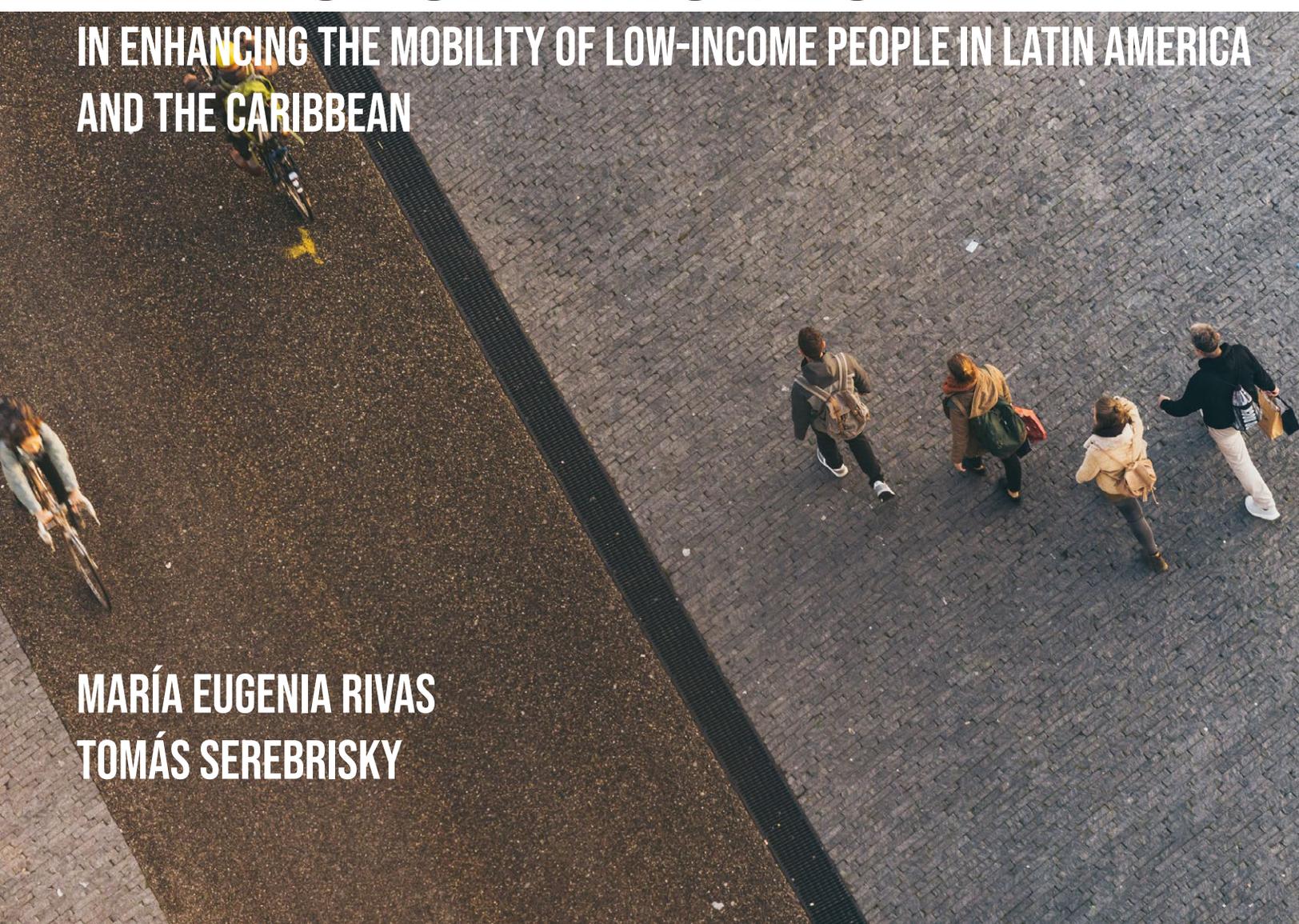


THE ROLE OF ACTIVE TRANSPORT MODES

IN ENHANCING THE MOBILITY OF LOW-INCOME PEOPLE IN LATIN AMERICA
AND THE CARIBBEAN



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ABSTRACT

Active transport modes play a key role in developing sustainable transport systems by making cities accessible, safe, inclusive, and green. In Latin America and the Caribbean, walking and cycling represent a large share of total trips, especially for low-income groups. But for them, the decision to travel by using active transport modes, especially walking, is not based on sustainability but affordability. Income disparities in the region are also reflected in pedestrian and cycling infrastructure, with poor neighborhoods lacking infrastructure of sufficient quality or size. Despite some successful experiences in the region, there is a lack of integration between transport modes, particularly public transport and cycling, which is crucial for improving the accessibility of low-income people, who usually live in peripheral areas, face long commutes, and require connecting infrastructure and services. The region has the opportunity to improve low-income groups' access to livelihood opportunities and key services by developing infrastructure supporting nonmotorized transport, increasing citizen participation in planning, improving planning and regulation, and integrating active transport modes in urban transport systems, especially public transport.

Also known as *active travel* or *nonmotorized transport*, active transport usually refers to walking and bicycling, but includes transport via small-wheeled, self-propelled mechanisms such as skates, skateboards, and push scooters. Active transport modes play a key role in developing sustainable transport systems by making cities accessible, safe, inclusive, and green. In Latin America and the Caribbean, walking and cycling represent a large share of total trips, especially for low-income groups. Active transport modes offer sustainable and affordable options for trips across short and middle distances. However, for low-income people, the decision to travel by using active transport modes, especially walking, is not based on sustainability but affordability. Low-income people walk because they have no other choice, and typically do so in poor conditions (e.g., on streets without sidewalks). Income disparities in the region are reflected in pedestrian and cycling infrastructure; most poor neighborhoods lack needed infrastructure of sufficient quality or size.

The benefits of walking and cycling for users and cities in terms of health, the environment, and quality of life are widely recognized. Active transport modes have become more popular in cities worldwide, and Latin America and the Caribbean is no exception. However, their importance from a public policy perspective is usually neglected. In many cities in the region, nonmotorized transport is considered only a modest priority, receiving low levels of investment and scarce attention from authorities. There is no enabling environment for its key role in urban mobility. Despite some successful experiences in the region, there is a lack of integration between transport modes, particularly public transport and cycling, which is crucial for improving access to livelihood opportunities and key services among low-income groups. Such groups usually live in peripheral areas, face long commutes, and require connecting infrastructure and services.

The challenge of Latin America and the Caribbean is to develop transport policies that promote more inclusive transport systems, particularly considering the region's high levels of income inequality. The region has the opportunity to improve low-income groups' lives by developing infrastructure supporting nonmotorized transport, increasing citizens' participation in planning, improving planning and regulation, and integrating active transport modes in urban transport systems, especially public transport. The potential of active transport modes lies in the recognition of their crucial role in achieving sustainable transport systems and their synergies with other transport modes to improve the access of underserved groups.

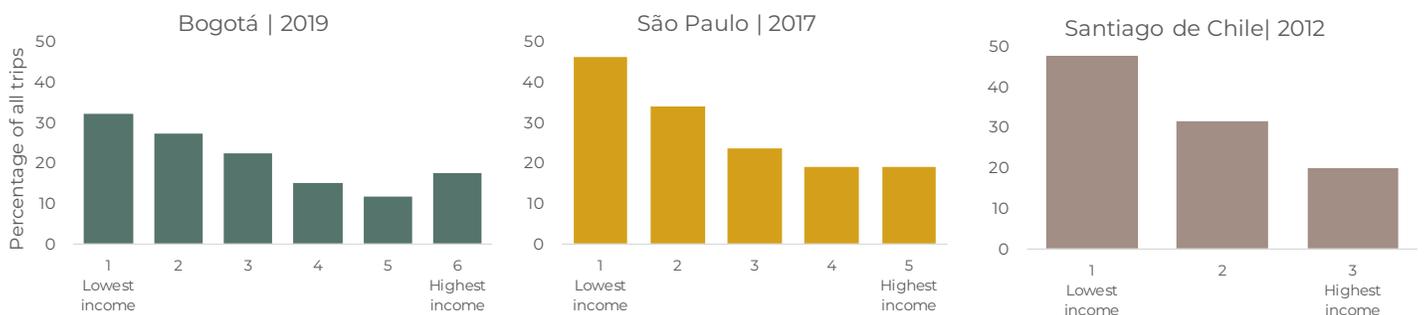
2. ACTIVE TRANSPORT MODES: CHOICE OR NECESSITY?

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The benefits of active transport modes far exceed the objectives of mobility itself. They generate benefits for their users in terms of fitness and health, as well as enjoyment. An increase in walking and cycling also means less traffic congestion, reduced noise and air pollution, and transport cost savings. The increased use of active transport modes fosters more compact, cohesive, and livable communities, and also increases property values.

Yet many residents of disadvantaged areas in Latin America and the Caribbean rely on walking and cycling not out of choice but out of necessity—due to economic, cultural, and urban space characteristics beyond their control. In several cities in the region, walking is the main transport mode. Walking trips represent a significantly larger share of total transport among low-income than high-income groups (Figure 2.1). About 30 to 45 percent of all trips taken by low-income people are on foot, in contrast to around 20 percent among higher-income groups.

Figure 2.1 Share of Walking Trips in Total Transport, by Income Level, in Three Latin American Cities



Source: Author's elaboration based on origin-destination surveys.

People may sacrifice motorized trips (in particular public transport) because of affordability, becoming “captive” walkers over relatively long distances (Cavallo et al., 2020). They take more time to reach their destinations, affecting their quality of life. An analysis of a select group of cities in Latin America and the Caribbean reveals that, in half the cities considered, the financial burden of a 60-trip basket of transportation trips for the bottom quintile of the income distribution exceeds 25 percent of users’ monthly income (Rivas, Serebrisky, and Suárez-Alemán, 2018). Thus, every

motorized trip represents a burden, compelling people to walk. This is especially so among women performing care-related tasks.¹ Beyond affordability, access to motorized transport is a binding constraint. Many irregular settlements or slums on the outskirts of cities are poorly served by public transport services. In Montevideo, Uruguay, around 27 percent of people from low-income groups say they walk because they have no other transportation option, while this figure is only 5 percent for high-income groups (Mauttone & Hernández, 2017).

