The Potential for Shared Mobility Services to Promote Equity and Social Inclusion in Latin America and the Caribbean

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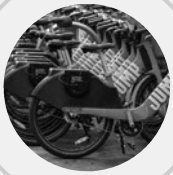

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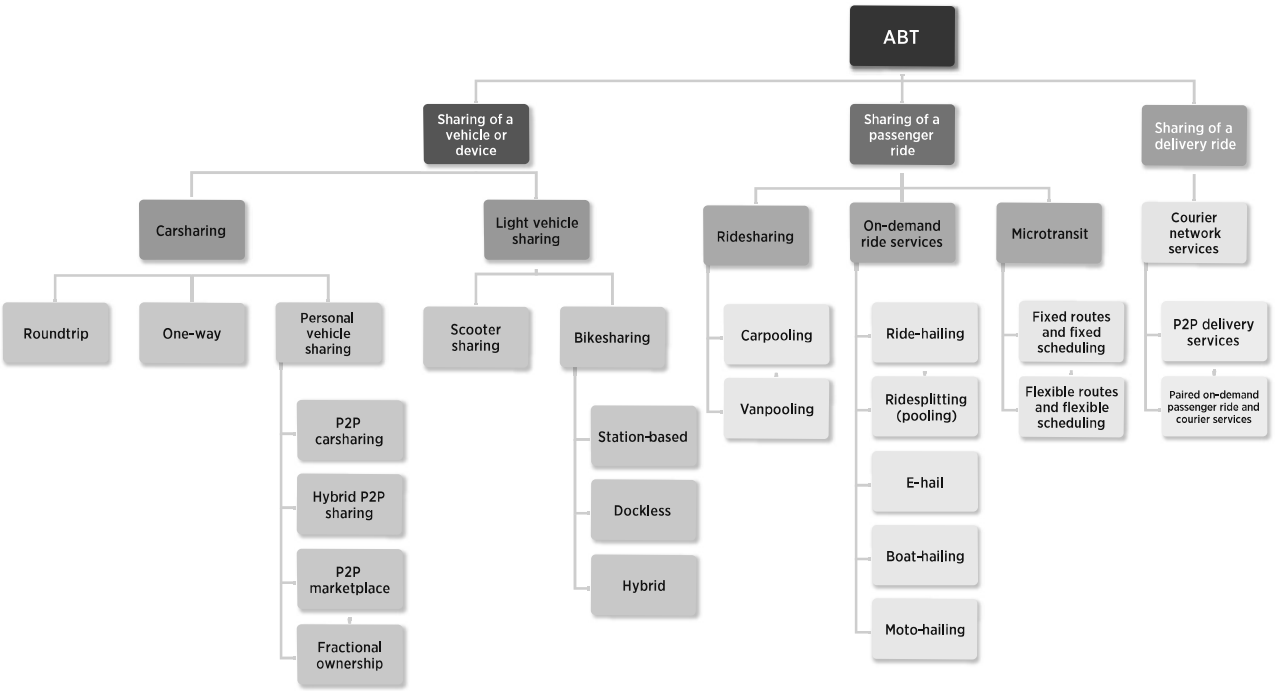
Emerging transport alternatives based on information and communication technology (ICT) have catalyzed broad transformations in urban mobility at the local neighborhood and city levels (Alemi et al. 2019; Hall, Palsson, and Price 2018; Romanillos et al. 2016). Between 2010 and 2019, the app-based transport industry – understood as digitally enabled transport services that connect spare capacity or idle goods with demand for mobility – received a total disclosed investment of 49 billion U.S. dollars (Holland-Letz et al. 2019). Pre-COVID-19 forecasts projected growth of 25 percent by 2025 for such services, including bike-sharing, e-scooters, ridesharing, car-sharing, and ride-hailing, with the largest investments targeting firms with origins in the United States, China, and Europe (Wolff, Possnig, and Petersen 2019). However, the potential of these services to either alleviate or exacerbate existing social inequalities, as well as their role in the mobility and accessibility of low-income and socially disadvantaged urban populations, has been a topic largely unexplored.

The term "app-based transport" encompasses a broad set of urban mobility alternatives that, under different business models, place smartphones at the core of their operation to both supply and access transport services (Shaheen et al. 2020; Cervero 2017). App-based transport includes services such as ride-hailing and vehicle sharing services, micromobility (e.g., shared bikes or e-scooters), and microtransit (minivans or small buses not attached to fixed routes and schedules, otherwise known as demand-responsive transit). Mobility as a service (MaaS) is often used as an umbrella term to refer to such emerging transport services (Hensher 2017). These innovations have rapidly disrupted transport markets and regulations, brought about changes in individual and collective travel behaviors, and raised concerns about their potential social and environmental externalities.

FIGURE 8.1 The Landscape of Shared Mobility Made Possible by Technological Advances in Communications and Portability



Source: Shaheen and Cohen (2019).
Note: ABT: app-based transport; P2P: peer-to-peer.

These new forms of urban mobility have context-specific effects and pose challenges for governance and decision-making (Oviedo, Perez-Jaramillo, and Nieto 2021). Furthermore, in the contexts of rapidly growing cities in Latin America and the Caribbean, shared mobility alternatives have the potential to either positively or negatively influence inequality. Their role in disrupting the travel behavior of citizens with different social identities, socioeconomic characteristics, levels of social and transport (dis)advantage, access to labor, and exposure to health and road-related and environmental risks is still under-researched.

Although there are few studies on app-based transport and transport-related social exclusion in Latin America and the Caribbean, emerging research has examined their impact on spatial and economic accessibility. There is also research on the role of fear, insecurity, and bias in the provision and use of app-based transport. On the positive side, unique features such as panic buttons in ride-hailing and microtransit services have improved safety, especially for women and for people traveling at night. Ride-hailing also provides opportunities for disadvantaged groups to access employment, as in the case of disabled drivers who are prevented by local regulations from working

in the traditional taxi industry. The role of transport network companies as a source of economic activity for the unemployed or for people wanting to gain extra income through flexible work is well documented (Azuara, González, and Keller 2019). Furthermore, flexible services such as shared micromobility provide first- and last-mile solutions to access public transit and can improve accessibility for people who cannot walk or cycle. They can also be an attractive alternative for people without cars who can afford these services.

From a perspective of inequality and exclusion, barriers associated with access to app-based transport include issues of affordability, coverage, and access for vulnerable populations. For instance, a lack of adequate infrastructure can make shared micromobility unusable, at least safely, in some parts of a city. Furthermore, ride-hailing services are heavily influenced by perceptions of crime, which can lead to the exclusion of some neighborhoods from their supply. Given the diversity of regulations and approaches to app-based transport services in different contexts, users can also be negatively affected by volatile fares, leading to prohibitive costs for some users. In addition, there is evidence of discrimination against different actors involved in the provision of this type of service, as well discrimination against some users due to context-specific perceptions. Another larger issue that can have both direct and indirect effects on inequality is the potential contribution of new services to congestion, vehicle miles traveled, and safety and pollution.

This chapter discusses the extent to which app-based transport services may either exacerbate or ameliorate transport-related social exclusion and social and transport (dis)advantage, focusing on the implications for (in)accessibility and social (in)equality. Relying on emerging research in Latin America and existing research on the Global North, the chapter focuses on how the services are distributed and used, and on their impact on different social groups. The analysis recognizes that while knowledge generated from research on the Global North is helpful to understand some patterns and shed light on how app-based transport might affect people, the trajectory of app-based transport in Latin America and the Caribbean is expected to be different given the unique context of urban mobility and spatial patterns in the region's cities. In exploring the different forms of inequality and exclusion implicit in the design and provision of app-based urban transport services (Coutard 2008; Kamruzzaman et al. 2020; Oviedo and Dávila 2016), the analysis shows how the range of travel needs and preferences of travelers have a direct bearing on the potential barriers and opportunities created by app-based transport services in terms of (un)equal mobility and accessibility. Furthermore, it discusses avenues for the design of policies and regulations of these mobility innovations in Latin American and Caribbean urban markets to foster socially inclusive and sustainable mobility.[1]

1. While the contents of this chapter touch upon issues that have been identified as relevant in terms of the regulation of transport network company services – such as pricing, liability, employment, and safety, among many other considerations (Azuara, González, and Keller 2019; Oviedo, Perez Jaramillo, and Nieto 2021) – an in-depth discussion of regulations in different countries and their implications is beyond the scope of the chapter.

8.1 App-based Transport Is Here to Stay: Recent Trends and Future Projections for the Region

The landscape of app-based transport is diverse, encompassing different transport services, vehicle technologies, and digital platforms (Figure 8.1). In Latin America, a fertile ecosystem for start-up investments has given rise to home-grown companies seeking to fill gaps in the urban mobility market through data-driven innovations and versions of services in various sectors adapted to local conditions (Oviedo, Perez Jaramillo, and Nieto 2021). The most common forms of app-based transport currently operating in the region include micromobility, microtransit, and ride-hailing (Figure 8.2).

FIGURE 8.2 Types of App-based Transport in Operation in Latin America and the Caribbean

MICROMOBILITY | MICROTRANSIT | RIDE-HAILING

Photo: Urbvan.

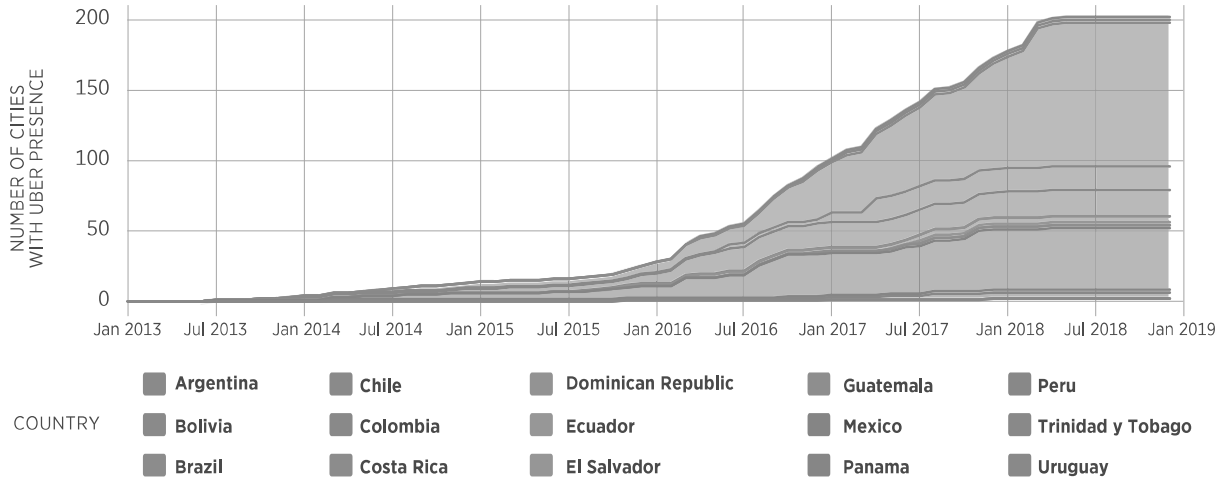
Photo: Jetty.

8.1.1 Ride-hailing and Ridesharing

Ride-hailing services are defined as on-demand mobility services supported by digital platforms and smartphones that enable users to request a personal driver to transport them for a fee to where they want to go. Operated through cell phone apps, the features of ride-hailing include the ability to provide point-to-point service, track and share trip information in real time, know the waiting and travel time and costs before making the trip, use a variety of payment forms, and employ a dynamic pricing mechanism that changes according to traffic conditions and other time-bound demand determinants. Ridesharing or pooled ride-hailing services operate similar to ride-hailing, but riders share vehicles with other passengers with similar origins or destinations at discounted fares.

Latin America is the fastest-growing and one of the most profitable regions for global and local ride-hailing companies seeking to expand their operations. The region has the highest number of simultaneous trips globally, with more than 25 million monthly active riders across 15 countries (Moed 2018). As shown in Figure 8.3, Uber – perhaps the most well-known transport network company in the industry – has grown exponentially in the region. Today, Uber operates in 15 countries in the region: Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, Panama, Peru, and Uruguay. Brazil is Uber's second-largest market in the world, with 500,000 drivers and, according to Uber's own data, more than 17 million users (Darlington and Londoño 2017). In Central America alone, there were an estimated 1.3 million users in the first semester of 2018.

