coverage rate will reach 91% of total households in the LATAM-18 region mainly driven by countries like Brazil, Chile, Uruguay, Puerto Rico, and Trinidad, pushing fiber deployments to have nationwide FTTH coverage as promised.

Illustration 7. Coverage, penetration, and take-up forecast



Source: SmC+ analysis

FTTH penetration is expected to double between 2021 and 2026 (27% to 54%). This will be the result of FTTH coverage expansion to more homes and technology migration from other technologies.

Lastly, FTTH/B take up rate will increase to 59% by year end 2026, as more cable operators and legacy copper networks will migrate towards full FTTH networks. It is expected that the region will consolidate FTTH as the main fixed broadband technology, but there will be still room for other fixed and mobile technologies such as 5G. The take up rate will grow because of the increase in subscriptions versus homes passed after an initial period of infrastructure deployments.



5G will see its subscription growth starting in 2022 with a significant trend change in 2026.

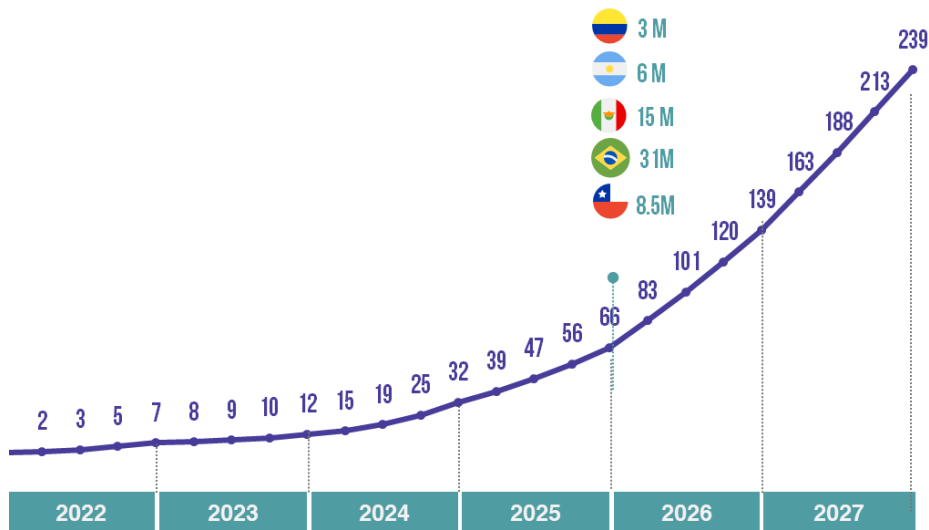
5G subscriptions in Latin America are expected to reach 240 million by 2027, a total of 30% of all mobile subscriptions. 5G mobile subscriptions in Latin America are expected to grow almost four times yearly from 2021 to 2027, with an overall growth rate of 170% through 2025.

By 2021, 4G accounted for two-thirds of all subscriptions in Latin America and is still expected to be the dominant technology by 2027, retaining 54% of the subscribers' share.

The initial adoptions of 5G in Latin America have taken place in Brazil, Chile, and Dominican Republic, where the 5G spectrum auctions took place in 2021. Although not offering spectrum auctions, Puerto Rico, US Virgin Islands, Suriname, Trinidad & Tobago and Uruguay were the pioneers in 5G services in the region. Mexico, Guatemala, and Peru have followed these with initial trials of 5G.

A new wave of 5G spectrum (in the 3.5 GHz band) is expected to arrive in 2023, primarily in Argentina, Colombia, and Uruguay. Other countries already moving to make their first 5G spectrum assignments by end of 2023 or early 2024 are Argentina, Bahamas, Bolivia, Costa Rica, Ecuador, Jamaica, Mexico, Panama, Paraguay, and Peru.

Illustration 8. Latin America 5G forecast (millions)



Source: SmC+ analysis



Where spectrum has already been assigned, the initial 5G adoption has outpaced that of 4G. Chile has reached 843 thousand users in Q1 2022, three times faster than 4G technology adoption, and the country's traffic growth was 1,359%, or six times 2G traffic. On the other hand, Brazil achieved 3.4M 5G users by July of 2022. 4G technology reached 2.5M users in its first 12 months of adoption.

The most representative 5G markets in LATAM by 2027 will be Brazil with 108 million subscribers, Mexico with 45 million subscribers, and Chile with 11 million subscribers.