For cycling trips, the evidence of socioeconomic differences is not as strong as for walking trips (Figure 2.2). Cycling’s share of total transport depends on urban commuting patterns, the overall size of the city, and the extent of bicycle use.² In Bogotá, people from low-income groups ride bikes much more often than do others: in 2019, their share of cycling trips was between two to four times that of the highest-income group. In the poorest and second-poorest income groups, cycling trips represent 4.8 percent and 9.0 percent of all trips, respectively. They spend more time travelling as they ride several miles daily to avoid public transport costs. The average travel time of a bicycle trip in 2019 for the poorest stratum (42.6 minutes) was almost twice that of the richest stratum (23.6 minutes) (Steer-CNC, 2019). Even though bicycle use reduces travel costs significantly, the cost of buying a bicycle and its equipment can sometimes be prohibitive (Rodríguez et al., 2017), which can partially explain the smaller share of bicycle trips in the lowest-income group in Bogotá.

Figure 2.2 Share of Cycling Trips in Transport, by Income Level, in Three Latin American Cities



Source: Author’s elaboration based on origin-destination surveys.

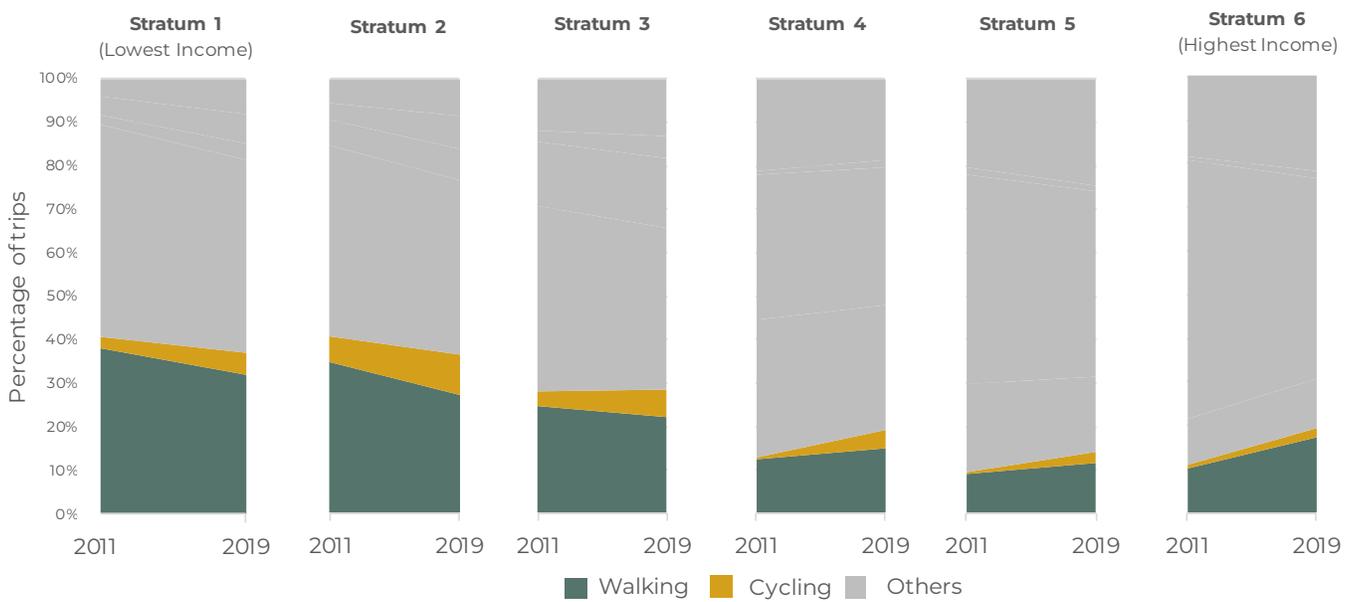
Though low-income groups tend to walk and cycle more than other income groups, this trend is slowly changing for walking, which has a smaller modal share among low-income groups than in the past. In Bogotá, between 2011 and 2019 there was a decrease in walking across the three poorest strata, whereas the three richest strata increased their share of walking trips (Figure 2.3). The most likely drivers of these changes in modal shares are an increase in private vehicle ownership among low-income groups, as well as a shift in social attitudes among high-income groups as they become increasingly aware of the individual and social benefits of walking. The same trend was observed in Santiago de Chile when comparing the last two origin-destination surveys. Between 2001 and 2012, there was a fall in walking trips from 53.0 percent to 48.7 percent for lower-income groups and from

1 Low-income mothers walk mostly due to necessity and often in unsafe traffic environments.

2 Cycling penetration is quite different among cities, Bogotá being at the top of the ranking in Latin American and the Caribbean with a cycling modal share of 6.6 percent.

36.2 percent to 31.5 percent for middle-income groups, whereas there was an increase from 14.7 percent to 20.0 percent for high-income groups (Herrera & Razmilic, 2016). The reduction of walking trips among low- and medium-income groups was linked to an increased private transport share and a reduction in the public transport share. The overall increase in cycling trips from 2.1 percent to 3.9 percent was mainly guided by medium- and high-income groups.

Figure 2.3 Changes in the Share of Walking and Cycling Trips in Total Transport, by Income Level, between 2011 and 2019 in Bogotá



Source: Author's elaboration based on Steer-CNC (2019)



3. LESS CONNECTIVITY FOR THOSE WHO NEED IT MOST

Although low- and middle-income groups have significant shares of active transport modes, the evidence suggests important disparities in access infrastructure and general conditions for walking and cycling. There is a clear imbalance between the supply and demand conditions for active transport, where the most disadvantaged face poor walking and cycling conditions and are exposed to greater safety, security, and environmental risks, disincentivizing their mobility.

3.1 LESS INFRASTRUCTURE FOR THE MOST INTENSIVE USERS

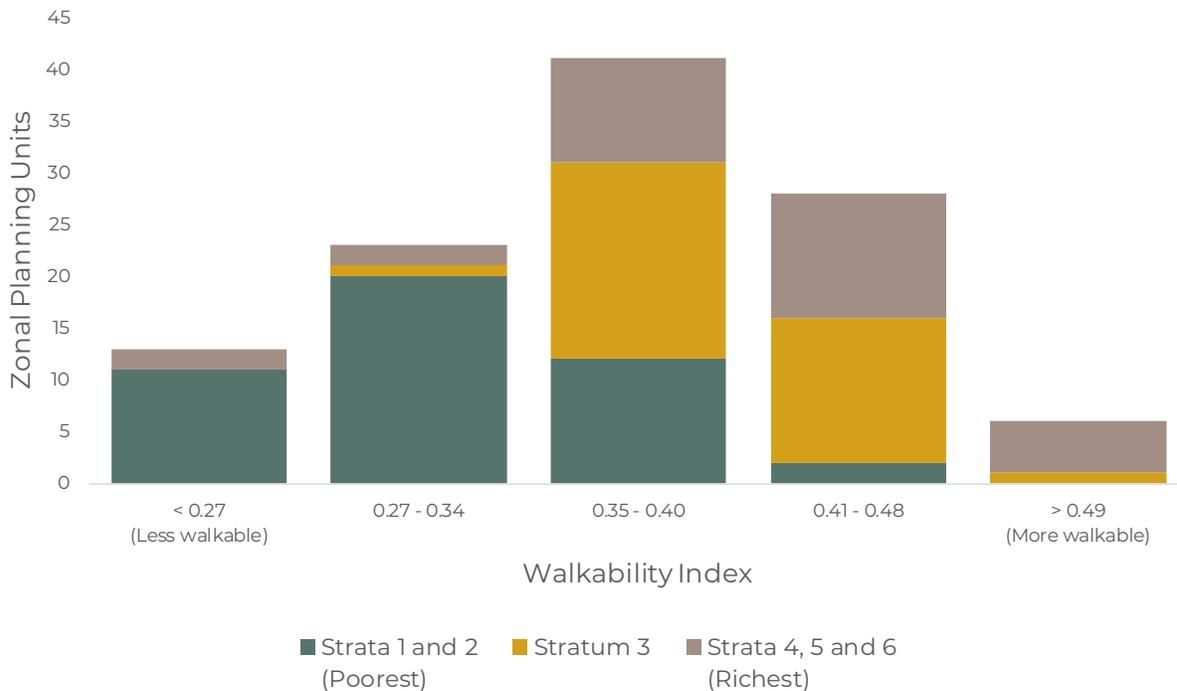
WALKING

Walkability³ conditions in low-income neighborhoods are usually not pedestrian friendly. Low-income groups have the largest share of walking trips among socioeconomic groups and face the poorest walking conditions. Environmental and traffic-related risks range from unpaved and weather-vulnerable roads, dark and isolated routes, heavy-traffic streets without pedestrian facilities, or a lack of sidewalks in several sections of a route, making walking conditions extremely poor and increasing the risk of accidents.

Spatial inequalities in walkability conditions are significant in cities in the region. In Barranquilla and Soledad in Colombia, for instance, high-income areas have better sidewalks and other pedestrian infrastructure, and are more pedestrian friendly than other zones (Arellana et al., 2021) An analysis of walkability in Bogotá shows that households living in Zonal Planning Units (UPZ, by its Spanish acronym) characterized by low socioeconomic strata enjoy low walkability levels compared to households from the richest socioeconomic strata (Figure 3.1).

³ The term *walkability* can refer to different kinds of phenomena. It can be related to making walkable environments; others relate the concept to the obtained outcomes (lively places, sustainable transport, or exercise), whereas some use the term as a proxy for good urban planning (Forsyth, 2015). At the individual level, the most basic requirement for walking is feasibility: that is, being physically able to walk (Alfonzo, 2005).

Figure 3.1 Walkability Index by Socioeconomic Strata in Bogotá, 2018



Source: Author’s elaboration based on Alcaldía de Bogotá D.C. (2018) and socioeconomic data from the District Secretariat of Planning.

Note: The walkability index is a weighted average of five subindexes, including the environmental quality subindex, density index, proximity index, comfort index, and entropy index.

The walkability conditions are usually worst in informal settlements, where sidewalks are largely absent, and unpaved roads impede the realization of trips. In informal settlements in Buenos Aires, roads become impassable during rainy days as well as after (so long as the mud lasts), making walking conditions difficult and increasing the need for boots or other protective gear (Scholl et al., 2020). It is common for parents to not send their children to school during rainy days. These difficulties are aggravated by the location of informal settlements in flood-prone areas, the obstruction of drainage, and a lack of vegetation to retain surface runoff. In Caribbean countries, in addition to rain and floods, walkability conditions worsen as people are also exposed to humidity and extreme heat.