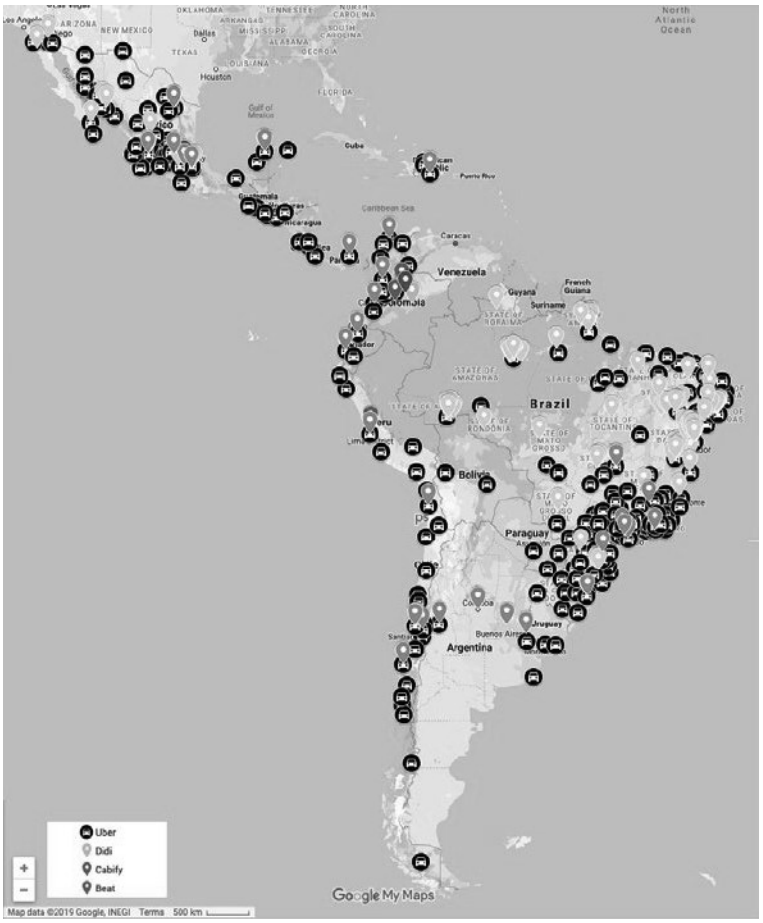
FIGURE 8.3 Expansion of Uber in Cities of Latin America and the Caribbean (Number of Cities with More than 100,000 Inhabitants, by Country)



Sources: Prepared by the authors based on Azuara, González, and Keller (2019).

Beat, Cabify, Lyft, and DiDi are the main ride-hailing services apart from Uber operating in Latin America and the Caribbean (Figure 8.4).[2] DiDi has followed an expansion pattern similar to that of Uber, entering and competing with both local and global transport network companies for urban markets in the region. DiDi-associated research reported that the ride-hailing and food delivery services covered 200 million users in Latin America in 2019 and was expanding quickly. Rapid expansion and acquisitions of local transport network companies (e.g., Didi acquired local firm "99" for US$1 billion) have contributed to the consolidation of a handful of transport network companies in Latin America, which has added layers of complexity to current regulatory and policy debates across the region (Oviedo, Perez Jaramillo, and Nieto 2021).

FIGURE 8.4 Presence of Ride-Hailing Operators in Latin America and the Caribbean



Source: Oviedo, Perez-Jaramillo, and Nieto (2021).

2. Since the merger of Cabify and Easy.

The introduction of these new transport network company services has raised concerns about their impacts on vehicle miles traveled and congestion. A study in San Francisco (Erhardt et al. 2019) shows that ride-hailing services are the main contributor to congestion and estimates a weekly increase of 62 percent in vehicle delays due to the presence of transport network companies. Another study (Schaller 2021) analyzed four urban areas in California and found that ride-hailing increases vehicle miles traveled without this being offset by increased use of ride-hailing as a feeder option for public transit. Nevertheless, these and other studies should be considered with caution since different studies have shown varied results. For example, other research in the United States has found that transport network companies are decreasing congestion (Li, Hong, and Zhang 2016).

One of the few studies in Latin America and the Caribbean (Tirachini and Gomez-Lobo 2019), conducted in Santiago de Chile, concluded that if ride-hailing does not change to a more "shared" service that increases average occupancy per vehicle, total vehicle kilometers traveled can be expected to increase with increasing demand, with negative implications for congestion. In terms of the effects on car ownership, a study on ride-hailing in Colombia found that after such services began operation, there was a decline in taxis and a rise in the registration of small-size cars (often the preferred type of vehicle used by transport network company drivers) but no effect on large or mid-size vehicles (Granada, Perez-Jaramillo, and Uribe-Castro 2019). The results suggest a potential relocation effect in which taxi investors and drivers may be switching towards buying cars and working in the ride-hailing industry.[3]

Regarding public transit, it is possible that ride-hailing either siphons ridership from public transit or complements existing transit services, increasing coverage and access (Hall, Palsson, and Price 2018). Most frequently, ride-hailing can serve as a first-mile and last-mile feeder alternative. In other cases, it can supply transport in areas with a limited presence of public transit (Barajas and Brown 2020) or with schedules when public transit is not operating (Sabogal-Cardona et al. 2021). A study in Canada (Young, Allen, and Farber 2020) compared ride-hailing trips with the simulated public transit alternative and found that 31 percent of such trips had travel times similar to those of their public transit counterpart, and that 27 percent of such trips would take more than 30 additional minutes on public transit. As a policy recommendation, the study suggests taxing ride-hailing trips that occur in the context of substitution. The risk of public transit being replaced by ride-hailing in Latin America and the Caribbean (at least to some extent) is based on the different security features of ride-hailing that are absent in public transit (Oviedo, Granada, and Perez-Jaramillo 2020; Scholl, Oviedo, and Sabogal-Cardona 2021), and on some experiences from the Global North. The most extreme example occurred in Innisfil, Canada, where in 2017 the local government replaced public transit with Uber by providing important fare subsidies (Cecco 2019).

3. The study estimated a 2.7 percent increase in the share of total vehicles three years after Uber, the first transport network company in Colombia, launched operations.

Given the scale and pace of expansion of app-based transport, most available research on and knowledge about it in Latin America and the Caribbean has focused on ride-hailing. Therefore, a large portion of this chapter will focus on this mode of transport in order to illustrate the challenges and opportunities of shared mobility for equality and inclusion.

8.1.2 Microtransit

Microtransit is a form of bus-based, demand-responsive public transport service that incorporates app-based technologies used for ride-hailing services (apps, Wi-Fi, and GPS-enabled smartphones) to provide highly flexible routing or scheduling for minibuses and vehicles shared with other passengers. Passengers can use a digital platform (e.g., a website or a smartphone app) to request and program a shared ride in a small bus or van that may or may not have a fixed route with flexible boarding locations (Westervelt et al. 2018). Also known as demand-responsive transit or dial-a-ride services, microtransit in the Global North is frequently associated with paratransit services.[4] Most experiences with microtransit have been in the United States and Europe, with many recent initiatives still in the pilot stage. Results in these contexts suggest that implementation of microtransit services and integration with larger transport systems is difficult and expensive, and that it is hard to consolidate enough users to make it financially sustainable.

Experiences in Europe have illustrated the potential impact of microtransit on urban mobility. For example, Kutsputlus in Helsinki (Finland), which has been described as the "first fully automated, real-time demand-responsive public transport service" in the world (Rissanen 2016, 1), was designed based on customer time-efficiency and focused on areas where public transport had not been competitive. The Kutsuplus experiment grew in popularity and ridership over time, leading to a decrease in subsidies to the point of being comparable with other public transportation systems. Kutsuplus evaluations demonstrated that the service both competed with private vehicles and complemented public transportation, if integrated with train services (Rissanen 2016). Despite these positive assessments, however, another analysis noted that most trips in Kutsuplus were less than 10 kilometers and lasted no more than 30 minutes, and that the service had a low occupancy rate (1.27 passengers per vehicle) and low load factors (14 percent) (Haglund et al. 2019). Analyses of another experience in the Netherlands (Breng flex) suggested, on the other hand, that microtransit service could eventually compete with cycling and mass transit (Alonso-González et al. 2018).

4. Paratransit is a term commonly used in the Global North to refer to door-to-door, on-demand, collective services designed for the elderly and people with disabilities with vehicles equipped to attend to the specific needs of users. This is not to be confused with the concept of informal paratransit, which refers to traditional conventional public transit services common in cities of the Global South that range from minibuses to shared taxis, rickshaws, and motorcycle taxis.

In Mexico, microtransit is better known as vanpooling and is still a novel but rising service, with at least two microtransit companies now operating. Urbvan started as a pilot in 2016 with only five vehicles.[5] Currently, the company has raised more than US$10 million in investments, and it was estimated have 230 operational buses in 2020. Jetty, another Mexican microtransit competitor also founded in 2016, has recently expanded operations from Mexico City to Puebla. Having tapped into an unsatisfied demand for higher-quality public transport services that can serve as an alternative to semi-formal minibuses known as combis (jitneys), the experience of Jetty points to the potential financial viability of these services (Tirachini et al. 2020).

Although it is premature to assess the long-term effects of microtransit services in Mexico on modal shares in cities, pre-pandemic insights suggest that the use of shared vans (or minibuses) is more attractive to car users (Tirachini et al. 2020). Furthermore, perceived problems of quality and security in traditional public transport systems among people with higher purchasing power are key factors behind the market consolidation of microtransit (Flores-Dewey 2019). Emerging research suggests microtransit services could contribute to a more diverse set of alternatives for collective transport and have the potential to promote sustainable mode shifts (Flores-Dewey 2019; Tirachini et al. 2020). More interestingly, microtransit technology in Mexico might be an avenue to improve the quality of semi-informal services. Other countries in the region with microtransit projects include Chile (where microtransit services have been operating since 2018),[6] Argentina (where most services have focused on corporate trips), and Brazil, which has two successful examples (City 2.0 in Goiana[6] and TopBus in Fortaleza).[7]

8.1.3 Micromobility

Shared micromobility services have been in operation for about a decade or more in the region. Bikesharing was the first service to emerge. Rio de Janeiro and Santiago de Chile launched the first programs in December 2008. More recently, cities in Latin America and the Caribbean have witnessed the introduction of e-scooter sharing services, although these remain novel in the region. Although loosely serving similar purposes in the region, e-scooter services have been dockless since inception, while bikesharing systems initially depended (and in many cases still do) on docking stations. Research in the United States suggests these systems are not used equally by all

5. See "Urbvan, la app que reduce en 25% el tiempo de traslado de los mexicanos," *Expansión,* August 2, 2019 (https://expansion.mx/emprendedores/2019/08/02/urbvan-la-app-que-reduce-en-25-el-tiempo-de-traslado-de-los-mexicanos).

6. See Via, "CityBus 2.0 Celebrates One Year of Service with 80,000 Riders," February 18, 2020 (https://ridewithvia.com/news/citybus-2-0-celebrates-one-year-of-service-with-80-thousand-riders/).

7. See Via, "Sindiônibus and Via Launch New On-demand Public Transportation Service in Fortaleza, Brazil," December 4, 2019 (https://ridewithvia.com/news/sindionibus-and-via-launch-new-on-demand-public-transportation-service-in-fortaleza-brazil/).

socioeconomic groups. In an analysis of the geographic and temporal usage characteristics of Lime e-scooters versus bikeshare systems, McKenzie (2019) found significant differences among the two services. Bikeshare activity had a greater spatial reach and was mainly used for work purposes, while e-scooters were mainly used for leisure, recreation, and tourism. Bikeshare's longer history of operation and trust among users compared to e-scooters may affect the way users' approach and utilize each service.

To date, research on micromobility has been concentrated in the United States and Europe. A study in Zurich (Reck, Martin, and Axhausen 2022) found that the distance of the trip, precipitation, and access to vehicles are the main factors that determine whether people use electric bikes. Different results were found in a study of Catania and Palermo in Italy, where Campisi et al. (2021) pointed to age, job occupation, and perceived safety as the main factors. Aman, Zakhem, and Smith-Colin (2021) showed that disadvantaged communities (low-income populations or racial/ethnic minorities) experience inequalities in access to scooters and bike systems in Austin, Texas. A study of Paris by Krier et al. (2021) showed that the shared e-scooter system is mainly replacing walking and the use of public transportation.

Nascent research on e-scooters and bikesharing in Latin America from an operational perspective (travel times, cost, and accessibility) seeks to understand users' preferences. The debate about the role of e-scooters in urban mobility is divided by the appearance of e-scooter sharing companies (e.g., Lime, Grin, and Movo). Before these companies entered the scene, scooters (both regular and electric) were privately owned, not considered a major component of urban mobility, and often used as a tourism/recreation system (Wang 2008), as an aid for people with reduced mobility, or as an option for the elderly to stay mobile and participate in activities (Thoreau 2015). With the emergence of e-scooter sharing companies, this mode of transport became the center of a business model based on the idea of renting an e-scooter through an app via electronic payment. Users can see the location of scooters in the app and pick up the most convenient one. Such a model has enabled the mass deployment of vehicles in various cities across the globe, including in several Latin American and Caribbean cities. E-scooters are now considered a potential key future player in first- and last-mile access, particularly in the context of socio-technical transitions to electric and sustainable mobility.

In Latin American cities, the introduction and growth of micromobility has been sporadic and faced significant regulatory and operational challenges. Dockless bikesharing systems appeared on Latin American streets in 2017 and e-scooter services started in 2018. By April 2019, the region boasted 73 systems in 31 different cities (most in Brazil). However, by June 2020 a total of only 14 systems remained in service in 12 cities. The combined effect of the COVID-19 pandemic, regulatory restrictions, and higher-than-expected operational costs led to a drastic decline of these services in the region (Vadillo Quesada Moreno et al. 2021). Moreover, as mentioned in Chapter 6, many forms of

micro mobility depend on pedestrian and bikeway infrastructure that in many cities is lacking, precarious, or incomplete. Therefore, the lack of appropriate and high-quality infrastructure to ensure the efficient and safe use of these services also poses barriers and slows uptake. Nonetheless, the observed reemergence and consolidation of e-scooter and e-bikesharing services in cities in Europe and North America signals potential growth of these services in Latin America and the Caribbean, so consideration of their potential for inclusion is relevant for future policy and research in the region. A recent study in Bogota by Oviedo and Sabogal-Cardona (2022) highlights that city's potential for cycling by arguing that 80 percent of current car-based trips are less than 10 kilometers (an easily cycled distance) and around half of the trips are less than 6 kilometers. The study also shows that, under different scenarios of modal shifts from car to cycling, different population segments see reductions in travel times and gains in accessibility to employment. The design of a large-scale bikeshare system might be the way to take advantage of the Bogota's cycling potential.