Illustration 9. Latin America 2027 5G forecast per country (millions)

COUNTRY	5G AUCTIONS/ DEPLOYMENTS	2022	2026
ARGENTINA	2023*	0	17.013.583
BAHAMAS	2023*	0	15.356
BARBADOS	2025*	0	361
BOLIVIA	2023*	0	415.010
BRAZIL	Nov/2021	4.834.000	62.584.064
CHILE	Feb/2021	1.443.046	12.324.595
COLOMBIA	2023*	0	6.904.858
COSTA RICA	2023*	0	346.697
ECUADOR	2023*	0	774.798
GUATEMALA	2025*	0	27.916
JAMAICA	2024*	0	3.535
MEXICO	2022 (D)	776.188	32.007.659
PANAMA	2024*	0	38.045
PARAGUAY	2024*	0	48.883
PERU	2021 (D)	18.191	1.731.413
PUERTO RICO	2020	112.110	1.549.042
TRINIDAD & TOBAGO	2019 (D)	0	2.096
URUGUAY	2019 (D)	6.262	1.422.188

* Estimated auction year, D = 5G deployments in current assigned frequencies.

Source: SmC+ analysis

Higher bandwidth and lower latency rates from 5G will boost the Internet of Things (IoT) market, expected to reach 128 million devices by 2026. Currently, most IoT devices use 3G or 4G networks, with the limitations of these technologies causing a reduction in IoT expansion. The IoT boom will be an important contribution to 5G adoption, although it is yet to be seen how much traffic will go through WiFi networks.

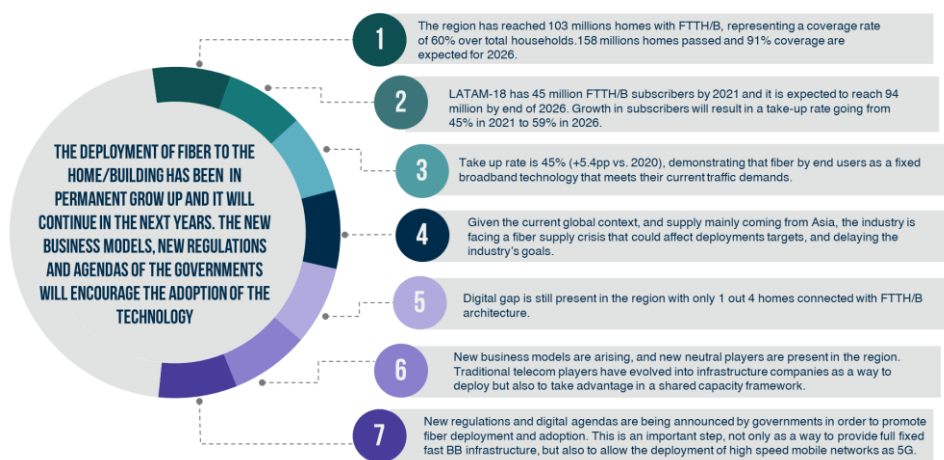


FTTH/B 2021 LATAM Panorama Key Findings

FTTH/B will be consolidated as the main fixed broadband technology in the region.

The deployment of fiber to the home/building has been in permanent growth phase and will continue over the next few years. The new business models, regulations, and agendas of the governments will encourage the adoption of the technology.

Illustration 10. FTTH/B 2021 LATAM panorama key findings



Source: SmC+ analysis

Although a digital gap is still present in the region with only one out four homes connected with FTTH/B architecture, growth in the region is expected in the number of homes passed and subscribers. It is expected that fiber deployments will allow homes passed to increase from 103 million in 2021 to 158 million in 2026, which results in coverage increasing from 60% to 91%. At the same time subscribers are expected to grow at a higher pace, climbing from 45 million in 2021 to 94 million in 2026.

Based on these figures, subscribers will grow faster than homes passed, resulting in an increase of the take-up rate. The take-up rate will climb from 45% in 2021 to 59% in 2026, indicating there will still be room for synergies in fiber deployments where investment has already been completed. This ratio is in line with Europe's performance in 2021 with a the take-up rate of 52%, indicating that Latin America is five years behind in terms of adoption of FTTH/B.