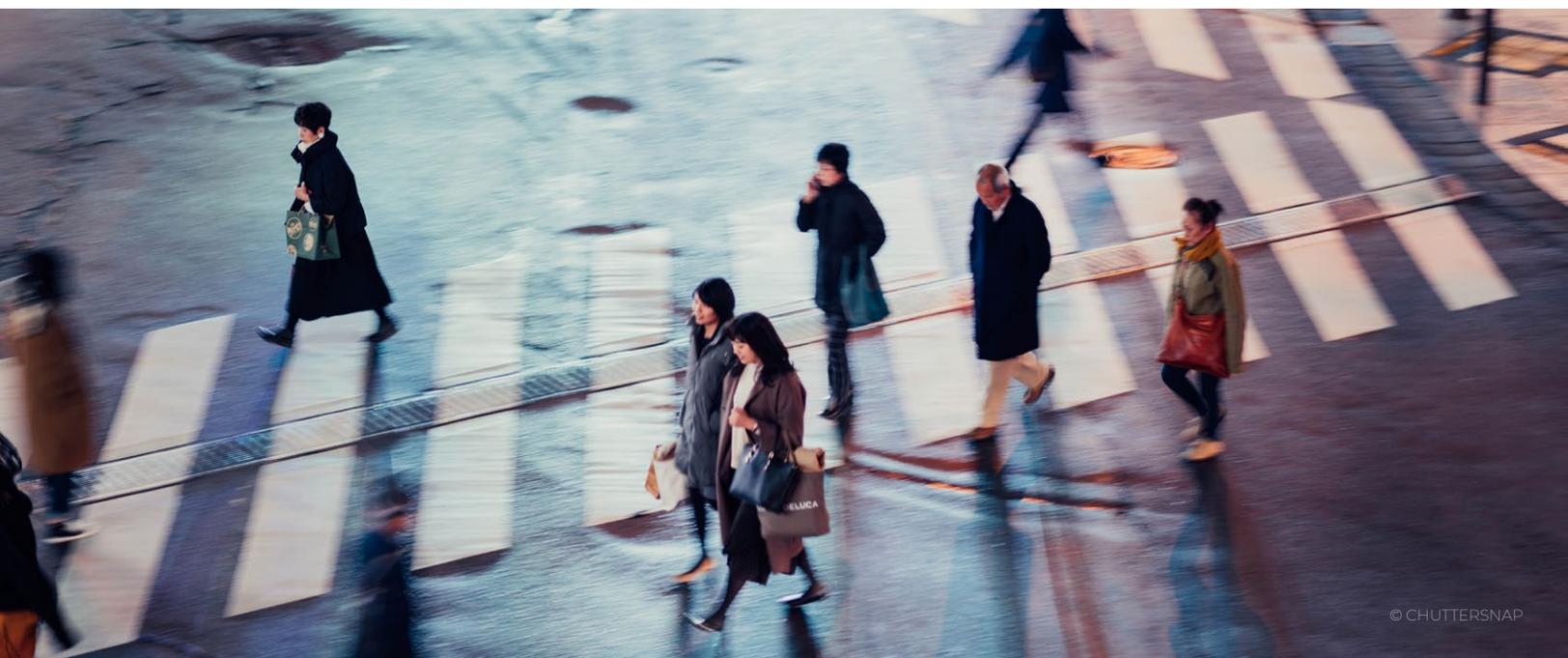
In several cities in Latin America and the Caribbean, people living in poor neighborhoods are also exposed to geographic barriers, aggravating their walkability. In hilly cities, the richest neighborhoods are usually located in the valleys, and the poorest neighborhoods in the city outskirts among the hills. People have to travel longer as they have to walk on steep slopes in uncomfortable walking conditions and suffer sun exposure in the hottest months due to a lack of vegetation.⁴ A lack of sidewalks and public lighting also make travel difficult at night. For example, in Lima, Peru, the

⁴ In Santiago de Chile, for instance, the four highest-income municipalities are home to 32.2 percent of the total surface area of green areas, while the four poorest municipalities have only 4.1 percent (Reyes Pácke and Figueroa Aldunce, 2010).

commuting trips of low-income groups are much longer than average, with steep road segments and a lack of adequate nonmotorized infrastructure (Ortegon-Sanchez and Hernandez, 2016).

Many cities are experimenting, albeit in the form of pilots, with urban interventions to improve walkability conditions. Most of them involve pedestrianization initiatives known as “complete streets.” Pedestrianization has acquired relevance over the years in several cities, including Buenos Aires, Santiago de Chile, Bogotá, and Quito (Hidalgo and Huizenga, 2013). Buenos Aires is a clear example of how the pedestrianization of a city’s microcenter allows the humanization of city spaces, transforming streets into quality public spaces (Marcús, 2018). Plan Centro in Santiago de Chile has successfully promoted active transport modes, and is recognized as the first of its kind in the city, as it prioritizes pedestrians and cyclists over cars (Herrmann-Lunecke, Mora, and Sagaris, 2020). Latin America is the worldwide leader in implementing complete streets with 93 percent of programs worldwide (Sarmiento et al., 2017), Bogotá being the pioneer. Today the Ciclovía of Bogotá is the largest worldwide event of its kind. It takes place each Sunday and during holidays, offering more than 120 kilometers (km) of complete streets and featuring the participation of 1.5 million people walking and biking (Flues et al., 2020).

Recently, tactical urbanism has received increasing attention as an effective way to promote long-term goals related to street safety, walking, and public spaces through the implementation of flexible, low-cost, and short-term projects. The intervention of Panamá Camina (“Panamá walks”) in 2018 included the pedestrianization of part of a busy intersection near the Plaza de Mayo in Panamá City and the promotion of art and culture. In 2018 around 90,000 people walked and 60,000 vehicles transited around Santa Ana’s area; however, just 20 percent of the public space was designated for pedestrians (IDB, 2018). The successful intervention generated 73 percent more walking space, a 72 percent positive view of the intervention, 78 percent more visits during weekends, and more security, according to 45 percent of those interviewed. Paseo Bandera’s intervention in Santiago de Chile’s historical and civic neighborhood represents another positive experience of tactical urbanism in the region. However, these positive walkability initiatives are localized in central urban areas and are associated mainly with commercial and business activities. There is a need to develop and promote peripheral interventions so that low-income groups can also benefit directly from a focus on tactical urbanism.



INNOVATIVE SOLUTIONS: OUTDOOR PUBLIC ESCALATORS IN COMUNA 13, MEDELLÍN

Comuna 13 is a densely populated area of around 140,000 people scattered in 19 neighborhoods, located in the hilly and poor outskirts of Medellín, Colombia. It has one of the most violent histories in the city and is deeply marked by armed conflict. In 2007, the planners of the Empresa de Desarrollo Urbano (EDU, Urban Development Company) developed the Integrated Urban Project for Comuna 13, to improve social and physical connections between the planned and the informal city, creating an accessible route from the upper parts of the neighborhood to the San Javier metro station (Reimerink, 2018). Outdoor public escalators in the neighborhood of “Las Independencias” represented just a part, although the most visible, of the integrated measures developed in Comuna 13.

The objective of the public escalators, inaugurated in 2011, was to improve accessibility through the neighborhood. They replaced 350 concrete steps and directly benefited more than 12,000 citizens of this sector of Medellín (Terminales Medellín, 2020). They are equivalent to ascending 16 floors in 12 sections (6 ascending and 6 descending) across a total length of 384 meters (Correa, 2021). The escalators improved walkability conditions for inhabitants. For example, they saved 50 minutes per week for a man delivering five gas tanks in the area (Reimerink, 2018). But benefits went beyond mobility. The escalators encouraged new projects, including different types of art surrounding the place, reinforcing a sense of pride among the residents of Comuna 13.

Despite the positive impact of the escalators, the project has also presented limitations. The escalators have become a popular tourist site, contributing perhaps more to Medellín’s international image than to its residents’ mobility (Naef, 2020). Despite the fact that the escalators have shortened travel times, the project has been criticized for its limited benefits to children and seniors and for being impractical for residents that need to use the escalators before they open at 6 a.m. (Reimerink, 2018). In addition, at the beginning of the COVID-19 pandemic, the inhabitants of Comuna 13 had to intervene with the authorities to reactivate the escalators, because when tourists disappeared, their operations were reduced to only two hours (Naef, 2020). Even then, the project is an example of how it is possible to promote and implement mobility projects in disadvantaged areas. In this sense, the integration of mobility projects in urban development plans is crucial for their success.



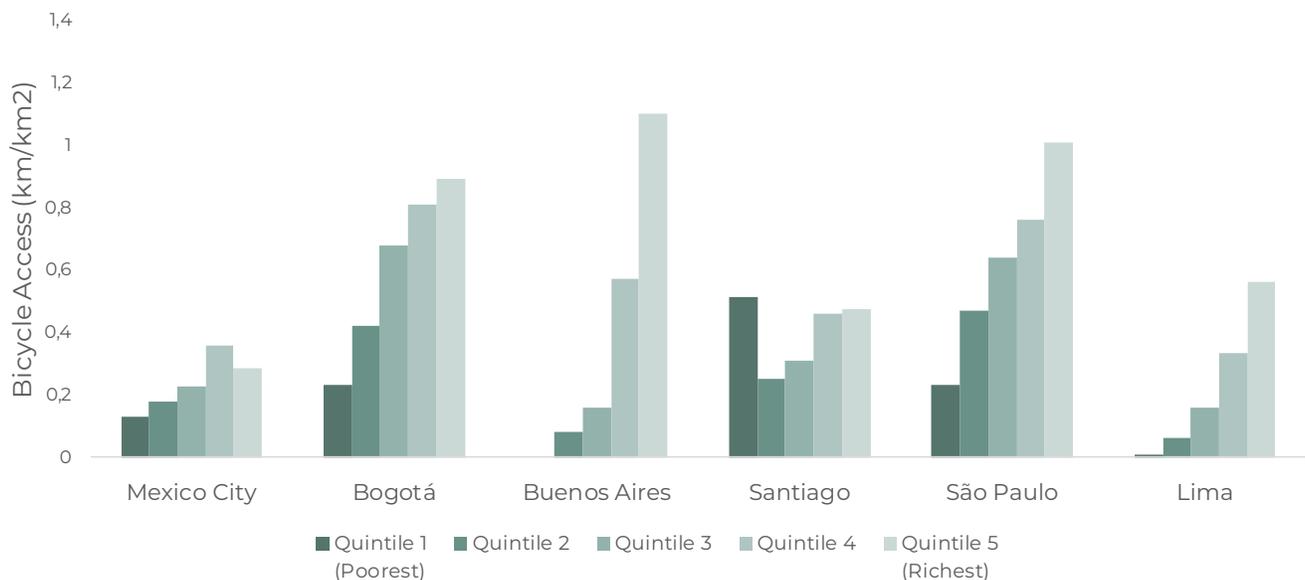
BOX 3.1

CYCLING

Specialized infrastructure for biking is recognized as an effective tool in increasing citizens' mobility and accessibility, and one of the most valued factors when deciding to ride a bike. An increase in a city's biking network may induce a preference for this mode for two reasons. First, more bikes mean more demand for specialized infrastructure; second, there is a positive relationship between an increase in the number of bicycle trips and a decrease in user incidents (Rodríguez et al., 2017), resulting in fewer fatalities and better road-safety outcomes—a concept known as “safety in numbers.” International findings focusing on high-income countries show reductions in incidents of 30 to 68 percent over 24 years, while a study on Bogotá found a decrease of 55 percent in 7 years, consistent with the safety-in-numbers hypothesis (Carvajal et al., 2020). Also, in Bogotá, living close to cycling infrastructure increases marginally—but positively—the probability of an individual using a bicycle as the primary transport mode (Rodríguez-Valencia et al., 2019).