8.2 App-based Transport, (In)Equalities, and Exclusion

The development and adoption of app-based transport may also present an opportunity for cities to overcome dependence on cars, foster innovation, and improve the quality, coverage, and complementarity of public transport alternatives (Cervero 2017; Hensher 2017; Wong, Hensher, and Mulley 2017). These new forms of urban transport also open opportunities for new business ventures and their employment opportunities and innovative labor practices, as well as formal and informal supply-demand interactions. Firms, investors, and a growing number of advocates for app-based transport have deployed similar arguments to justify the rapid growth in both the supply of and demand for these services. For example, to those who can afford them, ride-hailing and car sharing offer convenient and comfortable private mobility services. Additionally, micromobility can potentially serve as a feeder and support for mass transport systems, and microtransit can help increase transport service coverage in places where there are public transport supply gaps.

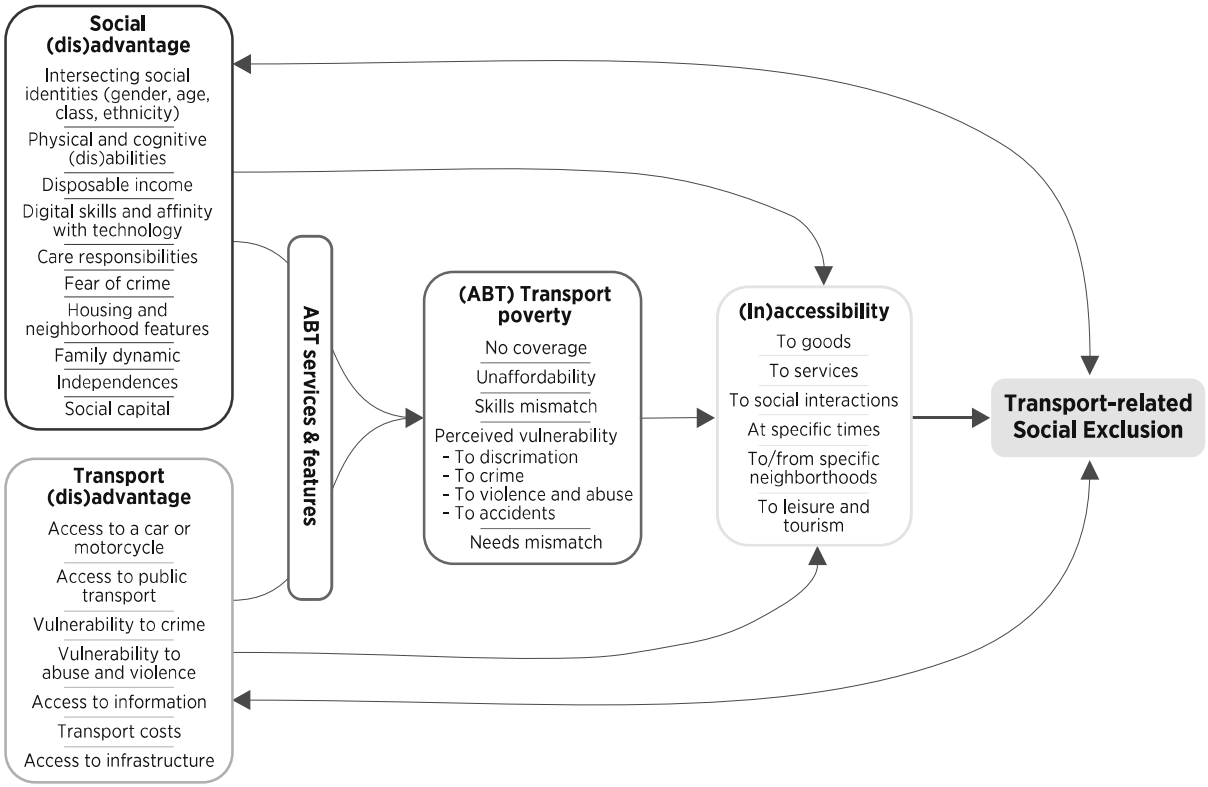
Whether all these benefits can be achieved and at what cost for social equality, health, and the environment remains widely contested (Wong, Hensher, and Mulley 2017), with conflicting research findings adding to the debate. For instance, while some authors argue that ride-hailing services siphon ridership from public transport systems (Bruce Schaller, 2018) others suggest it could act as a feeder for the first or last mile of public transport trips (Hall et al., 2018a). Similarly, while electric scooters have potential to increase sustainable mobility, their effect on reducing cycling and walking trips, which ultimately are preferred by health policy specialists due to their health co-benefits, raises relevant questions about their possible role in increasing health inequalities. An interesting fact regarding micromobility is that electric scooter technology was originally developed to help people with disabilities and the elderly (Thoreau 2015). Such potential remains as a way to improve local mobility for individuals who may have physical impairments that prevent them from walking long distances, effectively expanding their spatial reach and accessibility (Smith, Sochor, and Karlsson 2018).

However, as privately owned and operated enterprises operating in loose to absent regulatory frameworks, app-based transport services offer benefits that are largely limited to those who can access them. Research on ride-hailing adoption has shown variables such as income, race, and ethnicity, as well as the availability of transport options (i.e., car ownership), as salient determinants of adoption and frequency of use. These variables can make such services inaccessible for a considerable share of the population. Educational attainment and digital literacy can also pose barriers. In Pakistan, for example, young girls, elderly persons in rural areas, and illiterate citizens do not use these services because they cannot use a mobile phone (Malik and Wahaj 2019). And in India, demand comes mainly from the middle class due to price and technology barriers (Kameswaran et al. 2018).

On the supply side, operators of app-based transport services in India often belong to working classes or have immigrated from villages and are often the victims of marginalization and discrimination (Kameswaran et al. 2018). Despite emerging evidence from research, app-based transport advocates often promote the transformational potential of these innovations, with limited consideration of the social consequences of the practices that businesses engage in. Emerging studies on micromobility, for example, have found that social equity and subsidies and incentives to include marginalized groups are by and large not considered when designing and implementing micromobility systems (Caulfield, Oeschger, and Carroll 2020).

Figure 8.5 diagrams the potential links between social and transport disadvantage, transport poverty, inaccessibility, and social exclusion. Considering the nature of app-based transport, the discussion frames advantages and disadvantages as a continuum, recognizing that many users of on-demand transport alternatives may be better off socially or have access to a wider set of transport options. Building on the literature on transport (dis)advantage and exclusion and the characteristics of app-based transport services identified in the previous section, the framework also recognizes that not all disadvantaged persons are poor, and that poverty is not the only constraint to accessibility and the (in)ability to use specific transport modes such as app-based transport, a constraint understood in this context as '"app-based transport poverty." Moreover, many of the considerations are general, so as to accommodate considerations that should be independent of the type of service, yet recognize the added complexities brought about by existing digital technologies. The relationships presented in Figure 8.5 reflect the unique features of on-demand transport services assisted by technology while maintaining the core rationale of the relationships between concepts identified in previous research on transport and inequalities. This framework will be used to illustrate the relationships between services such as ride-hailing, micro-transit, and shared micro-mobility, on the one hand, and (dis)advantage, inequality, and transport-related social exclusion, on the other.

FIGURE 8.5 Links between (Dis)advantage, (In)accessibility, and Transport-related Social Exclusion in App-based Transport Services

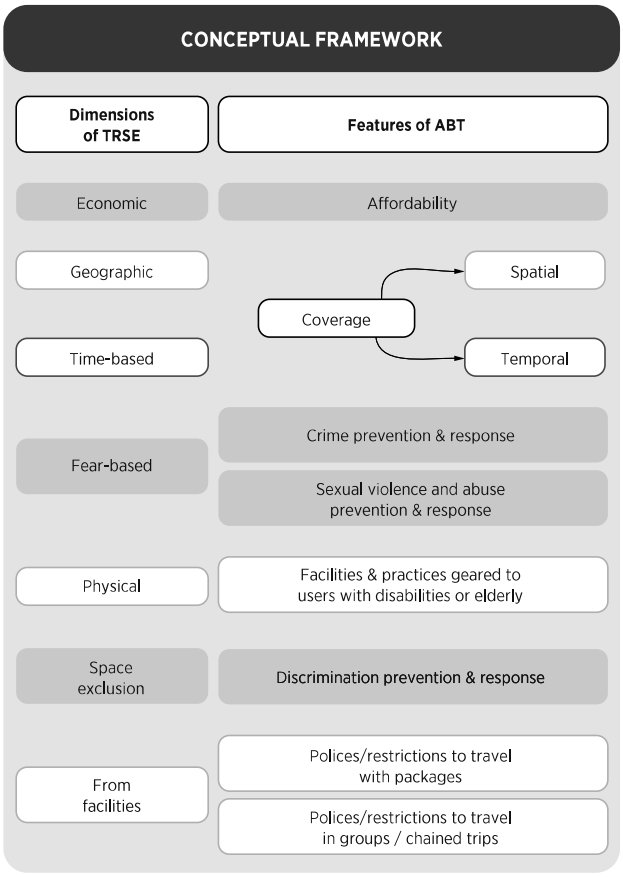


Source: Prepared by the authors.
ABT: app-based transport.

Figure 8.6 extends this framework and illustrates the linkages between the geographic and temporal distribution of costs and benefits of app-based transport and their potential effects on specific population groups that may use such transport, and the dimensions of the transport-related social exclusion. This extension also considers the potential discrimination or exclusion of individuals with specific social identities. This approach can help illustrate the practices, perceptions, and relationships of actors in a rapidly changing industry, and understand changes brought into play by broader external factors such as regulations, social and economic dynamics, and even global disruptions such as the COVID-19 pandemic. Figure 8.6 draws on the seven dimensions of transport-related social exclusion (Church, Frost, and Sullivan 2000) to address specific aspects of transport provision that are relevant for app-based transport. More than providing an exhaustive list of features of app-based transport related to transport-related social exclusion, Figure 8.6 reframes the goals and practices of different actors in transport systems in relation to social exclusion and inequalities.

Research on transport-related social exclusion has historically focused on the demand side of urban transport and on persons affected by transport, rather than on those making the decisions on how that transport is provided. This chapter addresses this gap by engaging directly with available evidence about app-based transport and its contributions to transport-related social exclusion and the mobility of transport-disadvantaged populations. Figure 8.6 shows several service features of app-based transport services such as ride-hailing, micromobility, and microtransit and their relationships with dimensions of transport-related social exclusion.[8]

FIGURE 8.6 Links between Dimensions of Transport-related Social Exclusion and Features of App-based Transportation Services



Source: Prepared by the authors.
Note ABT: app-based transport; TRSE: transport-related social exclusion.

8. Specific aspects that are more concerning in the Latin American and Caribbean context such as crime and gender violence, as well as discrimination, have been explicitly included. They are included in order to inform a more nuanced analysis of topical issues in regional transport policy and practice.

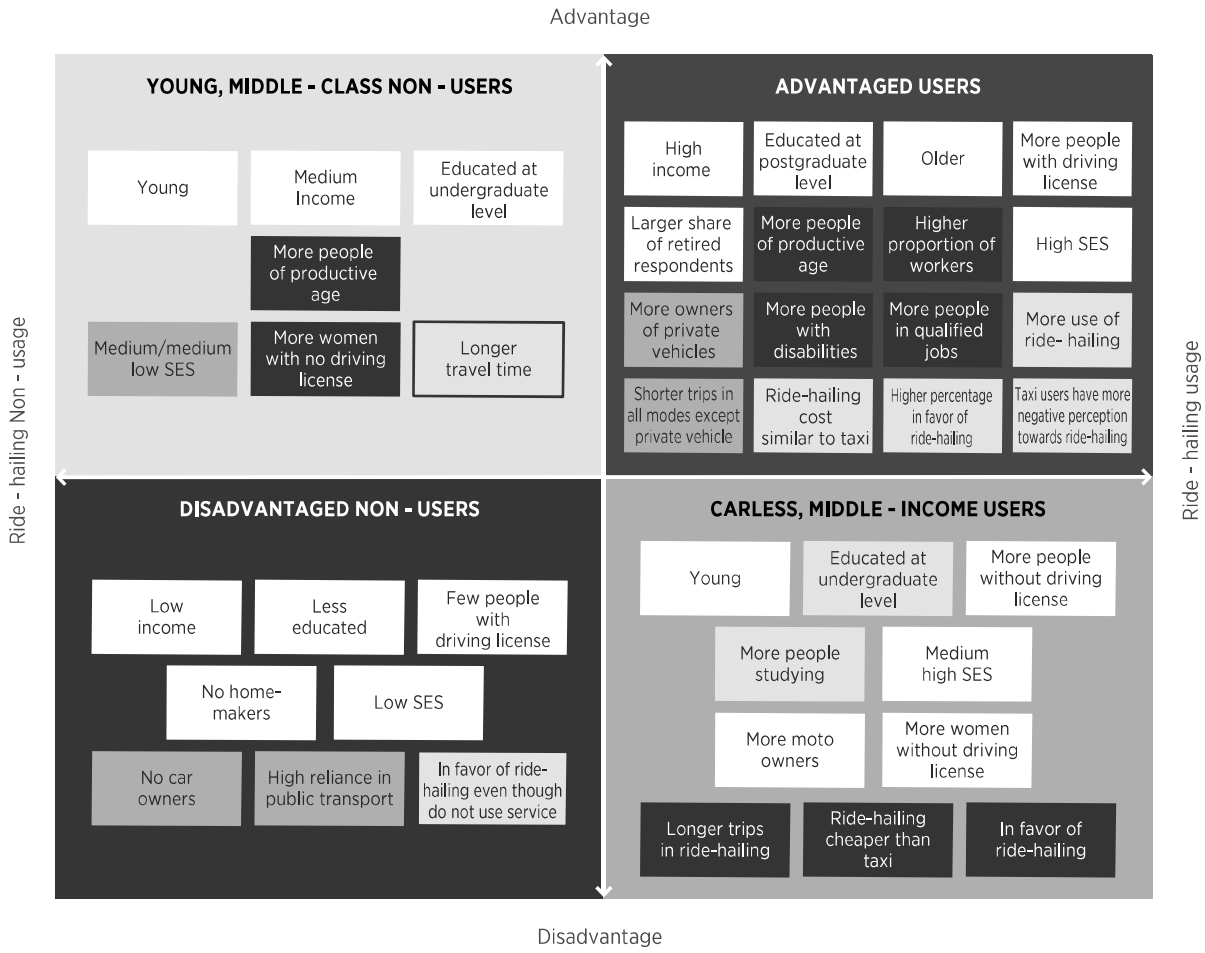
8.3 Who Uses App-based Transport Services?