Given the current global context, and supply mainly coming from Asia, the industry is facing a fiber supply chain crisis that could affect deployment targets, causing a delay to the industry's goals. This supply chain crisis is linked with raw materials scarcity, production restrictions in Asia, and logistical bottlenecks for containers and freight. Together with the supply chain challenge, as is happening in other regions of the world, there is a deficit in fiber deployment workforce skills, which the region will have to tackle to meet growth expectations. To combat this shortage, the Fiber Broadband Association LATAM Chapter has partnered with Fyco



Learning¹⁰, to create the FBA Academy. The aim of this program is to provide high-quality training opportunities to impart knowledge and skills for design, assembly, installation, operation, and activation of FTTx networks. These courses are held in the Spanish language and at a cost adjusted to the region's workforce needs.

Finally, new business models are coming into play and new neutral players are present in the region. Traditional telecom players have evolved into infrastructure companies as a way to deploy, but also to take advantage of a shared capacity framework. Infrastructure business models are expected to keep evolving in the coming years, where specialization and network sharing are expected to gain terrain and become the new standard.

On the regulatory side, new regulations and digital agendas are being announced by governments to promote fiber deployment and adoption. This will require considerable coordination between national and sub-national authorities as local governments have a substantial influence in the permits and rules for new deployments. For these deployments to occur, local companies and investors will need more clarity on the conditions and regulations for the implementation of fiber. This is an important consideration, not only to provide full fixed high-speed broadband infrastructure, but also to allow the deployment of high-speed mobile networks such as 5G.

Five trends shaping the FTTH/B market.

Five trends are shaping the FTTH/B market dynamics for the foreseeable future, linked with the infrastructure, commercial and corporate strategies.



Coverage and penetration growth

While coverage has reached 60%, only 25% of households have adopted fiber in the region. Only five out of 18 countries have achieved an above-average penetration rate. However, the region still shows a strong penetration and coverage growth that has been constant in the region.



Penetration growing higher than coverage

Penetration has grown faster than coverage in the last five years, resulting in an increase in the take-up rate of 45%. This take-up rate implies that the region has a commercial opportunity to capture new FTTH/B subscribers with limited investments. Efforts from telecom players are focused on how to connect more homes already reached by FTTH/B networks, resulting in faster penetration than coverage.

¹⁰ [Fyco Learning](#)





Smaller players are gaining relevance

Big players have been focused on the FTTH/B evolution in dense areas and how to migrate existing networks toward full fiber networks. In many cases, incumbent players are still pushing for the use of legacy copper infrastructure.

Due to this, some white areas have been the perfect scenario for small players deploying local networks to offer faster connections in a less competitive market.



FTTH market consolidation

The ecosystem has understood the implications and advantage of deploying fiber networks in a region where fast broadband access is required. FTTH/B has been consolidated as a technology with strong potential and room to grow in comparison to other legacy copper and cable-based architectures.



Changes in infrastructure business

The current digital exclusion has pushed the region to adopt more efficient business models promoting smarter investments in infrastructure, allowing providers to reach more homes in a shorter period of time. We expect to see strong growth of passive infrastructure companies and neutral networks as alternatives to shareable infrastructure.

External and internal factors affecting the adoption of FTTH/B networks.

The growth expectations of the FTTH/B networks will be affected by external and internal factors with different drivers supporting this assumption. Challenges and drivers should be addressed to comply with these expectations, meet the deployment demands, and allow fiber broadband to become a key component in the region's digital gap reduction.

Opportunities

- There is a huge data demand, which pushes for technologies with higher bandwidth rates and lower latencies.
- 5G implementation requires huge fiber deployments to provide fiber to the antenna (FTTA).
- CAPEX reduction is expected as new business models arise and willingness to share infrastructure materializes.
- Digital National Plans are pushing the expansion of fiber coverage in the region to reduce the digital gap.



Challenges and barriers

- Public-private partnerships (PPP) need to be adopted in the region, mainly to increase coverage in remote areas where there is no business case for private companies.
- Fiber deployments in the region will be highly vulnerable to supply chain delays.
- 5G implementation can be also a barrier as offering high speed capacities without full fiber deployment (just to the antenna).
- Return on Investment (ROI) of fiber projects will not always meet investor and shareholder minimum thresholds. Markets in Latin America face the challenge of having lower ARPUs and high currency fluctuations compared to other regions.
- Legacy technology is still present and offering acceptable Internet services to end users. This has two negative impacts on the fiber deployments; firstly, many users will not demand fiber solutions; and secondly, operators are still willing to maximize the investment made on legacy technology.
- Shortage in workforce could impact fiber network buildouts.





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