However, in some cities in the region, this specialized bike infrastructure tends to be fragmented and concentrated only in tourist and high-income areas. The infrastructure is characterized by inequality, particularly because of its socio-spatial dimension that implies differences in access and use across different social groups (Rodríguez et al., 2017). Bicycling networks do not equally benefit different income groups in Latin America and the Caribbean, with the best-served areas located in the wealthier neighborhoods. For example, in Rio de Janeiro and Curitiba, the supply of bicycle infrastructure in the wealthiest quintiles is more than double that of the lowest-income quintile in terms of area and population (Tucker and Manaugh, 2018). An analysis of six Latin American cities shows that bicycle infrastructure density (km/km²) tends to increase with income (Figure 3.2).

Figure 3.2 Bicycle Infrastructure Density, by Income Quintile, in Selected Cities

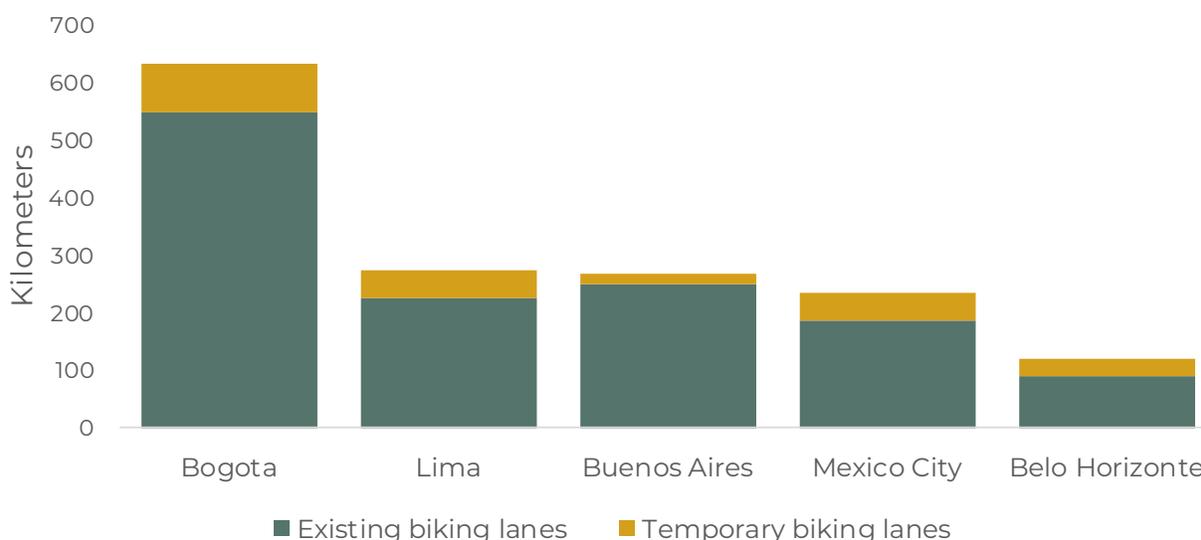


Source: Camacho (2017).

Despite income disparities in the provision of cycling infrastructure, some cities in the region showed remarkable progress in the five years between 2015 and 2020. São Paulo, Brasília, and Bogotá are the cities with the largest cycling networks in Latin America and the Caribbean. São Paulo has the largest, and also has seen the most extraordinary growth (82 percent), reaching 655 km in 2020 (CET, 2020; ITDP, 2015). Brasília’s cycling infrastructure grew by 64 percent in the period 2015–20, reaching 554 km (SEMOB, 2020). Bogotá, with a more modest growth rate than other Brazilian cities but a higher starting point, increased its bicycle network by 25 percent, reaching a total of 552 km (Instituto de Desarrollo Urbano, 2020). Bogotá thus represents a successful reference for the region in terms of cycling infrastructure and bicycle use, but it still has several challenges to address (Box 3.2).

Due to the COVID-19 pandemic, governments have implemented pop-up bike lanes in several cities in the region, accelerating the growth of bike networks and dynamizing the sector. During the pandemic, walking and biking were recommended as the preferred transport modes, whenever possible, as these modes met the required social distancing norms and requirements of minimum daily physical activity (WHO, 2020). Measures implemented by governments included the expansion of cultural and commercial areas into public spaces on sidewalks and roadways, such as in Buenos Aires (Ministerio de Cultura, 2020), and pop-up bike lanes as temporary mobility solutions. These lanes offer a rapid and low-cost solution, providing more alternatives for mobility, while keeping within social distancing norms. The growth of bike infrastructure in some cities in the region ranges from 6.8 percent in Buenos Aires to around 30 percent in Mexico City and Bogotá (Figure 3.3), with cities such as Bogotá deciding to make the new infrastructure permanent (Bogotá, 2020). Overall, the implementation of pop-up bike lanes, which use spaces previously reserved for private vehicles, has been a boost for improving cycling conditions in the region, despite some unexpected results due to a lack of relevant studies in the planning process. For instance, traffic was severely affected in some streets where pop-up bike lanes were implemented, affecting essential services such as ambulances. The remaining challenge is to extend the benefits of these improvements to low-income groups.

Figure 3.3 Pop-Up Bike Infrastructure Prompted by COVID-19 in Selected Cities, 2020



Source: Author’s elaboration based on city governments and transport authorities.

BOGOTÁ: A REGIONAL REFERENCE FOR CYCLING SUCCESS

Bogotá has successfully developed a large cycling infrastructure over the last 20 years; it has consistently grown, from a practically nonexistent network in 1998 to 552 kilometers in 2020 (Figure 3.2.1). The growth in infrastructure has also enabled the growth of bicycle's share of total transport, from 0.58 percent in 1996 to 6.6 percent in 2019. Among the factors that explain this success are a latent bicycle culture, the positive influence of advocacy groups, and a continuation of policies and political leadership (Rosas-Satizábal and Rodríguez-Valencia, 2019). However, the sector still faces challenges in increasing bike use, including reducing accident rates, improving the maintenance of the existing network, implementing a bike-share system, and reducing bicycle theft (Rosas-Satizábal and Rodríguez-Valencia, 2019). Addressing these challenges is especially important considering the disproportionate gender distribution of trips, with men taking 75.8 percent of trips and women the remaining 24.2 percent (Alcaldía de Bogotá D.C., 2020). This indicates underlying problems of security, road safety, and mobility patterns.

Figure 3.2.1 Evolution of Cycling Infrastructure and Its Modal Share in Bogotá



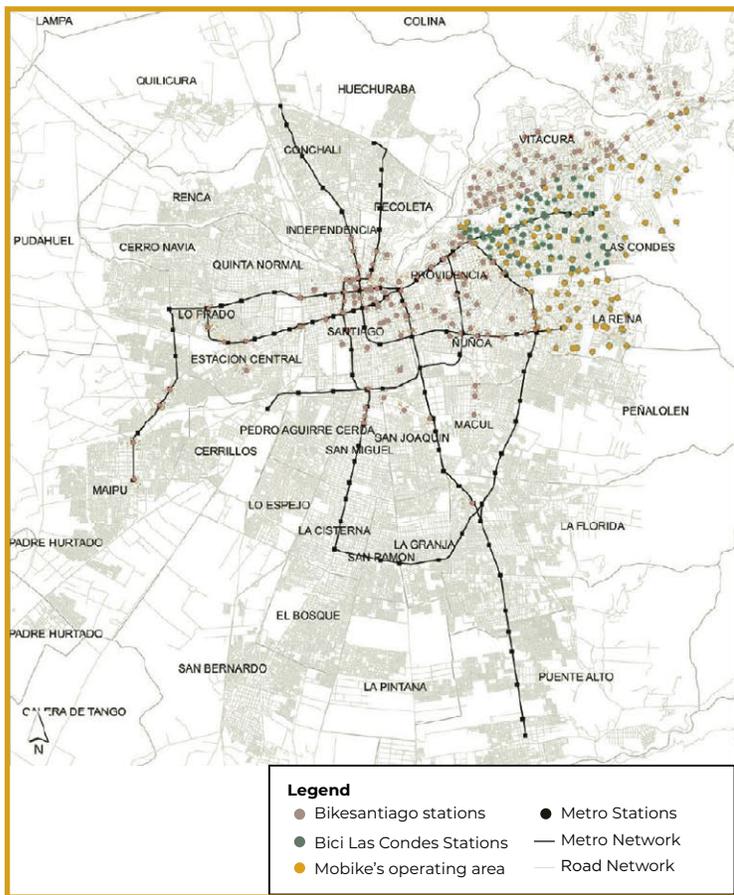
Source: Author's elaboration based on Observatorio Ambiental de Bogotá (2021); Prada (2013); Rosas-Satizábal and Rodríguez-Valencia (2019); and origin-destination surveys.