Understanding the contributions of app-based transport to transport-related (in)equality and degrees of inclusion in Latin American cities requires an examination of who uses those services and the extent to which different population groups enjoy the benefits versus bear the burdens of the distribution of costs and benefits of different types of services.

8.3.1 Insights from Ride-Hailing in Latin American Cities

Research on ride-hailing users and non-users in Latin American cities suggests that those benefiting directly from these on-demand services correspond largely to homogeneous groups defined by specific features of age, income, and travel patterns, among other relevant characteristics. For example, drawing on a 2018 survey, research in Bogota found that users and non-users can be classified according to four representative clusters defined by features related to their levels of transport and social (dis)advantage (Figure 8.7) (Oviedo, Scorcia, and Scholl 2021).

FIGURE 8.7 Ride-Hailing User and Non-User Classification in Bogota, Colombia

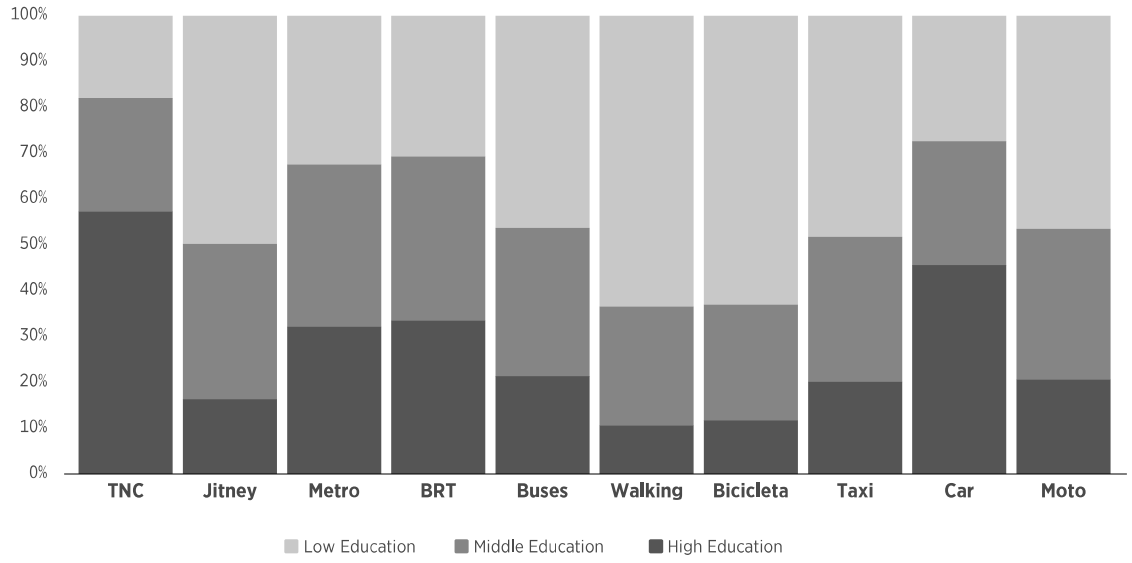


Source: Oviedo Scorcia, and Scholl (2021).
Note SES: socioeconomic status.

Socially advantaged ride-hailing users in Bogota tend to belong to high-income and highly educated groups, and that they experience different transport-related advantages such as short trips, high levels of car ownership, and convenient locations relative to the city's main centers of activity. Many of these observations are similar to research findings in Mexico City (Sabogal-Cardona et al. 2021) that individuals with medium and high levels of education are 1.7 and 3.4 times more likely, respectively, to become adopters of ride-hailing services than individuals with low levels of education. Moreover, in Mexico, income was found to be the most important variable explaining ride-hailing adoption. A person with high income is 3.8 times more likely to use the service than someone with low income. The importance of income is also reflected in levels of usage in the

larger cities of the region. For example, in Bogota only 21.6 percent of ride-hailing trips are made by low-income persons. Similar levels are found for Mexico City (23.8 percent) and Medellin (30.8 percent). Figure 8.8 illustrates the differences in terms of social (dis)advantage of users of different transport modes in Mexico through the distribution of education levels by transport mode, further supporting the need to account for differences in social (dis)advantages of users and non-users when studying app-based transport.

FIGURE 8.8 Distribution of Trips by Mode and Education Level in Mexico City (percent)



Source: Sabogal-Cardona et al. (2021).
Note: TNCs refer transport network companies, that is, to ride-hailing or other transport services enabled by digital platforms.

While in Bogota the advantaged ride-hailing users cluster boasts higher car ownership than other clusters, more disadvantaged ride-hailing users (see the bottom-right cluster in Figure 8.7) tend to be middle-income, younger adults who are currently studying and have less access to private vehicles, particularly cars (Oviedo, Scorcia, and Scholl 2021). In Mexico City, household car ownership was found to decrease the likelihood of adopting ride-hailing by 79 percent (Sabogal-Cardona et al. 2021). In Medellin, findings suggest that wealthy and highly educated families with low vehicle availability are more likely to use ride-hailing compared to other groups (Bedoya-Maya et al. 2021). These findings from different contexts in the region point to ride-hailing as a possible enabler of car-based mobility for car-less populations (with sufficient income).

From an equality and inclusion perspective, these findings suggest that while ride-hailing may be reinforcing the advantages of already privileged population groups in terms of social, economic, and mobility conditions, it is also serving the mobility needs of users who, although they have the education, access to information and technology, and disposable income to make use of these services, also have a more limited set of transport options available (Oviedo, Scorcia, and Scholl 2021). In other words, while social advantage seems to be a precondition for ride-hailing use, these services are addressing specific transport disadvantages for some population groups.

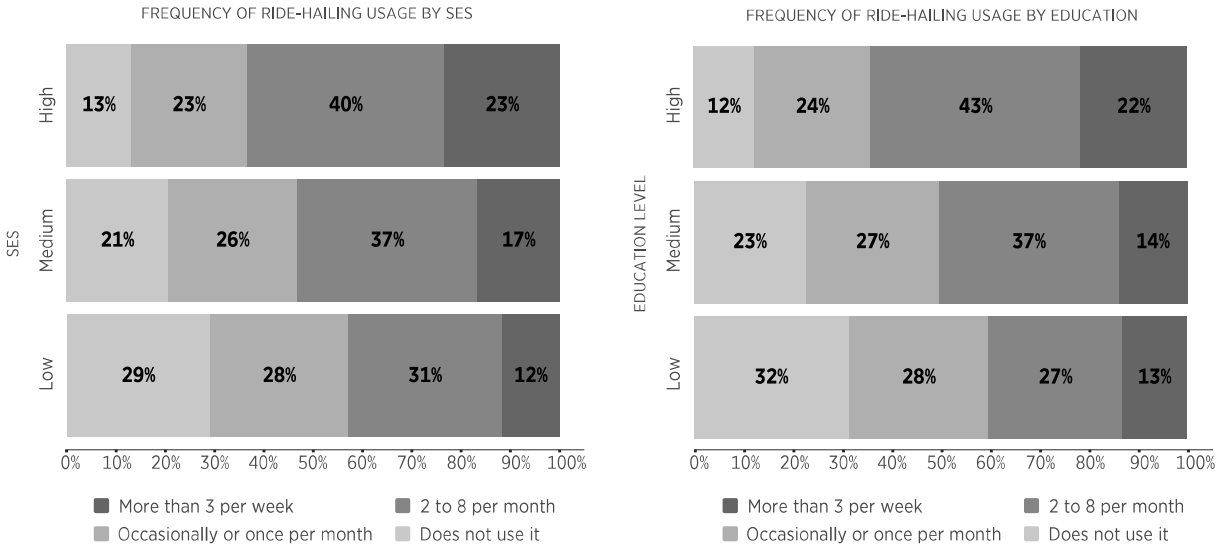
The disadvantaged ride-hailing users cluster in Figure 8.7 also reflects differences in transport advantages by gender, with more women without driving licenses and access to private vehicles using this mode. Findings from Mexico City suggest that gender has an influence on the likelihood of ride-hailing adoption, with women having a 35 percent higher likelihood than men. From a perspective of social disadvantage, this may be related to power relations and the distribution of care responsibilities in the household, which has implications for transport disadvantages to which ride-hailing could be responding (Gamble and Dávalos 2019; Levy 2013). Findings from these studies in Latin America and the Caribbean contrast with literature on cities in the Global North (Lavieri and Bhat 2019; Mitra, Bae, and Ritchie 2019; Rayle et al. 2016), which suggests that gender is not a determinant of ride-hailing demand.. For example, in the United States men were 16 percent more likely than women to adopt ride-hailing (Mitra, Bae, and Ritchie 2019). This difference constitutes one of the main particularities of the ride-hailing phenomenon in Mexico City and other cities in Latin America and the Caribbean.

Characteristics associated with social advantage, such as higher income and familiarity and engagement with technology, are more likely to correspond to increased levels of ride-hailing adoption in Mexico City, Medellin, and Bogota. It was also found that less frequent users have a greater willingness to make more trips if their purchasing power improves. The analysis of IDB survey data for over 6,000 ride-hailing users and non-users collected during 2020 found that higher socioeconomic status (SES) and educational attainment (both of which are positively correlated with income) are two of the most important predictors of frequency of use of ride-hailing services.[9] Specifically, 29 percent of people in the low SES group are not users of ride-hailing (i.e., people who never use the service), a proportion that declines to 21 percent in the medium SES group and to only 13 percent in the highest SES group (Figure 8.9). Furthermore, only 12 percent of people in the lower SES group use ride-hailing more than three times per week, while the proportion of such frequent users increases to 17 percent in the medium SES group and to 23 percent in the higher SES group. Similar patterns are observed for level of education (IDB and Steer 2020).[10]

9. Each country has a different system for socioeconomic stratification.

10. Authors' analysis based upon survey data collected by the IDB and Steer (2020) on ride-hailing users and non-users. All mentions to the reference indicate that we are referring to this data.

FIGURE 8.9 Frequency of Use of Ride-Hailing Services by Socioeconomic Status (left) and Level of Education (right) (percent)



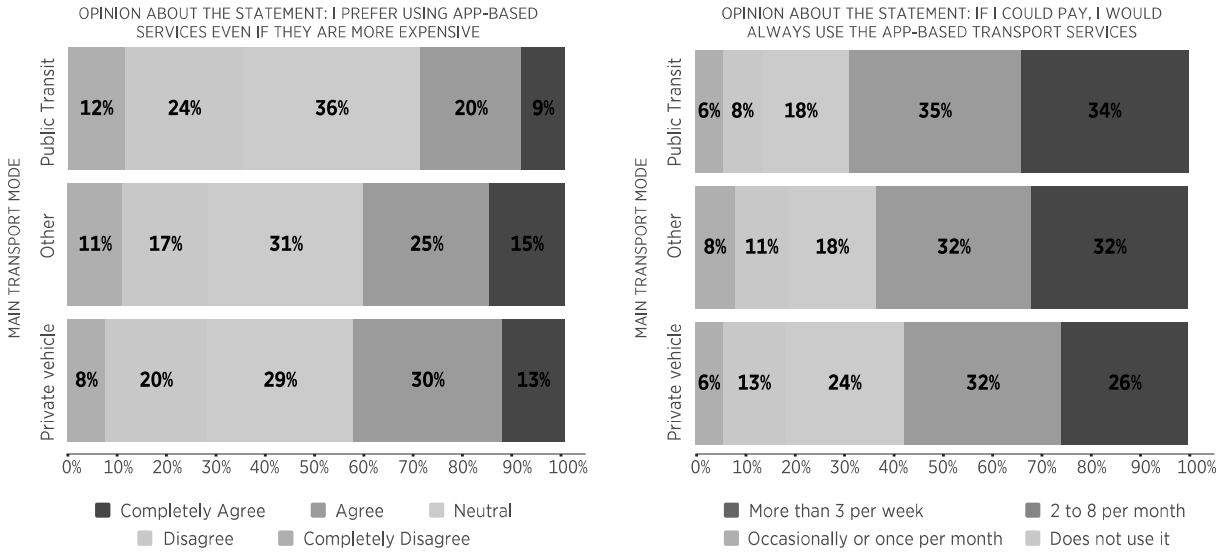
Source: Prepared by the authors based on IDB and Steer (2020).
Note SES: socioeconomic status.

Findings from the IDB survey also illustrate ride-hailing users' degrees of transport (dis)advantage in Bogota, Medellin, and Mexico City. For instance, regular public transit use appears to have no effect on the frequency of use of ride-hailing services when controlling for key demographics and perceptions. Furthermore, across the board, frequent transit users are less willing to make more ride-hailing trips in scenarios in which transport fares increase. In other words, the demand curve is less price elastic for higher and lower SES groups. Social disadvantages intersect with transport disadvantages, leading to a potential reduction of mobility, or at least preventing growth in the travel capacity of transit-dependent individuals in contexts where transport is poor or inadequate or there is a narrow set of affordable service alternatives. However, the same transit users in the survey reported that they were willing to become ride-hailing users in scenarios in which their purchasing power increased.

Those who rely on public transit as their primary mode express less willingness to pay for ride-hailing services. As can be seen in the left panel of Figure 8.10, only 29 percent of current public transit users reported that they would continue to use ride-hailing services as a complementary mode if ride-hailing fares were to increase. On the other hand, those who primarily travel in private vehicles such as autos or motorcycles tend to be less sensitive to prices (suggesting a lower price elasticity of demand for ride-hailing), with 43 percent stating that they would continue to use the services if

there were a fare increase. Conversely, a substantial share of public transit respondents would be willing to switch to ride-hailing if their purchasing power were not a restriction (69 percent), which suggests that ride-hailing is also an attractive transport alternative for individuals experiencing transport disadvantage (Figure 8.10). This suggests a potential risk of losing transit ridership should income increase, transit fares increase, or transport network companies develop more affordable services.

FIGURE 8.10 Responses to the Two Variables Related to Willingness to Pay according to the Main Transport Mode People Use for Their Regular Trips (percent)



Source: Prepared by the authors based on IDB and Steer (2020)

8.3.2 Users and Non-users of Micromobility and App-based Public Transport Service (Microtransit) in Latin American Cities: Who Benefits?

While there has been increasing research on ride-hailing in the region in recent years, services such as micromobility or microtransit remain under-researched. Despite this, recent work regarding their adoption and use suggests that factors such as income, car ownership, access to adequate public transit services, and propensity to adopt technology are all likely to mediate how people benefit from or are negatively affected by other app-based transport services (see Figures 8.5 and 8.6 earlier in the chapter). For example, data from Goiana, Brazil collected by the National University

of Brasilia in June 2019 found that 80 percent of riders of the new demand-responsive app-based bus service, CityBus 2.0, would have used private single-occupancy vehicles (including taxis and ride-hailing apps) (62 percent) and personal vehicles (18 percent) for trips for which they now use microtransit service. In other words, 80 percent of on-demand passengers were not using public transit for their journeys but had started doing so when an app-based on-demand option was available (Via Transit 2020). Additionally, prior use of app-based transport services appears to influence adoption.

As in the case of ride-hailing adoption, the use of microtransit and demand-responsive transit services require some technological literacy and access to digital banking, potentially presenting barriers for low-income users and suggesting that disadvantaged populations may become excluded from the use of vanpooling services, e-bicycles, or e-scooters. Moreover, less than 70 percent of homes in Latin America and the Caribbean have access to an Internet connection (OECD 2021) and only about 50 percent of the population in large cities in the region has a formal account with a financial institution (García, Grifoni, and López 2013). Among the large cities in Latin America and the Caribbean, the highest percentages of non-access to banking services are for Montevideo (55.6 percent), Lima (49.4 percent), and Medellin (44.5 percent), with percentages for other cities not much lower. On average, not having enough money (65.8 percent) is the main reason for not having a bank account.

In Montevideo, mechanisms for collecting and distributing e-scooters throughout the city as well as the lack of widespread availability of secure spaces for parking and charging suggest that most of the supply of e-scooters is concentrated in high-income neighborhoods close to the city center (i.e., areas with high social and transport advantage) (Hipogrosso and Nesmachnow 2020). Research from other regions suggests that micromobility users tend to be young, well-educated, and affluent males. For example, in Zurich (Reck and Axhausen 2021) and in the United States, e-scooter users are mostly younger, educated males, who use the service almost twice as much as women (in the case of the United States) (Krizek and McGuckin 2019). The same trend was observed in Vienna (Laa and Leth 2020), New Zealand (Curl and Fitt 2020), and France (Christoforou et al. 2021). In the Sicily region of Italy, a gender imbalance between men and women was identified regarding engagement with e-scooters, suggesting that social disadvantages such as occupation and perceived levels of safety can prevent people from using the services (Campisi et al. 2021). Research on the observed differences in the use of micromobility services suggests that these differences can be explained by gender differences in risk perceptions, trip patterns and purposes (i.e., care trips often made by women are difficult to perform reliably on an e-bicycle or e-scooter), and restrictions for changing clothing after a cycling commute. Overall, the user base for app-based transport services has been found to be generally well-educated younger adults, usually from childless households, and from middle-upper-income households in very urban environments with one or less cars and a tendency to use multimodal transit (Shaheen et al. 2020).

8.3.3 Service Providers as Beneficiaries of App-based Transport

A major dimension of social inclusion in app-based transport is its role as an enabler of employment opportunities. Ride-hailing services have positively impacted the labor market of marginalized groups in various international contexts, employing young people out of work and providing economic and social stability (Malik and Wahaj 2019). In France, it has enabled minorities and other disadvantaged groups to work (Defossez 2017). In Colombia, it has become a way to either earn extra income or an opportunity for the unemployed (Reilly and Lozano-Paredes, 2019). This creates satisfaction and induces loyalty from the drivers to transport network companies (Malik and Wahaj 2019). Beyond drivers, ride-hailing companies make fixed investments that have a positive impact in their respective countries. For example, Uber has two regional offices: an Andean, Central America, and Caribbean office in Costa Rica, and a Southern Cone office in Buenos Aires. Additionally, the firm has created excellence centers in San José and São Paulo and planned one for Bogota with a project investment of US$40 million in the next five years that is expected to create 600 new jobs by the end of 2023. This shows that ride-hailing companies are contributing to a growing economy that employs many people with various levels of skills across the region.

A survey of 5,251 Uber drivers in Brazil, Chile, Colombia, and Mexico sheds additional light on the main characteristics of ride-hailing providers in the region, Table 8.1 summarizes the main features of the Uber drivers in the study (Azuara, González, and Keller 2019). The survey reveals the reality of working with a ride-hailing application in the region, detailing both the advantages and disadvantages among drivers. It is built around questions about demographics, life before working with Uber, drivers' experiences, satisfaction with Uber, financial conditions, and drivers' health. Understanding the characteristics and conditions of drivers of ride-hailing applications from a (dis) advantage perspective adds depth to the contributions of app-based transport to the social and economic opportunities of those delivering or enabling these services. Examining ride-hailing drivers through a lens of social and transport (dis)advantages can also help inform a frequent debate surrounding these applications in the region: the definition of employment regulations (Oviedo, Pérez-Jaramillo, and Nieto 2021). To work in ride-hailing services, it is necessary to have access to a car, a valid driver's license, and the physical and cognitive skills necessary to drive the vehicle, which suggest relative levels of social and transport advantages as preconditions to engage in this economic activity.

TABLE 8.1 Main Features of Uber Drivers in Latin America

	Percent	Average	Median
Demographic Data			
Sex: Male	93.5	–	–
Age (in years)	–	37.7	36.3
Married/Cohabitating	64	–	–
Household members	–	3.6	4
10 to 12 years of education	35	–	–
Tertiary education or more	55	–	–
Internal migrant	8.3	–	–
International migrant	3.7	–	–
Time working on the platform			
Time working on the platform (hours per week)	–	–	19
Use the platform less than 10 hours per week	36	–	–
Use the platform between 10 and 30 hours per week	42	–	–
Use the platform between 30 and 50 hours per week	22	–	–
Other economic activity			
Uber drivers having a job (different from Uber)	50	–	–
Uber drivers who drive Uber as their main economic activity	25	–	–
Uber drivers who consider themselves as unemployed and looking for a job	20	–	–
Financial security of the drivers			
Hourly income of Uber drivers	–	US$11.60	–
Uber drivers who would stop driving Uber if they were offered full-time salaried work with the same income	40	–	–
Uber drivers who use also other ride-hailing application	28	–	–
Uber drivers contributing to a pension system	33	–	–
Uber drivers contributing to a healthcare system	<50	–	–
Uber drivers who own the car used to drive on the platform	50	–	–
Uber drivers who do not have household savings	53	–	–
Uber drivers who are in debt	74	–	–

Source: Prepared by the authors based on Azuara, González, and Keller (2019).

There is a marked gender gap in the industry, with female drivers accounting for a small share of Uber drivers: men account for 95 percent of drivers in Brazil, 91 percent in Chile, 94 percent in Colombia, and 94 percent in Mexico. The gender gap has also been documented in research outside Latin America and the Caribbean. In the United States data from more than 1 million Uber drivers showed a 7 percent earnings gap between women and men and suggest that there is no reason to expect that the so-called gig economy has the potential to overcome gender gaps in employment (Cook et al. 2018). On the other hand, in other contexts with more marked gender inequalities, such as Cairo, Egypt, ride-hailing services have provided women with an opportunity to work in an industry historically dominated by men (Rizk, Salem, and Weheba 2018). Motivations to work in ride-hailing include the need to supplement family income or become the household's primary source of income while maintaining the flexibility to fulfill other family obligations and meet social expectations (Rizk, Salem, and Weheba 2018).

In terms of schooling, 55 percent of drivers in the survey reported having more than 12 years of education, which suggests that most drivers are more socially advantaged than workers in unskilled labor sectors. However, using education as a proxy for social advantage (i.e., income and ability to work in well-paid employment), the findings suggest that, depending on the context, although the share of drivers with postgraduate degrees varies, it remains small. For example, 5.8 percent of drivers have postgraduate degrees in Brazil, 3 percent in Chile, 7.6 percent in Colombia, and 2.8 percent in Mexico (Azura, González, and Keller 2019). Uber drivers in the survey are mainly married or cohabitating with a partner (64 percent of the full sample) and are also often the main breadwinners of their households, which are most frequently composed of four members. Results from the survey also show that most drivers (73.5 percent) were economically active in the month before they joined the platform, which suggests that ride-hailing might be complementing regular income. This suggestion is bolstered when examining drivers' reported workload. The mean number of working hours in the Uber application was 19 hours per week, with most drivers working less than 30 hours per week (with the Uber application). The survey found that 36 percent of Uber drivers reported using the platform less than 10 hours per week and 42 percent between 10 and 30 hours a week. Only 22 percent use it more than 30 hours per week. Mexican drivers are the exception, with one-third using the platform in excess of 30 hours during the week. There are also gender disparities in this area. Women work in the Uber application 14 hours per week on average, five ours less than the overall mean (Azura, González, and Keller 2019).

Although Uber might complement income for many drivers, ride-hailing is the main source of employment for 25 percent of the drivers surveyed (Azura, González, and Keller 2019). Twenty percent of participants see themselves as unemployed and are actively looking for a job. More importantly, work through the Uber app is not enough to cover living expenses. Most drivers report facing financial struggles and lack of social security (only 50 percent make contributions to health insurance), and only one-third of the sample contributes to a pension system (Azura, González, and Keller 2019).

These circumstances put drivers in a precarious situation, evident in their non-contribution to a pension plan or maternity or sick leave, and their lack of accident/liability insurance (Reilly and Lozano-Paredes 2019). The implications of such circumstances for employment are more severe for young drivers and those close to retirement, who face more severe social disadvantages – the first group because they do not see the need to contribute to social security, and the latter group because they believe it is too late for them (Reilly and Lozano-Paredes 2019). Debates about drivers' status as independent workers have ramifications for policy and regulation and imply recognizing social vulnerability due to lack of adequate protections (Reilly and Lozano-Paredes 2019).

Other forms of app-based transport also influence employment opportunities and conditions for both advantaged and disadvantaged citizens. Microtransit improves working conditions for drivers in the traditional collective transport sector. In 2019, for example, Jetty (Mexico) won the MIT Inclusive Innovation Challenge Regional Income Growth and Job Creation Award because of its role in improving working conditions for drivers and safety and comfort for passengers (MIT Initiative on the Digital Economy 2019). Unlike traditional jitney services, Jetty incorporates aspects such as employment contracts for drivers, adequate insurance policies, comfortable vehicles, and the option to have contracts with other transport operators (Flores-Dewey 2019; Tirachini, Abouelela, and Antoniou 2020).

In shared micromobility, key functions for the operation of e-bike and e-scooter systems, such as active rebalancing and recharging of bicycles and scooters (NACTO 2019), also create employment opportunities for disadvantaged populations. This is because these activities can be performed by low-skilled labor, which can provide labor market opportunities for marginalized sectors of society. However, it is necessary to set up mechanisms to avoid poor working conditions, child labor, potentially risky nighttime shifts (Vadillo Quesada et al. 2021), and discrimination in hiring (Shaheen, Cohen, and Zohdy 2016).

Another employment opportunity related to the app-based mobility sector may be associated with the domestic production of vehicles. Although no data exist to date on possible generation of employment from manufacturing scooters and bicycles in the region, the manufacturing sector is one of the most relevant employers of low-skilled labor in Latin America and the Caribbean, employing between 8 and 13 percent of the population with 0 to 3 years of total education in Bolivia, Colombia, Guatemala, Honduras, and Nicaragua (Weller 2009). It remains to be seen if the domestic production of such vehicles could prove to be a source of high-quality formal jobs for the region.