BOX 3.2

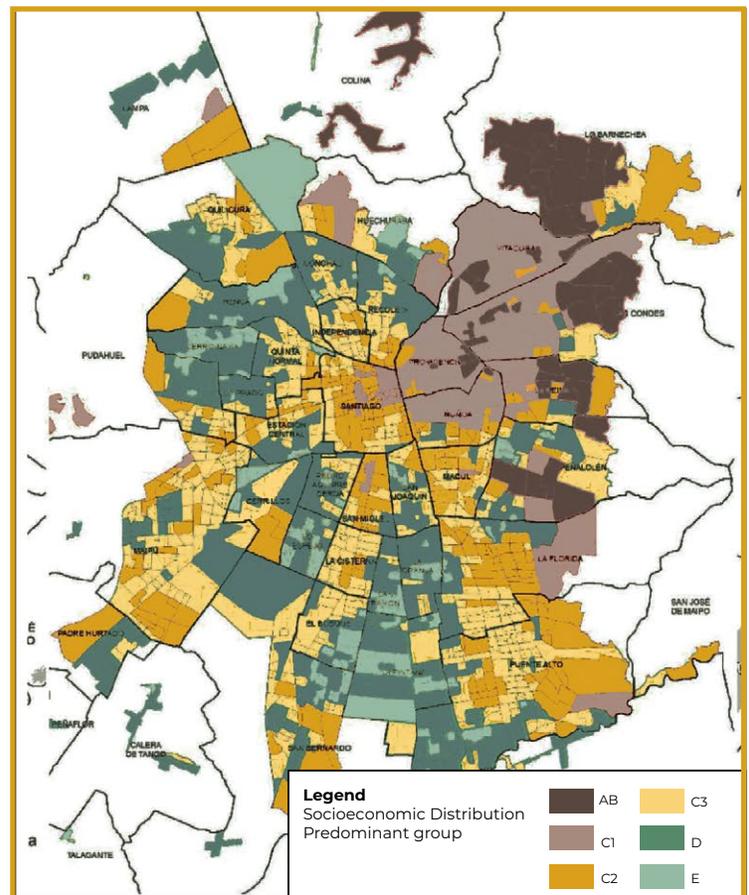
The uneven access to mobility alternatives in the region is also seen in new infrastructure services such as bike-share systems. The first phases of bike-share systems in Latin America were implemented in wealthier areas, an unequal distribution that remains. In five large Brazilian systems, only a fraction of the population (between 6 and 18 percent) and area (between 8 and 25 percent) were covered by these systems (Duran et al., 2018). These systems are located mainly in wealthier neighborhoods, where the mean income of the served areas is twice the cities' mean income. In Santiago de Chile, bike-share systems are also concentrated in high-income areas, mostly in the northeastern part of the city (Figure 3.4). From an equity perspective, the implementation of public bicycle systems could serve as an instrument for the redistribution of accessibility and the costs and benefits of urban mobility (Rodríguez et al., 2017).

Figure 3.4 Bike-Sharing Stations' Connectivity and Socioeconomic Distribution in Santiago de Chile

Bike-Sharing Stations and Metro Network



Socioeconomic Distribution



Source: Mora and Moran (2020).

Note: AB and C1 groups are the most affluent, and E group is the poorest.

For low-income groups, access to bike-share systems goes beyond physical proximity to services. Their main challenges include access to banking systems, an ability to pay, and levels of use of electronic payment systems (Rodríguez et al., 2017). The trip costs of bike-share systems can be equal to or higher than public transport fares, restricting access (Flues et al., 2020). Moreover, in extended and segregated cities, the 30-minute window that most systems allow without time-of-use penalties can also represent a restriction for low-income groups. The implementation of targeted subsidies benefiting low-income groups through, for example, social benefit systems, is a way to ensure access to bike-share systems for everyone. In the U.S. capital of Washington, DC, Capital Bikeshare for All offers affordable options for those who qualify for certain state or federal assistance programs. The benefits, accessible for a low annual membership of \$5, include unlimited rides with the first 60 minutes of each trip included. Meanwhile, the normal annual membership is \$85, with just the first 30 minutes of each trip included (Capital Bikeshare, 2021).

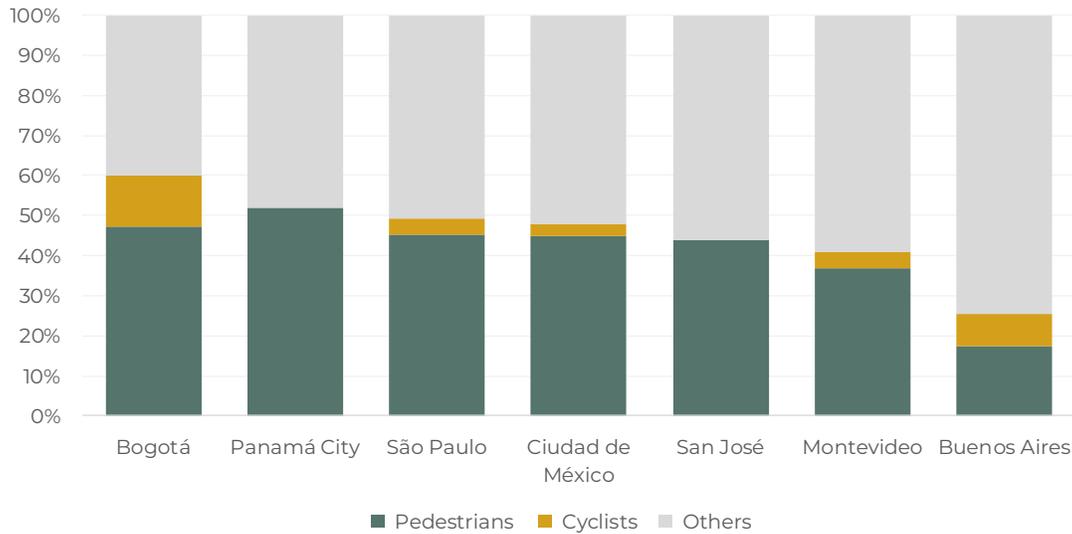
3.2 INFRASTRUCTURE AND BEYOND: WALKING AND CYCLING ON UNSAFE AND INSECURE ROUTES

Specialized infrastructure is highlighted as a key factor for promoting active transport; however, in developing countries, safety and security conditions often determine whether to make a trip by foot, bike, or public transport or other motorized mode; or whether to make the trip at all. The results of a study of a medium-sized city in Latin America and the Caribbean shows that the subjective aspects of security and traffic safety are the most crucial factors affecting walkability. This differs from the results of studies in developed countries, where sidewalk conditions and attractiveness are the most important factors (Arellana et al., 2020).

In the context of urban road safety, pedestrians and cyclists are at a higher risk of being injured because of their transport mode. Vulnerability is related to the interaction of the urban space with motorized transport modes, roadway design, and mobility management. In several cities in the region, nonexistent or poorly maintained sidewalks force pedestrians to walk on the streets, exposing them to a higher risk of traffic accidents. In addition, how quickly an emergency vehicle reaches the scene of an incident, which varies across cities depending on their health systems, also affects road safety outcomes. Thus, mobility characteristics (in terms of modal share and users' behavior), the transport infrastructure, and the promptness of emergency response condition road safety outcomes.

The distribution of road fatalities by type of road users differs among cities (Figure 3.5). In some cities in the region, such as Bogotá and Panama City, more than half of road traffic deaths occur among pedestrians and bikers, the most vulnerable users. Even though there are no available statistics on accidents by income level, mainly low-income groups are affected, since they make the most trips. From an equity perspective, the negative impacts of transport in terms of road safety are not equally distributed among different types of users. In this sense, a fairer method to evaluate the impact of transport interventions to reduce collisions should seek to address injury outcomes and other equity issues (Davis & Pilkington, 2019).

Figure 3.5 Pedestrian and Cycling Death Crashes in Select Cities in Latin America and the Caribbean, 2018–19



Source: Author’s elaboration based on city governments’ information.

Note: Data 2018: Panamá City, San José; Data 2019: Bogotá, Buenos Aires, Mexico City, Montevideo, São Paulo.

Among the factors affecting road safety is the availability of policies, standards, and regulations focused on walking and cycling. These are unevenly distributed in Latin America and the Caribbean (Table 3.1), with most countries in Latin America (but not the Caribbean) having national or subnational policies promoting walking and cycling. However, regionally, just 30 percent of countries have design standards promoting the safety of active transport users. There is room for improvement not just from an infrastructure perspective, but also in the design and implementation of policies that ensure pedestrians’ and cyclists’ safety. For example, Salvador de Bahía in Brazil was able to reduce road traffic deaths by more than 50 percent, from 266 fatal accidents in 2010 to 121 in 2017, by bringing together institutions with the common goal of improving road safety (Pan American Health Organization, 2019). In particular, the program “Life Not Traffic” is noted for its work in data evaluation and qualification, and its efforts to integrate the topic of health in traffic discussions, improve infrastructure to protect those most vulnerable, invest in the implementation of drunk driving laws, and develop children’s education programs (Pan American Health Organization, 2019).

Table 3.1 Percentage of Countries with Policies Promoting Active Transport and Safety Standards, by Region

| Sub-region | Policies promoting walking and cycling | | Design standards for the safety of pedestrians / cyclists | |
|-----------------|--|----------|---|--------|
| | Sub-national | National | Partial | Yes |
| Caribbean | 0.00 | 50.00 | 75.00 | 25.00 |
| Central America | 50.00 | 16.67 | 50.00 | 33.33 |
| North America | 0.00 | 100.00 | 0.00 | 100.00 |
| South America | 25.00 | 41.67 | 58.33 | 25.00 |
| Total | 26.09 | 39.13 | 56.52 | 30.43 |

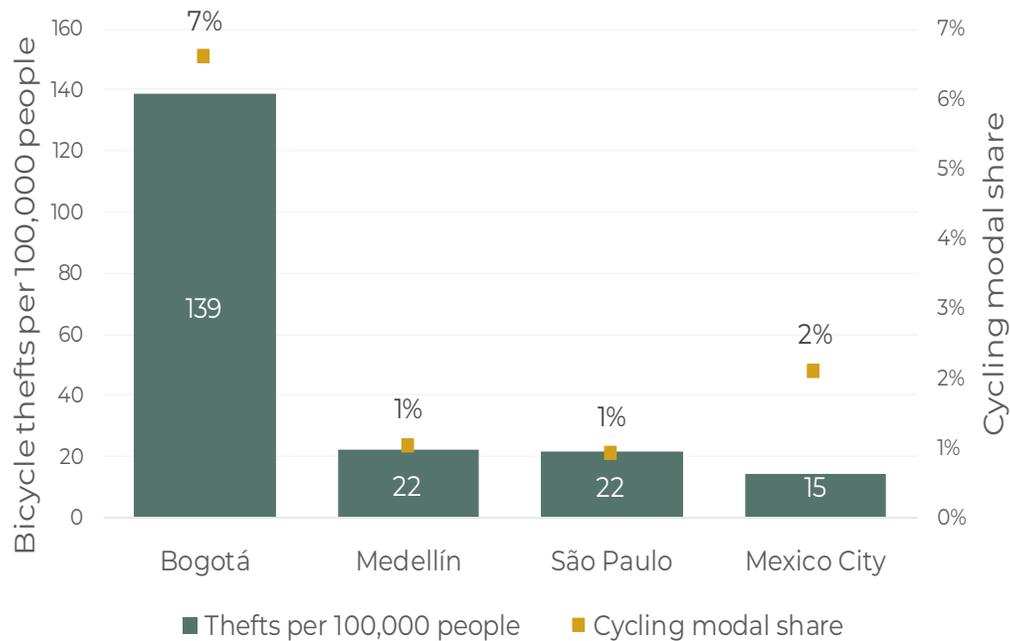
Source: Author's elaboration based on WHO (2018).