8.4 Benefits and Barriers of App-based Transport from the Perspective of (In)equality, Inclusion, and Social Exclusion

This section discusses the benefits and barriers to accessing app-based transport services for disadvantaged groups, using the framework shown in Section 8.2. Analyzing the linkages between seven dimensions of transport-related social exclusion and service features of app-based transportation services illustrates several challenges in equitable provision of these services, including issues of coverage, affordability, safety, and discrimination, among others.

8.4.1 Spatial and Temporal Coverage Costs and Benefits: Geographic and Time-based Dimensions

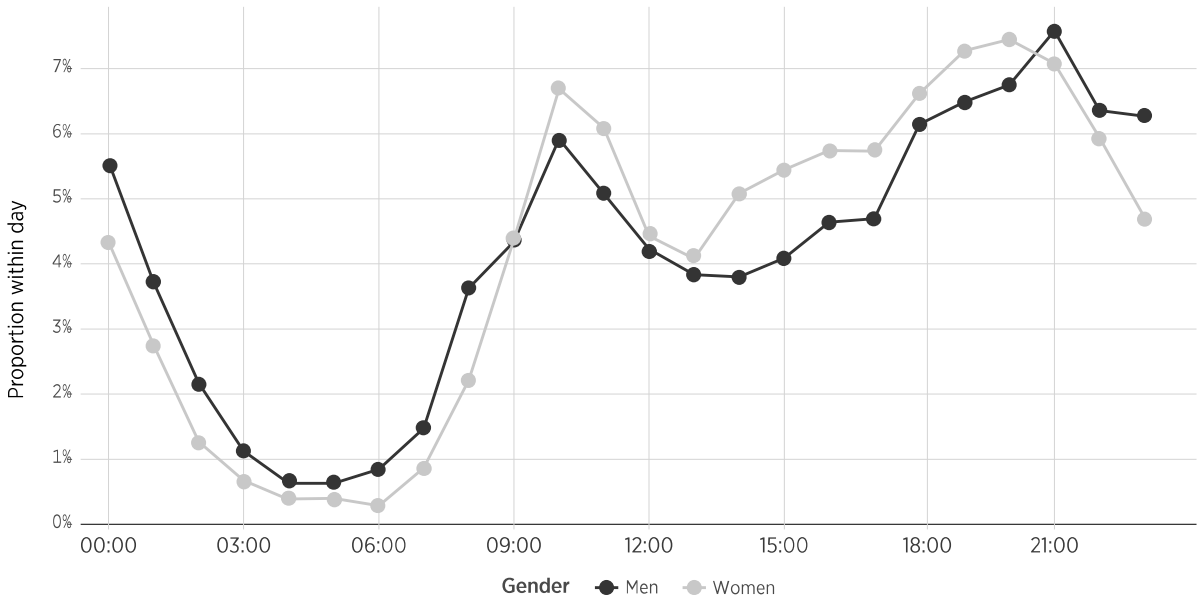
It is argued that ride-hailing services can potentially fill spatial and temporal gaps in public transit systems in poor areas and potentially increase access from outlying areas to mass transit stations. For example, in San Francisco, California ride-hailing services were found to provide trips to and from low-density areas (Rayle et al. 2016). Moreover, such services may bridge temporal gaps by providing needed service during off-peak, weekend, and nighttime hours when public transit is scarce (Khavarian-Garmsir, Sharifi, and Hossein Abadi 2021).

Coverage or service provision is largely shaped by dynamic pricing models that, through real-time variable pricing, are designed to meet the demand for rides by providing incentives for drivers in areas and times with higher demand. In other words, prices for trips increase in areas and times of high demand. While these pricing mechanisms have been found to reduce wait times and increase consumer surplus for riders by directing drivers to higher-demand areas, this implies that such services may be unaffordable to lower-income groups during these peak times, as demonstrated by the often-uneven spatial demand for ride-hailing trips within urban areas. During peak hours prices can surge by up to 200 percent of the flat/base fare in order to provide economic incentives to drivers to serve higher-density, central areas of the city with higher demand. This may leave gaps in coverage in peripheral areas and make trips unaffordable for low-income populations. Moreover, studies on mobility resilience have found that while upper-income socioeconomic groups turned to ride-hailing during transit disruptions, lower-income and minority groups were less likely to do so due to affordability barriers (Borowski et al. 2020). Drivers' responses to surge pricing can be explained party by their increase in revenue. A study by Castillo (2020) highlights that surge pricing (compared to no changes in the fare) increases gross revenue by 1.59 percent and benefits platforms and drivers (Castillo 2020).

Ride-hailing can also contribute to temporal accessibility in the afternoon and evening, serving specific travel needs that are often non-mandatory activities, and adjusting better to the needs of care-related trips and other travel purposes often needed by women. Trip data for ride-hailing users in Mexico City between October and December 2020 provided by DiDi Mexico shows most trips happen between 7:00 pm and 10:00 pm (DiDi 2021) (Figure 8.11).[11] Although patterns for men and women are similar, women make proportionally more trips in the afternoon. The boxplots in Figure 8.12 show travel time in ride-hailing services by gender in the same database. Despite some outliers with relatively long travel times (above 40 minutes), most trips are under 20 minutes (with average travel time being 18 minutes), and there are no large differences between genders. Findings in Figures 8.11 and 8.12 can be interpreted considering the advantages and disadvantages of users, who often have sufficient disposable income to engage in non-mandatory travel using more comfortable alternatives such as ride-hailing. From a perspective of inclusion, the larger share of women traveling in the evening shows that the features of this service can adapt better to their needs and perceptions. This adds to transport-related inclusion of women, as on-demand services can address travel needs at times when the family car is not available for women or at times and places when public transport is not available. While the benefits for women are limited to those with sufficient purchasing power, the evidence suggests that women benefit from the added flexibility and responsive nature of services such as ride-hailing.

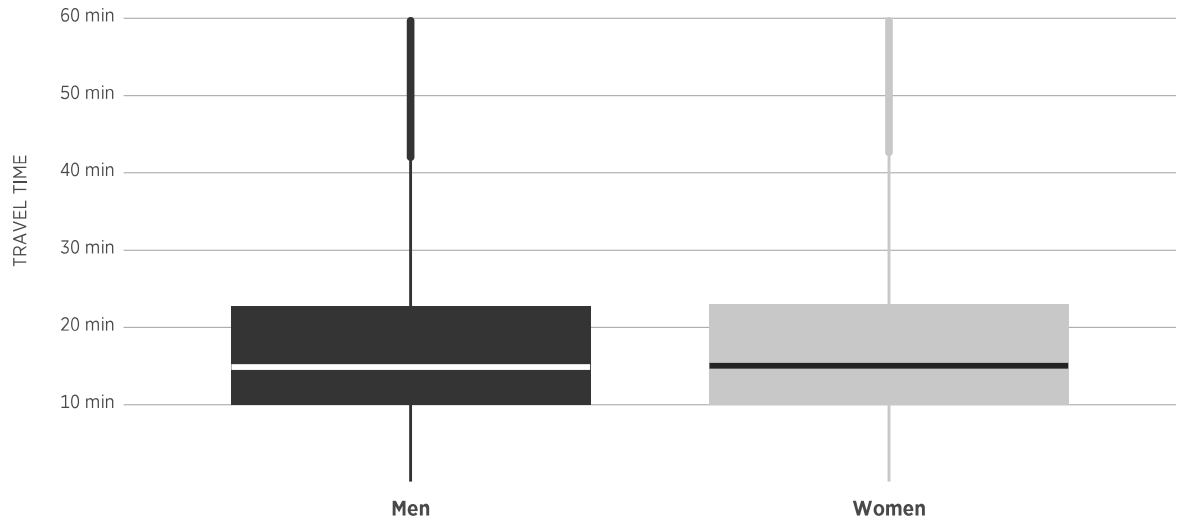
11. Data were gathered in the middle of the coronavirus pandemic before vaccines were available. Therefore, results should be considered with caution.

FIGURE 8.11 Distribution of Trips by Time of Day and Gender (percent)



Source: Prepared by the authors based on Scholl, Oviedo, and Sabogal-Cardona (2021) and DiDi (2021).

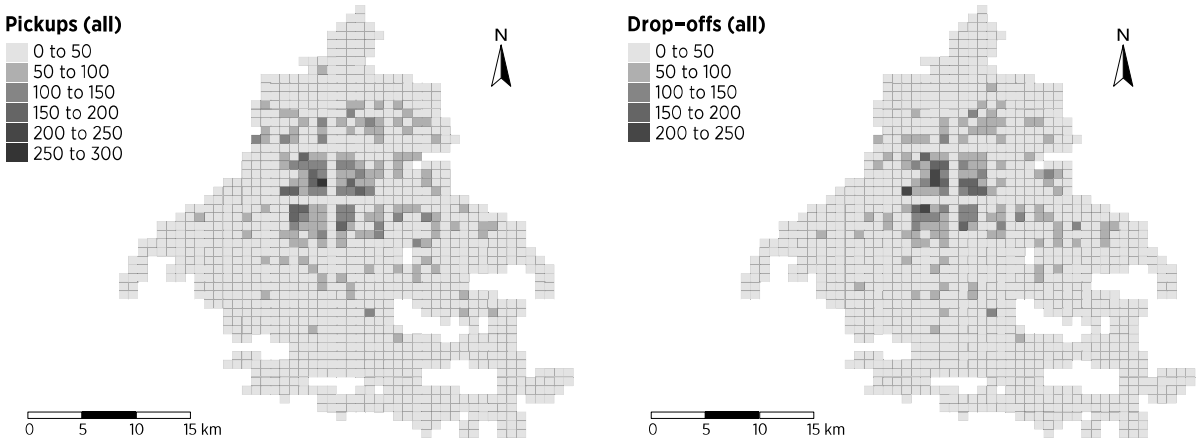
FIGURE 8.12 Travel Time Distribution of Ride-Hailing Trips by Gender



Source: Prepared by the authors based on Scholl, Oviedo, and Sabogal-Cardona (2021) and DiDi (2021).

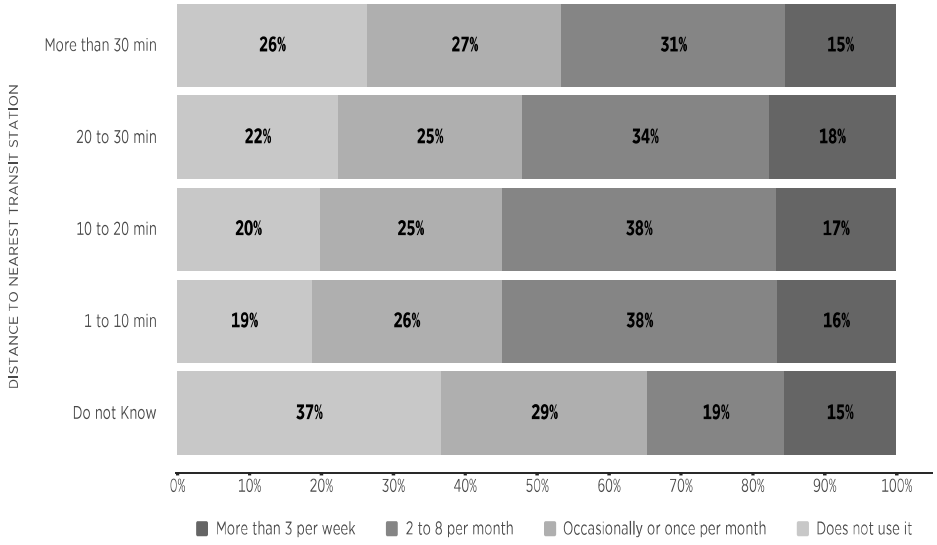
As shown in Figure 8.13, ride-hailing trips are concentrated in the central area of Mexico City, which is also the hub of employment and economic activity. Analysis of Uber data in the context of Bogota, Colombia suggests that the potential for transfers from public transit towards ride-hailing is higher in areas already within coverage of public transit in middle-income and wealthy neighborhoods (Oviedo, Granada, and Perez-Jaramillo 2020). People who do not know how far away they live from the nearest transit station are proportionally the group that least engages with ride-hailing (37 percent do not use the service) (Figure 8.14) (IDB and Steer 2020). This variable can be interpreted as a proxy for users unfamiliar with transit or infrequent users, which suggests that they have other choices against which ride-hailing is not a competitive alternative. Moreover, Figure 8.14 supports findings from Bogota suggesting that being closer to transit stations might be associated with more use of ride-hailing. For example, 81 percent of people living within a 10-minute threshold to the nearest transit station said they use the service. The percentage decreases to 78 percent for people living within 20 to 30 minutes and to 74 percent for people living more than 30 minutes away. Considering that adequate access to public transit is a form of transport advantage, the provision of ride-hailing may be bridging spatial and transport-supply-related disadvantages for users with sufficient purchasing power.

FIGURE 8.13 Numbers of Drop-offs and Pickups of Ride-Hailing Trips (All Genders) in Mexico City



Source: Prepared by the authors based on Scholl, Oviedo, and Sabogal-Cardona (2021) and DiDi (2021).

FIGURE 8.14 Frequency of Ride-Hailing Trips and Walking Distance to Nearest Transit Station



Source: Prepared by the authors based on IDB and Steer (2020).

Micromobility systems have been found to focus on high-demand areas due to the need for increased profitability, leaving out people and areas that might already be excluded (Deka 2018; Qian and Niemeier 2019). Dockless e-scooters and bicycles tend to be picked up from and be supplied more in high-demand areas. For instance, research reviewing nine bikeshare systems in Europe and the United States (Médard de Chardon 2019) shows that rebalancing of the systems is often influenced by contrasting goals (maximizing utility versus enabling trips throughout the city) and that bikeshare stations located close to transit stations are more balanced than those located further away from public transit. If not adequately rebalanced, micromobility vehicles might be less available for some lower-income neighborhoods. In Latin American cities, given high levels of social and spatial segregation, highly attractive areas tend also to be wealthier, as observed in cities like Bogota, Mexico, Santiago de Chile, and Buenos Aires (Blanco and Apaolaza 2018; Oviedo 2021). This concentration of demand with higher purchasing power tends to be targeted at implementing micromobility schemes such as shared e-scooters and e-bikes, which also have higher fares than other services. These strategies carry an implicit risk of spatial exclusion as they can add to the connectivity gap between richer and poorer neighborhoods.

Similarly, absent government partnerships or regulations mandating full coverage of disadvantaged areas, microtransit companies may provide more coverage where it is profitable for drivers, coinciding with higher-demand sectors (which are higher-income areas). Supply patterns might therefore lead to inequalities in access to services that are still left with no regulation in many contexts in Latin America and the Caribbean. It is important to differentiate between docked and dockless systems in the case of bicycles, and free-floating and enforced parking systems in the case of scooters. Although free-floating systems require less infrastructure and are easier to implement, the distribution of the vehicles during the day is left to users. In the case of station- or hub-based systems, their initial distribution determines the origin and locations of the trips, thus filtering which geographic areas will take advantage of the system. Including minority and low-income neighborhoods in service areas and actively rebalancing equipment to ensure service availability can help overcome service availability concerns (Shaheen and Cohen 2019).

App-based collective transport has the potential to either complement or compete with public transit (Hall, Palsson, and Price 2018; Rissanen 2016), as well as to enhance equity by providing mobility for socially excluded groups (Brown 2019). For short trips, for example, walking and cycling could be replaced by microtransit (app-based collective transit) or micromobility (app-based scooters and electric bikesharing systems). Although these services may have the effect of reducing active transport, they can save time and alleviate time poverty for lower-income groups, particularly for people who rely on walking as a primary mode of transit. However, research to date is limited and has resulted in contradictory findings, suggesting that the effect of microtransit on the poor depends on contextual factors such as the quality of transport infrastructure, availability of public transit systems, and the way microtransit systems are implemented (Alonso-González et al. 2018).

Upgrades to transit vehicles, payment systems, routing, and attention to customer service, microtransit, and app-based commuter shuttles appear to improve public transit quality in some cities and, in so doing, may even increase ridership. For example, a study of microtransit services in Mexico City found that a central factor in their success was the lack of availability of high-quality and reliable public transit. Service improvements included seamless access to information about timetables and frequencies, the ability to reserve seats, a cleaner and modern fleet, and comfortable vehicles. Ease of connectivity with mass transit facilitates the ability of microtransit services to improve temporal and spatial access. These services emerge as a response to informal public transit or jitneys in Mexico City (which account for 11.5 million trips every day) and seek to integrate with the Bus Rapid Transit and subway systems, which account for 1.1 million and 4.5 riders million per day, respectively (Flores-Dewey 2019). According to Urbvan, a microtransit operator in Mexico, 52 percent of users have stopped using the car and 38 percent of passengers use it as a last-mile solution. The company also argues that customers prefer its service over traditional transit despite higher costs because its vans offer a better experience with more comfortable trips (Wi-Fi and air conditioning are included) and shorter travel times.

8.4.2 Affordability Barriers and Enablers: The Economic Dimension

Recent research has shown that through the application of ICT in widely available smartphones and apps, ride-hailing is able to more cost-effectively provide services compared to traditional taxi services (Oviedo, Perez Jaramillo, and Nieto 2021). For example, a U.S.-based survey found that a 68 percent of ride-hailing users agree that these services are less expensive than taking a taxi (Smith 2016). Nevertheless, relative to other transit modes, ride-hailing prices can be inaccessible for some groups.

In Bogota, transport network companies have adapted their offer of services to respond to different market segments, although mainly high and middle-income groups. On the one hand, ride-hailing platforms have maintained a middle-range service aimed at more affluent populations. On the other, they have begun to implement strategies to reach market segments with lower purchasing power by offering differentiated services and prices (Oviedo, Scorcia, and Scholl 2021). Some of these strategies involve offering discounts during non-peak hours, creating "basic" service lines that drivers with older vehicles can provide, and making other modifications in the service features that can make the trip cheaper for the user, such as sharing trips with other passengers (ride splitting or pooling) (de Souza Silva, de Andrade, and Alves Maia 2018).

The only documented case of a ride-hailing service targeting lower-income users as its core demand segment was the Bogota company Picap (Oviedo, Scorcia, and Scholl 2021). Picap was a motor-

cycle-based ride-hailing service that, due to lower operational and capital costs of motorcycles relative to automobiles, offered a flat fare that was as low as 70 percent of the basic fare of other car-based ride-hailing competitors. Picap took advantage of the flexibility of motorcycles to navigate congestion and provide an attractive alternative in terms of travel time in areas underserved by public transit, mostly low-income neighborhoods. However, the company faced significant pushback from the local administration due to pronounced road safety risks associated with the services and a national government policy in Colombia that public transport should not be provided using motorcycles. This led to government sanctions on the company, which has now moved to delivery services. The emergence of lower-cost service alternatives for app-based transport can contribute to attracting more demand from socially disadvantaged and transport-disadvantaged segments of the population

Affordability challenges aside, there may be positive externalities related to traffic safety issues and crime that are not currently accounted for as a result of app-based transport services. For example, a study in Brazil concluded that the introduction of Uber caused a reduction of traffic fatalities and hospitalizations (Barreto, Silveiro Neto and Carazza 2021). A similar study in Chile concluded that the entry of Uber reduced drunk-driving accidents and deaths (Lagos, Muñoz, and Zulehner 2019).

Despite efforts by transport network companies to reduce prices for users, and despite the positive effects of market competition regarding lower fares, the predominant share of the population using these services continues to be higher-income groups that either voluntarily or circumstantially do not use their car. Although transport network companies have offered discounts for users at specific times to encourage people from lower-income neighborhoods to use the service, surveyed drivers in Bogota said they prefer to switch between apps and avoid discounted trips to maximize their revenue and, as a consequence, these discounts might not reach low-income populations. For example, in Costa Rica, almost a third of the population uses the service between two and five times a week to commute, go out at night, visit family and friends, or go to the doctor, or they use it on the day they cannot use their own vehicle because of circulation restrictions (Oviedo, Pérez-Jaramillo and Nieto 2021). A small but considerable share of commuters is willing to stop using private vehicles and switch to an integrated system (transit plus ride-hailing) with relatively low fare increases. The same applies to current transit users. Using data from IDB and Steer (2020), it can be estimated that if ride-hailing costs are reduced by 25 percent and integrated into massive transit systems, transit ridership could increase by 0.9 percent in Bogota, 1.4 percent in Medellin, and 0.5 percent in Mexico City. Regular transit users have lower rates of ride-hailing usage than regular private vehicle commuters. The survey by IDB and Steer (2020) shows that 14.9 percent of regular car users versus 24.4 percent of regular public transit users have never used ride-hailing services. Moreover, 42 percent of car users take more than one ride-hailing trip per week compared to just 34 percent of transit users. Also, transit users are not willing to keep using ride-hailing if prices increase, though they are willing to make more ride-hailing trips if their financial capacity

improves. Although this is expressed in terms of the primary mode of transport of respondents, there is a strong correlation with income, with private car users coming largely from higher-income groups and transit users coming primarily from middle- and low-income groups. A similar problem could arise for under-banked and lower-income groups, which may find the service inaccessible and unaffordable.

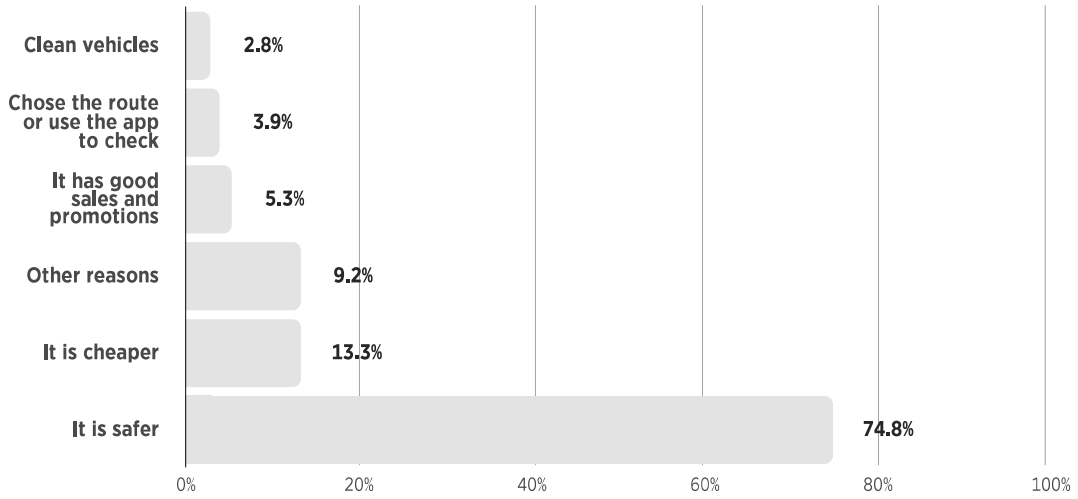
From an affordability perspective, ride-hailing users are willing to pay the higher prices compared with other services in exchange for better quality and security (Oviedo, Scorcia, and Scholl 2021). Some transit users, especially those who depend on semi-informal services such as jitneys in Mexico City, are also willing to pay a higher fare for better service. In this context, collective forms of app-based transport services such as the van pooling companies Jetty and Urbvan (microtransit) have the potential to address the needs of a larger target segment of demand than they are currently serving, as they can offer a middle range that is both cheaper than ride-hailing and appealing to transit users with more disposable income. Microtransit can also reduce the dependency on cars in areas with low transit supply by offering an attractive and comfortable choice of public transit to private vehicle users (Haglund et al. 2018).

Finally, e-scooters also may not be affordable to disadvantaged groups. For example, in Montevideo, Uruguay, the prices of e-scooters are not affordable for low-income residents, signaling a link between social disadvantage and e-scooter use (Hipogrosso and Nesmachnow 2020). However, shared micromobility potentially could contribute to reduce costs of shorter trips for users of private transit modes (Oviedo and Sabogal-Cardona 2022) and other car-based services such as ride-hailing. Shared micromobility also has the potential to improve last-mile affordability for public transit if adequately integrated in terms of the fare.

8.4.3 Crime, Gender, Safety, and Security: The Fear Dimension

As was shown in Figure 8.6, two of the main factors that can influence people's mobility and access to opportunities are insecurity and fear of crime. Both are salient factors determining transit mode choice and travel behavior, and they have even higher relevance in the context of mobility in Latin American and Caribbean cities. Fear of crime and sexual violence and abuse can mediate the adoption of on-demand service by specific users, under specific temporal or spatial conditions (e.g., late at night or in certain areas with high crime levels), and for specific trip purposes. In Peru, for example, safety is the most frequent reason people reported using ride-hailing services in 2016 (74.8 percent) (Figure 8.15).

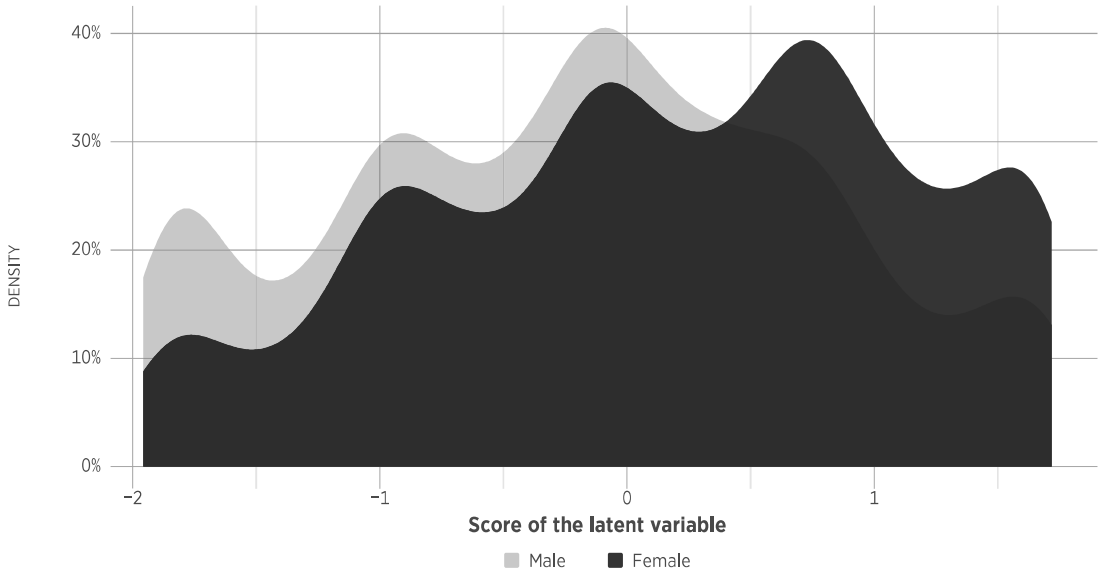
FIGURE 8.15 Reasons Why People Chose to Use Ride-Hailing Services in Lima, Peru, 2016 (Percent)



Source: Prepared by the authors based on information from the Compañía Peruana de Investigación de Mercados.