Note: Caribbean: Barbados, the Dominican Republic, Jamaica, and Trinidad and Tobago; Central America: Belize, Costa Rica, El Salvador, Guatemala, Honduras, and Panama; South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela; North America: Mexico.

Personal safety and security also have a significant effect on travel choices. In Latin American and Caribbean cities, insecurity as well as crime and violence can represent strong deterrents to walking, limiting the areas and times where it is possible to walk. In fact, people consider travel choices based on how safe and visible the routes are. In Soacha, Bogotá, the insecure environment leads people to use longer but better-illuminated walking routes, to walk in groups, or to travel by bus (both regular and informal) during hours when it is deemed unsafe to walk (Oviedo Hernandez & Titheridge, 2015). Residents of informal settlements in Buenos Aires use strategies such as walking in groups with neighbors to bus stops (if their departure times coincide), or asking family members to accompany or wait for them at bus stops (Scholl et al., 2020).

Insecurity is also an increasing concern for cyclists. In some cities in the region, bike thefts are widespread, driven by the selling of second-hand bikes and the lack of control and penalization of theft. In addition to the fact that stealing bikes is a low-value crime, it is difficult to prosecute those responsible as there is practically no way of associating a stolen bicycle with its owner. This is unlike car or motorcycle thefts, where a brand, license plate, or even a serial number can be given to the police. Another issue is the lack of transparency and availability of data disaggregated by type of theft in most of the cities in the region, which makes it difficult to monitor the sector's statistics. Among the cities reporting bicycle thefts, the differences per 100,000 are significant (Figure 3.6). These statistics could be affected by people not reporting the crime because of a lack of confidence that the bicycle will be recovered and differences in the practicality of reporting systems. In Bogotá, bike theft was the only crime that increased during the COVID-19 confinement, reaching a peak in May: it increased by 32 percent in 2020 compared to 2019 (Secretaría Distrital de Seguridad, 2020). While noting that cycling has thrived in Colombia during the pandemic, the insecure environment has led bicycle users to undertake extreme measures, such as enrolling in self-defense courses. In other cities in the region, although the situation is not so extreme, bike thefts represent a threat to cycling. Some strategies to avoid bike thefts include using old bicycles (Scholl et al., 2020), riding in groups, or taking longer but better-lighted routes.

Figure 3.6 Bicycle Thefts per 100,000 People and Cycling Modal Share in Select Cities in Latin America and the Caribbean, 2020



Source: Author’s elaboration based on official statistics of thefts and origin-destination surveys.

Eliminating traffic-related deaths and improving public safety and the personal security of pedestrians and cyclists are key to promoting active transport modes sustainably over time. In developing countries, these factors have been demonstrated to be crucial in travel decisions. Cities in the region should continue working on the five pillars of road safety: road safety management, safer roads and mobility, safer vehicles, safer road users, and the post-crash response (World Health Organization, 2011). The public safety and personal security problem exceeds the field of action of the transport sector itself, and requires coordination with police and public authorities to improve pedestrian and biker security. Improving public lighting, reinforcing video surveillance systems, and designing and implementing bike registries play a key role in building safer routes.



4. THE PARADOX OF INSUFFICIENT INVESTMENT IN ACTIVE TRANSPORT

Active transport generates extraordinary benefits in terms of health, accessibility, the environment, transport costs, and urban spaces. Walking or cycling to work, for example, is good exercise and has associated impacts on personal health and wellness; it reduces transport costs and increases productivity at work. Furthermore, active transport also has significant impacts on society. It decreases noise, air pollution, and congestion by replacing motorized trips, and alleviates the burden on health systems by reducing the risks of chronic illness or traffic accidents. Walking and cycling also contribute to creating more cohesive and compact communities. From a more overarching perspective, nonmotorized transport modes enhance economic development and overall quality of life.

One way to understand the advantages of active transport projects and interventions for society is by quantifying their costs and benefits (Table 4.1). The terms *bikenomics* and *walkonomics*⁵ have highlighted the importance of applying economic tools in the bicycling and walking sectors, respectively. Carrying out cost-benefit analyses (CBAs) can provide policy makers with valuable information for making investment decisions in the sector. In Latin America and the Caribbean, CBAs of walking and cycling projects are not widespread, but recently their use has increased. In Toluca, Mexico, a CBA of the bike-share system Huizi was conducted together with other initiatives in the framework of a low-emission zone (Cohen et al., 2017).

CBAs also contribute to increasing transparency and promoting sustainable transport practices. Using CBAs in nontraditional ways, such as to compare different transport modes, allows new perspectives on transport investment decisions (Gössling & Choi, 2015). In Europe, it was found that cycling and walking represent a benefit of \$0.21 and \$0.42 per kilometer to society, respectively, while a car represents a cost of \$0.12 per kilometer to society on average (Gössling et al., 2019). Considering the number of kilometers driven, the external costs of cars amount to \$565 billion per year, while cycling and walking represent benefits of \$27 billion and \$75 billion per year, respectively.

Cycling is also economical from a personal perspective. The annual costs of cycling in Santiago de Chile, for example, are around \$300 annually (Iglesias et al., 2019). In comparison, the costs of owning a private car in Santiago de Chile amount to around \$5,300 annually and \$4,600 for the region (Rivas, Serebrisky, et al., 2019).

5 The terms were developed by Decisio, a Dutch economic policy research and consulting firm.

Table 4.1 Active Transport Costs and Benefits

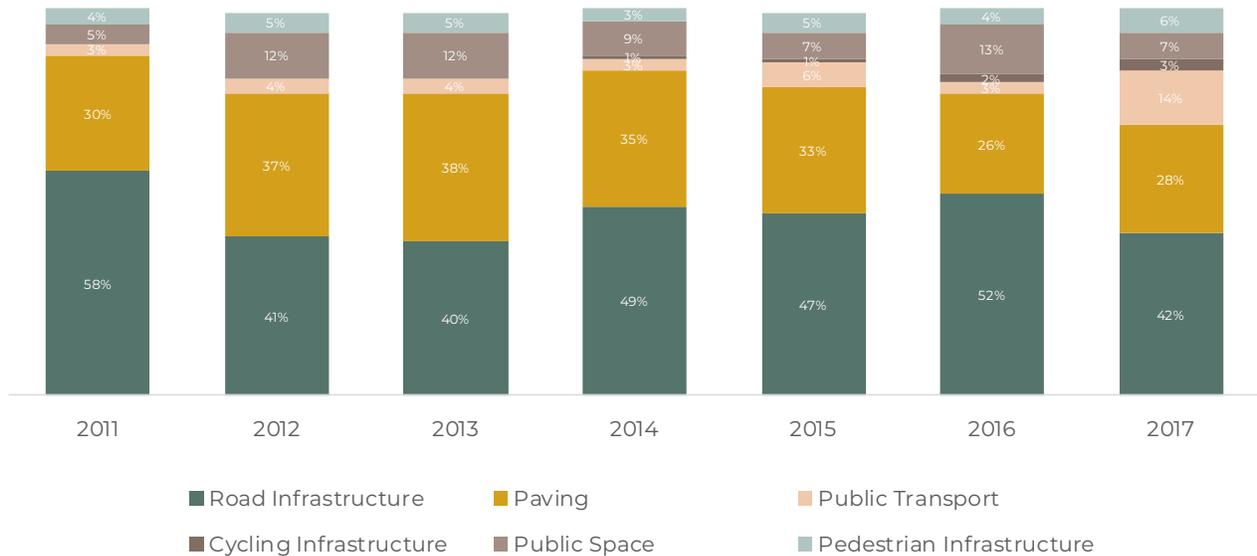
| | Improved Active Transport Conditions | More Active Transport Activity | Reduced Car Travel | More Compact Communities |
|-----------------|---|--|---|--|
| Benefits | <ul style="list-style-type: none"> • Improved user convenience, comfort, and safety • Improved accessibility for non-drivers, which supports equity objectives • Option value • Higher property values • Improved public space (more attractive streets) | <ul style="list-style-type: none"> • User enjoyment • Improved public fitness and health • More local economic activity • Increased community cohesion (positive interactions among neighbors) • Better neighborhood security | <ul style="list-style-type: none"> • Reduced traffic congestion • Road and parking facility cost savings • Consumer savings • Reduced chauffeur-ing burdens • Increased traffic safety • Energy conservation • Pollution reduction • Economic development | <ul style="list-style-type: none"> • Improved accessibility, particularly for nondrivers • Transport cost savings • Reduced sprawl costs • Open-space preservation • More livable communities • Higher property values • Increased security |
| Costs | <ul style="list-style-type: none"> • Facility costs • Lower traffic speeds | <ul style="list-style-type: none"> • Equipment costs (shoes, bikes, bike locks, etc.) • Increased crash risk | <ul style="list-style-type: none"> • Slower travel | <ul style="list-style-type: none"> • Increases in some development costs |

Source: Litman (2020)

Even though the benefits of active transport are widely recognized, and active transport infrastructure is relatively inexpensive, the sector receives very low levels of investment. Car-oriented planning in most cities in the region is reflected in the high investments in motorized infrastructure to the detriment of public transport and nonmotorized infrastructure. During the period 2011–17, investment in infrastructure dedicated to private vehicles (road infrastructure and paving) accounted for more than 80 percent of transport investment in the metropolitan areas of Mexico. In contrast, investment in cycling and pedestrian infrastructure amounted to only 6 percent of total investments (Figure 4.1), indicating that public investment is inequitable. In 2015, for example, 81 percent of investments were dedicated to private vehicles when just 31 percent of trips to work, and 25 percent of trips to school, were made by car. When considering active transport modes, just 13 percent of investment was dedicated to public spaces and cycling and pedestrian facilities, but these modes represented 24 percent of trips to work and 43 percent of trips to school (ITDP, 2017).

This imbalance is also evident in other cities in the region. In Santiago de Chile, investment in walking facilities represented just 2.78 percent of total investments during the years 2010 to 2016, whereas investment in bicycle infrastructure was much lower, translating into poor-quality infrastructure (Iglesias et al., 2019). In Quito, the investment in road infrastructure in the 2020 municipal budget was seven times the investment in active transport infrastructure (Municipio del Distrito Metropolitano de Quito, 2019).

Figure 4.1 Distribution of Mobility Projects' Investment in Metropolitan Areas of Mexico, by Type of Project, 2011–17



Source: ITDP (2020).

Note: Based on data on 59 metropolitan areas of Mexico.

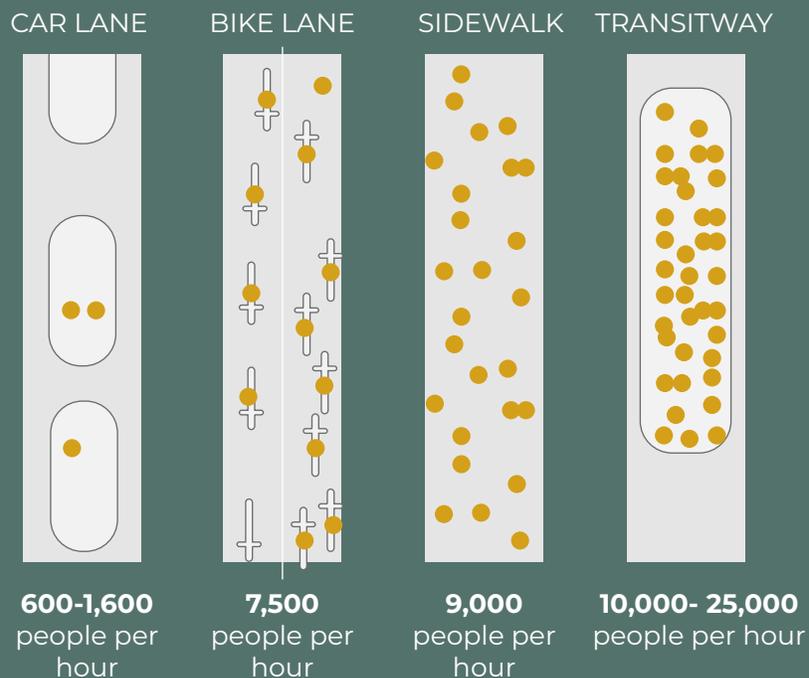
The insufficient level of investment in active transport modes represents a paradox, considering their associated benefits and their recognition by city governments. This paradox can be primarily explained by the lack of social demand and political economy reasons. Historically, it has been highlighted that the voice of low-income people in the political process is relatively weak; this is not only about geographical isolation, if not political and cultural isolation (Gannon & Liu, 1997). An inadequate representation of disadvantaged groups in the political process, together with the opposition of motorized groups to surrender space (Box 4.1), negatively affects the prospects of implementing active transport policies. Recently, the region has witnessed an increase of social demands, driven by bicycle civil organizations, accompanying the modal share's growth in several cities in the region, a trend that was boosted by the COVID-19 pandemic. But there is still room for a participative political process that includes all transport users' voices.

BOX 4.1

A FIGHT TO WIN: PUBLIC SPACE SURRENDERED TO CARS

Cars rule the urban space in most cities in the region at the expense of public space used by active transport modes and for recreational purposes. In addition to nonexistent sidewalks, pedestrian facilities and bike lanes are usually blocked by cars parking in prohibited places. Despite the disproportionate balance favoring private cars, cycling and walking are significantly superior in their use of urban space. A moving car (50 kilometers per hour and one occupant) takes 140 square meters (m²) of public space, 28 times more than a moving bicycle (5 m²) and 70 times more than a pedestrian walking (2 m²) (Harms & Kansen, 2018). Measuring the people who move on a street in a specific amount of time (for example, an hour) gives a complete picture of the efficiency of transport modes (Figure 4.1.1). Transit has the highest capacity, followed by walking and biking, whereas private cars are the most inefficient transport mode. A single travel lane for biking and walking traffic might move up to 5.6 and 4.7 times more people per hour, respectively, than a lane of private vehicle traffic—considering the most conservative scenario of two passengers per vehicle.

Figure 4.1.1 Ability to Move People per Hour, by Transport Mode



Source: National Association of City Transportation Officials (2016, 2019).

Note: Capacity of a single 10-foot lane (or equivalent width) at peak conditions with normal operations. The private vehicle traffic range varies, assuming one to two passengers per vehicle and 600 to 800 vehicles per hour. The on-street transitway traffic range varies by whether it involves bus or rail.

5. BETTER TOGETHER: ACTIVE TRANSPORT MODES AND PUBLIC TRANSIT

5.1 JUST BIKING OR WALKING OFFERS LIMITED ACCESS TO OPPORTUNITIES

Low-income groups tend to be on the periphery, where connectivity is low, affecting their mobility alternatives and access to opportunities. Living in the poorest neighborhoods, generally located far from areas where work opportunities are concentrated, requires traveling long distances. For these long trips, active transport modes are not a viable alternative, so integrating them with public transport networks represents the most efficient way to improve accessibility.

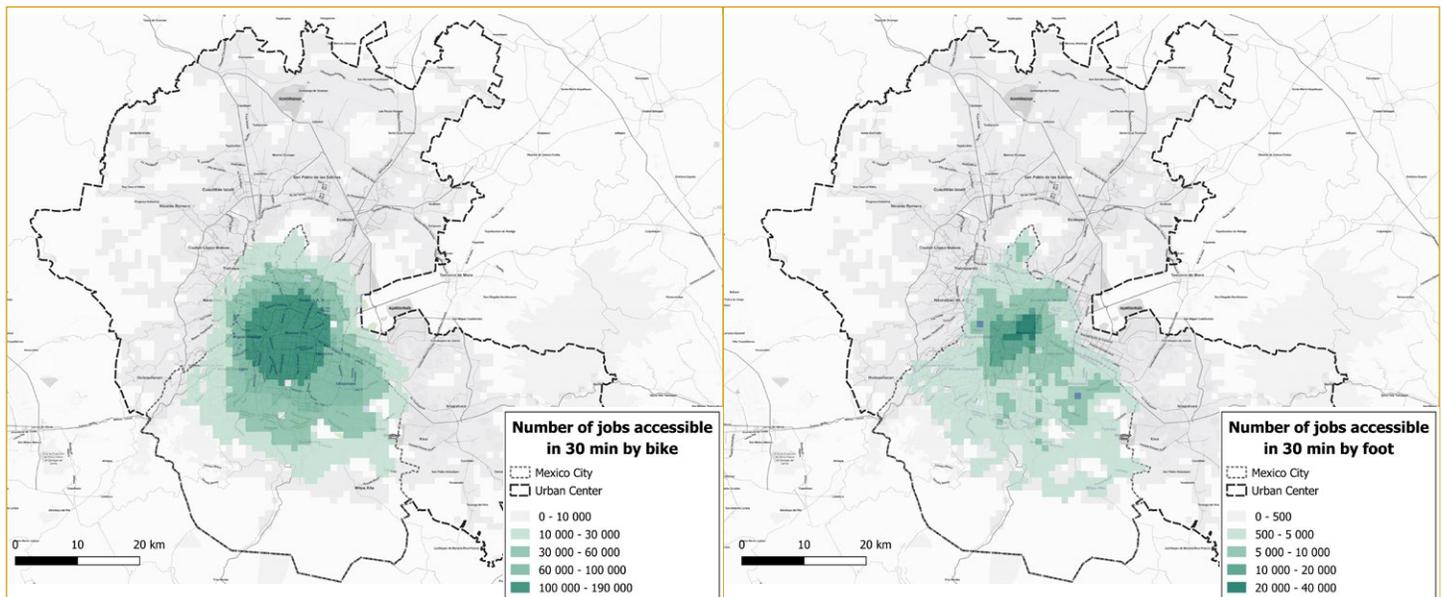
An analysis of access to jobs via walking and cycling in Mexico City, Bogotá, Montevideo, and Santiago de Chile highlights the limitations of active transport modes in peripheral areas. In the four cities, walking to formal jobs is an option only in central areas, reflecting highly concentrated formal employment markets (ITF, 2020). On the other hand, cycling accessibility depends less on proximity, as bikes allow one to travel further. Considering that most economic activities and job opportunities tend to be concentrated in the urban center, low-income residents may be limited to informal or lower-paid jobs closer to their residence on the cities' outskirts. For instance, in most places on the outskirts of Mexico City, active transport modes are not a feasible option for accessing employment. Outside Mexico City, fewer than 500 jobs can be accessed considering a threshold of 30 minutes by bike or foot (Figure 5.1). Inside Mexico City, the number of jobs that can be reached in 30 minutes rises to 40,000 by foot and 190,000 by bike. Higher job densities and policies to promote pedestrian and cycling activity may explain these higher accessibility levels inside the city.



Figure 5.1 Absolute Accessibility to Jobs by Active Transport Mode in Mexico City

Cycling

Walking



Source: ITF (2020).

The degree of access to work and study opportunities offered by active transport modes differs when socioeconomic groups are considered. A study of Barranquilla, Colombia, shows that low-income zones have higher walkability indexes but present lower pedestrian access to job and study opportunities and specific barriers to walkability (Arellana et al., 2021). By contrast, the highest potential pedestrian access to economic or education opportunities are located in medium- and high-income areas where, paradoxically, people rely more on private transport modes. For cycling, a study of Bogotá shows that half of the city's cyclists have access to less than 10 percent of the city's socioeconomic opportunities (Rosas-Satizábal et al., 2020). As highlighted in Bogotá, accessibility inequalities in bicycling are mainly explained by residence location, vehicle ownership, and gender. The top 10 percent of cyclists with the higher accessibility have 30 times more access to opportunities than the bottom 40 percent of cyclists.

5.2 THE POTENTIAL OF INTEGRATED TRANSPORT SYSTEMS

As a transport mode, the bicycle can be used to complete an entire trip without combining with other transport modes or as a means of transfer to, for example, a metro, bus, or rail system. The use of a bicycle from origin to destination is less appealing for long trips. Nonmotorized transport modes are completely flexible in terms of timetables and route design; however, they are not suitable for long distances (Giles-Corti et al., 2010), as required by the majority of low-income groups in Latin American cities.

The limitations of nonmotorized transport modes reinforce the need to integrate them with public transport to improve accessibility. Multimodal integration consists of using two or more different transport modes. When considering bicycle and public transport, three types of integration are common. The first consists of using a personal bicycle and parking it close to an origin-destination public transport station. The second involves transporting a personal bicycle onboard public transport, and the third involves using a shared-bicycle close to the entrance of a public transport station. Each multimodal alternative presents advantages for different travel needs and situations.

The benefits of integrating active transport modes with public transport can be very significant in terms of mobility. Together, public transport and bicycling provide more flexible alternatives than each stand-alone transport mode, and can play a key role in replacing car trips. To combine bicycling and public transport generates a unique synergy of speed and accessibility characteristics for long and short trips: the bicycle increases door-to-door accessibility, while public transport increases the speed and spatial reach (Kager et al., 2016). Whereas the bicycle provides significant flexibility and individual adaptation, public transport provides speed, generating a unique combination for a single trip chain. Analysis in Lima shows that an adequate integration of cycling facilities with public transport can increase the pedestrian coverage of high-capacity public transport by over six times (Ortegon-Sanchez & Hernandez, 2016). The quality of the surrounding urban environment and walkability conditions also factor into the choice of public transport for a trip. In Santiago de Chile, an analysis of accessibility to public transport and the quality of the walking environment, such as pedestrian-friendly environments and sidewalks, found a correlation between low-income and poor urban space quality and access to public transport (Tiznado-Aitken et al., 2018).

There is an urgent need to design and implement integrated transport policies, strengthening the key role of active transport modes in multimodal trips. Historically, in Latin America and the Caribbean, investment has been focused on stand-alone projects instead of integrated policies across different dimensions (administration, fare-setting, and modes).⁶ Despite certain policies' effectiveness, they have not effectively countered the negative transport trends in the region (Rivas, Suárez-Alemán, et al., 2019). An integrated and multimodal approach is necessary to improve accessibility through active transport modes. The existence of adequate infrastructure, including bicycle lanes and parking, is a determining factor for integrating bicycling and public transport, but not the only one. In Rio de Janeiro, it was found that among the self-reported barriers to using bicycles as a feeder mode for public transport are personal constraints, living too close to public transport boarding points, parking conditions, and public safety (de Souza et al., 2017). Self-reported ways to overcome these barriers included changing home location, owning a bicycle, implementing bicycling infrastructure, and improving parking conditions; the successful integration between active transport modes would also be worthy of consideration.

6 For an analysis of the key foundations of public transport integration, see Vassallo and Bueno (2019).

6. POLICY ACTIONS TO FOSTER MORE INCLUSIVE TRANSPORT SYSTEMS

Identifying the paths to improve the conditions of active transport modes is key to encouraging more sustainable and equitable transport solutions for all, especially in the Latin America and Caribbean region, which is characterized by high levels of income inequality. Cities can improve the access of underserved groups by focusing on and integrating four main areas of action: developing nonmotorized infrastructure and services, increasing citizen participation, improving planning and regulation, and integrating nonmotorized services into a more connected network (Table 6.1). For each of the four main areas of action, it is possible to identify strategies by transport mode and time horizon. The final configuration of activities per action area and their timing will depend on the policy objectives defined by city governments, each transport system's challenges, and governments' and citizens' creativity in developing innovative solutions and mechanisms to promote active transport.



Table 6.1 Policy Actions to Enhance Active Transport in Low-Income Groups and Improve Accessibility

| Area | Short Term | Medium and Long Term |
|---|--|---|
| Development of nonmotorized infrastructure and services | <ul style="list-style-type: none"> ● Set up registration, subscription, and payment systems that allow everyone access to bike-share systems. ● Develop stationary bike racks. | <ul style="list-style-type: none"> ● Increase the coverage of the system to peripheral and low-income areas for bike-share systems. ● Differentiate tariffs for bike-share systems. ● Target infrastructure provision. ● Use fiscal incentives to promote bike use. ● Support bicycling purchases among low-income groups. |
| Citizen participation | <ul style="list-style-type: none"> ● Increase the participation of civil society organizations to increase the profile and acceptance of the services. ● Develop tools for communication between users and the government. ● Develop participatory policies for the appropriation of public space. | |
| Planning and regulation | <ul style="list-style-type: none"> ● Focus institutions on active transport. ● Develop tools for infrastructure planning and management to ensure an equitable distribution of benefits (pedestrian and bicycle infrastructure provision). ● Monitor nonmotorized infrastructure and use indicators, identifying low-income users. ● Provide legal protection of vulnerable users. | <ul style="list-style-type: none"> ● Promote modal changes as a redistributive tool. ● Use land-use planning and construction regulations to promote mixed land use and quality public spaces. |
| Integration of nonmotorized modes | <ul style="list-style-type: none"> ● Gather and analyze data on active transport modes. ● Promote road safety education and awareness. | <ul style="list-style-type: none"> ● Integrate a bike-share system with the existing transit network. ● Integrate nonmotorized infrastructure with urban facilities to increase security. ● Develop modal transfer points. ● Integrate fare systems. |

● Walking ● Cycling

Source: Author's elaboration based on Ríos Flores et al. (2015); Rodríguez et al. (2017).

The development of nonmotorized infrastructure and services in the region is crucial for promoting active transport modes because it enables comfortable, safe, and efficient trips. Improvements in network infrastructure and services should explicitly consider the needs of low-income groups, especially their complete lack of access to specialized infrastructure of adequate quality. Having a positive walking experience involves high-quality pedestrian infrastructure, and interconnections with public space and the environment, representing a challenge that exceeds the scope of the transport sector. For instance, boosting residents' perceptions of an area's security requires investments in video surveillance and public lighting. The expansion of cycling infrastructure is also necessary to promote bicycle use and protect users. In particular, the expansion of bike-share systems to disadvantaged areas, together with differentiated pricing schemes,⁷ ensures that the benefits and flexibility of these systems can benefit different users more equitably.

Citizen participation is crucial for developing effective active transport policies. The interaction and interchange between users, nonusers, governments, and other key stakeholders, including different collectives, strengthens policy design and ensures initiatives' success and a fairer distribution of benefits. Otherwise, lower-income and peripheral neighborhoods can be bypassed in the process of developing connectivity networks because of their lack of power and influence (Oviedo Hernandez & Dávila, 2016). Citizen participation in strategies to promote active transport play a key role in reducing stigmas about nonmotorized transport. In some cities bicycling is associated with poverty. Or at the other extreme, cycling is related to the idea of affluence. The availability of information regarding active transport routes, services, and policies and strategies to promote cycling and walking leads to the increased use, safety, and acceptability of active transport modes. Despite having recreation—and not mobility—as their primary purpose, open street initiatives have contributed to strengthening the culture of active transport modes around cities. Other initiatives, such as *Cebras por la vida* (“Zebras for life”) in Bogotá, which involves artistic interventions in public spaces, such as “zebra crossings,” offer examples of successful citizen initiatives claiming better cultural and infrastructure conditions for pedestrians.

Planning can amplify the access to opportunities of disadvantaged groups through the design of integrated policies. In this sense, the development of cycle-inclusive policies is strongly related to the existence of local government institutions with exclusive functions associated with the bicycle (Ríos Flores et al., 2015). Planning active transport policies presents the challenge of coordinating among different government levels and sectorial planning departments, including public space and territorial divisions. In some cities, such as Santiago de Chile, investment in pedestrian facilities depends on each commune's administrative budget; therefore, cities would benefit from a centralized system that ensures effective fund redistribution (Tiznado-Aitken et al., 2018). In terms of governance and planning, the availability of participatory planning tools, such as participatory budgets, represents an opportunity for promoting active transport modes. The lack of representation and participation of vulnerable groups, such as people living in informal settlements, is an obstacle to planning processes (Rodríguez et al., 2017). However, the consolidation of civil society organizations to promote bike use, and in general, nonmotorized transport, can play a key role in breaking the circle of political exclusion and planning of infrastructure in cities in the region (Rodríguez et al., 2017). Regarding road safety and regulation, normative changes are instrumental for recognizing and ensuring the protection of the most vulnerable users, who are the most exposed to the unsafe

7 Electric bicycles may play a key role in improving accessibility for long trips. Electric bicycles or e-bikes make long trips easier across different topographies, requiring less physical effort by users. In fact, electric bicycles have the potential to double travelled distances (Fyhri & Fearnley, 2015). In addition, e-bikes represent transport cost savings because they can replace other modes of travel. Electric bike-share systems, still incipient in the region, represent an opportunity for low-income groups living on the periphery.



maneuvers of motorized users. Finally, through planning and regulation, it is also possible to encourage modal change to pursue redistributive objectives. In Mexico City, a natural fuel shortage experiment showed that bike-share trips through the Ecobici system increased by four to seven trips per hour, and the effects remained long after the fuel shortage receded (Crotte et al., 2021). In this sense, more strict policies about cars can incentivize bicycle use and boost its associated benefits.

There is an urgent need to consider active transport modes as an integral part of transport systems, claiming their vital role in urban mobility, especially in promoting sustainable transport. The integration should consider all transport system components, including services, facilities, and transfer locations. Fare integration with bike-share systems is crucial to ensure affordable transport services for low-income groups. Investments in parking facilities in public stations in low-income areas and improving the first and last mile, which are mainly crossed by foot, can significantly improve the accessibility of socioeconomically disadvantaged groups. A cycle-inclusive policy seeks to integrate the bicycle's use into transport networks with safe and efficient conditions (Ríos Flores et al., 2015). Road safety education and awareness are vital for improving cycling and walking conditions and promoting the intelligent coexistence of active and motorized transport.

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