Research in Mexico City, Medellin, and Bogota found that, controlling for other factors, high levels of perceived vulnerability on public transit (i.e., feeling fear or insecure while using public transit) are strongly associated with more ride-hailing use and higher willingness to pay for ride-hailing services. Women in these cities reported experiencing more vulnerability on public transit (Figure 8.16). Moreover, they are more likely to adopt ride-hailing due to heightened perceptions of insecurity on public transit. The results also indicate that there is an association between the willingness to walk to the nearest transit station to start a trip and feeling less vulnerability (when compared to not being willing to walk), and that living further away from transit stations leads to experiencing more vulnerability. These findings are also relevant for app-based transport services such as shared micromobility, which can improve the speed and sense of security perceived while accessing public transit, both on routes that are perceived as unsafe, and at times often associated with higher incidence of crime.

FIGURE 8.16 Distribution of the Latent Variable Vulnerability on Public Transit by Gender (Percent)



Source: Prepared by the authors based on IDB and Steer (2020).

Personal security in ride-hailing influences frequency of use, leading some users to use ride-hailing more and to continue using the service even if prices rise (IDB and Steer 2020). Data from surveys of DiDi users in November 2020 in Mexico City explored general perceptions of fear of crime, security features associated with ride-hailing, and the different strategies used to feel safer when traveling in ride-hailing services. The findings support the relevance of fear of crime for the use of app-based transport services. More information helps to uncover and discourage unwanted behavior on the user and driver side. The additional information included in ride-hailing apps discourages drivers from charging more, taking longer/unexpected routes, or even demonstrating inappropriate behavior towards passengers (Aarhaug and Olsen 2018). Results show that women are moderately more likely than men to value information available on ride-hailing trips that could improve personal security (e.g., knowing your location, pick-up time) and on the presence of a panic button in the app. More interestingly, being a woman reduces by 65.1 percent the likelihood of pooling (travelling with unknown people to feel safer), increases by 2.14 times the odds of sharing trip details from the app as a strategy to improve personal security, and is negatively associated (80.5 percent) with cancelling service due to the characteristics of the vehicle (Scholl, Oviedo, and Sabogal-Cardona 2021). Furthermore, as shown in Scholl, Oviedo, and Sabogal-Cardona (2021), all else being equal, women are 64.4 percent less likely to use pooling services than men but are 2.14 times more likely to share the details of their ride-hailing trips using their phones.

From a perspective of personal security, microtransit can play a role similar to that played by ride-hailing. Microtransit's service features such as real-time location and virtual booking have the potential to improve perceptions of safety among users. More reliable service schedules and higher-quality stops than in traditional transit are likely to reinforce these perceptions, particularly in cities with high levels of crime and perceived vulnerability on public transit, such as Mexico City, as shown earlier. Considering the willingness of users, and particularly women, to trade off higher costs for better perceived levels of security (Scholl, Oviedo, and Sabogal-Cardona 2021), microtransit can provide an affordable alternative for users who do not the necessary purchasing power to make regular use of ride-hailing, but who feel vulnerable using traditional transit services.

Going back to ride-hailing, interviews from Bogota also reveal that while users may use ride-hailing due to perceived improvements in their personal security compared to walking or transit in some contexts, relatively lower protections for drivers may lead to a perception of lowered security or more vulnerability compared to riders. A participant from a transport network company added that given the available mechanisms to protect users, "the most vulnerable actor in the provision of ride-hailing services is the driver." This is because drivers are required to pass background checks before being allowed to work for ride-hailing companies, while users have lower entry barriers and of course are not required to undergo background checks in order to use the service. Over time, transport network companies have implemented prevention and reaction mechanisms for both drivers and users aimed at improving safety and reducing vulnerability to crime and sexual harassment. However, these remain focused on user safety. Examples include in-app panic buttons, real-time location tracing, identity filters (drivers), driver information access (users), 24/7 support, route tracing (drivers) and route sharing (users) (Oviedo, Scorcia, and Scholl 2021).

Drivers in Bogota believe they face high risks of becoming victims of crime, a perception that is higher among women drivers who feel more vulnerable than their male counterparts (Oviedo, Scorcia, and Scholl 2021). To further the sense of security and create some sort of community, drivers use other applications such as WhatsApp or Facebook to share locations and be able to ask for help from other drivers (Oviedo, Scorcia, and Scholl 2021; Rizk, Salem, and Weheba 2018). In Bogota, drivers have also created support groups using applications such as WhatsApp and Zello (Walkie-Talkie), through which they send alerts to groups when they perceive themselves as being in a vulnerable situation, either in terms of crime or abuse. The groups also act as a first response when there is an incident (Oviedo, Scorcia, and Scholl 2021). While such groups are formed by both men and women who have had similar experiences and are looking for support and advice, for women the groups are essential to ensure their physical safety. Women drivers perceive these groups are critical for their safety, as they believe concerns about user safety from ride-hailing companies have put them at a disadvantage in this dimension (Rizk, Salem, and Weheba 2018).

8.4.4 Discriminatory and Spatial Dimensions

The space dimension of social exclusion in app-based transport is associated with restricted spaces and opportunities not accessible due to discrimination against people with specific social identities (i.e., gender, ethnicity, age, etc.). It is possible to understand how the design of app-based transport services can either prevent or open spaces for the inclusion or exclusion of specific individuals. Technology enables the exchange of more information between parties involved in the delivery of the service, which improves agent decision-making as well as resource allocation. While in principle this is a positive contribution of technology to improving the service, it also leaves room for autonomy in decision-making that can lead to discrimination. For example, the collection of decentralized information from clients enables a "reputation" system that creates a form of accountability both for passengers and drivers, and both parties can access specific information about the other to address security concerns. However, this can also lead to users preemptively rejecting specific drivers because of their characteristics or those of their vehicle, and to drivers refusing to provide the service to specific users.

Interviews with stakeholders such as government officials, ride-hailing companies, drivers, and civil society organizations in Bogota suggests that there are various forms of discrimination that can occur in ride-hailing environments in the Latin American context. Findings from interviews are consistent with documented accounts in local media. For instance, drivers in Colombia report discriminatory practices against riders who are Venezuelan immigrants due to perceptions of their associations with crime. Although interviewees explained at length that this is not related with xenophobia, but rather a common association based on rumors and some drivers' personal experiences, the result is that immigrants are occasionally denied ride-hailing services due to discrimination (Oviedo, Scorcia, and Scholl 2021).

Other forms of app-based transport can exclude residents by not allocating sufficient supply to specific areas of the city. This is the case for shared micromobility. Depending on local regulations, those deciding on the distribution of supply may decide not to allocate vehicles to areas with low-income populations, high crime rates, or lower demand. In microtransit, both drivers and users can discriminate. Given the positioning of new microtransit as a "premium" public transit service, its provision may also be targeted towards areas frequented by individuals with higher purchasing power, making it less available for other potential users. At present, there are no studies in the Latin American and Caribbean context concerning discrimination in ride-hailing or microtransit. However, it is necessary to explore whether there have been instances of discrimination, intended or unintended, in emerging microtransit and micromobility services in the region.

8.4.5 The Elderly and Disabled: The Physical Dimension

App-based transport services can have either positive or negative effects in enabling independent mobility for people with physical and cognitive impairments and the elderly. Independence is a critical area where research has found positive effects of ride-hailing services on physical exclusion. People with visual impairments perceive higher degrees of autonomy, control, and self-reliance in ride-hailing services. These perceptions are associated with the ability to book, pay, and track their routes through an app, allowing them to take a taxi by themselves (Kameswaran et al. 2018). Self-reliance is another reason users with disabilities may prefer ride-hailing services, since using them does not require assistance from family, friends, or strangers. Users with disabilities perceive it as acceptable to ask for help from drivers, since this is part of the driver's job (Kameswaran et al. 2018).

In Latin America, interviews with ride-hailing suppliers revealed that transport network companies do not have mechanisms that target or protect users with disabilities or the elderly. However, from the perspective of ride-hailing companies, the diversity of services they provide responds to different needs by offering to users a selection of different vehicles and options for shared trips (Oviedo, Scorcia, and Scholl 2021). An interviewee from a transport network company argued "there are no requirements for universal accessibility in the platform…[T]his is the responsibility of the regulator." This suggests that although transport network companies have made efforts to diversify their services, they have not yet explicitly extended them to populations at risk of physical exclusion. The same interviews suggest that ride-hailing drivers informally engage in some practices to support these users, but this is not standardized. These practices include helping users get into the vehicle, assisting with packages and enabling spaces for wheelchairs in the vehicle. However, as argued by one of the ride-hailing drivers interviewed, the willingness to do this "… depends on your moral compass," which suggests that these practices are not ubiquitous.

One additional potential positive effect of ride-hailing in this dimension in the case of Bogota is that it has provided an option for drivers with disabilities who are not allowed by law to drive taxis, as they can operate adapted vehicles with their private licenses (Oviedo, Scorcia, and Scholl 2021).

In microtransit, prebooking services, seat reservations, and dedicated stops and support staff onboard vehicles can help make trips more accommodating for users at risk of physical exclusion. However, as in the case of ride-hailing, there is no evidence of standardized practices to support these population groups, nor are there local regulations that enforce support for disabled populations where microtransit has been introduced. In some instances, on-demand vanpooling can provide exclusive services for the elderly and people with disabilities, but these often do not serve other users.

For micromobility, assisted electric vehicles such as e-scooters and e-bikes can facilitate short-distance travel for elderly users (Christoforou et al. 2021). However, users with visual impairments or physical disabilities are usually not able to make use of these services due to the implicit physical requirements to ride either bicycles or scooters. Recent developments in the Global North suggest that although companies have taken little action to make micromobility vehicles accessible to people with disabilities or the elderly, this landscape may change in the short term. Innovations in vehicle design such as adjustable height, changes in weight, and inclusion of chairs could make e-scooters more accessible in the near future. There is also scope for privately owned micromobility vehicles that can better adapt to the needs of persons with disabilities and the elderly, which requires adequate regulations and built environment conditions for their safe operation.

One of the biggest discussions regarding micromobility is about safety (International Transport Forum 2021). Elderly and other physically vulnerable users can face more negative impacts in collisions and accidents and be more prone to serious injury or death. Furthermore, recent debates about micromobility have raised awareness about the need to improve safety for both users and non-users, and to improve enforcement and regulations so that electric micromobility vehicles do not operate on sidewalks or other areas where they expose people with disabilities or vulnerable pedestrians to potential accidents (Campisi et al. 2021). Furthermore, it is necessary to provide additional street space for these modes of transit so that they do not encroach on pedestrians' right of way or endanger vulnerable users of public spaces such as the elderly, children, or people with disabilities. There is currently no indication that these considerations have been taken into account in Latin American and Caribbean cities where new micromobility services have been introduced. More policy is needed to address this dimension of transport-related social exclusion as new app-based transport services are introduced in the region.

8.4.6 Gender and Care Relations and Restrictions: The Facilities Dimension

The final dimension of the benefits and barriers of app-based transport from the perspective of (in)equality, inclusion, and social exclusion relates to services that are not adapted to the needs or abilities of specific populations. App-based transport services are often not sufficiently adapted to specific travel needs such as traveling with dependents or packages, or serving chained trips, such as those associated with mobility of care. Women tend to be more responsible than men for care trips. Evidence from the region in fact shows that woman are using ride-hailing for trips related to caring for children and the elderly, as well as chained trips, in cities like Bogota, Medellin, and Mexico City (Sabogal-Cardona et al. 2021). The distribution of ride-hailing use is relatively balanced by gender. Data from a survey of users and non-users shows that 51 percent of ride-hailing trips are made by women in Bogota, 46 percent in Medellin, and 58 percent in Mexico City (IDB and Steer

2020). Some service features offered by transport network companies are particularly helpful for women, including ease of traveling with bags and sharing trips with children and the elderly. However, these have not been standardized across platforms or promoted with this specific purpose to women and caretakers. As the use of private cars in households leans towards working males, women with the economic capacity to afford ride-hailing are increasingly seeing it as a viable option. Research in Mexico City shows that women are 35 percent more likely to use ride-hailing than men, and that if there is an elderly person in the household, women are more likely to use ride-hailing than any other transit mode, as reflected by the odds ratio of a regression model run in the study by Sabogal-Cardona et al. (2021).

Interviews from Bogota show that gender is very relevant in ride-hailing services. From the perspective of transport network companies, some ride-hailing platforms have marketing campaigns and certain incentives targeted at specific user segments such as students and single mothers, promising services better adapted to their travel needs (Oviedo, Scorcia, and Scholl 2021). However, transport network company respondents perceive that since catering to the needs of women is not included in public regulations, most practices to accommodate such needs are market driven. The case of the ride-hailing app SaraLT, which began operating in Argentina in 2019 and then later in Colombia in 2020, seeks to provide services exclusively by and for women, suggests growing recognition in the region of gender considerations in the provision of app-based transport. The company's slogan, *Juntas llegamos mas lejos* ("Together We Go Farther"), reflected interest in empowering women in the sector and better serving their needs. However, the COVID-19 pandemic set the company back and it has now halted operations.

Ride-hailing drivers interviewed suggest that women request more services for others, such as children, partners, and the elderly (Oviedo, Scorcia, and Scholl 2021). This points to the use of service features by women in novel ways to address the needs for care mobility and reduce the burden it entails for their time availability. However, it must be recognized that this is only possible in households with sufficient purchasing power.

In micromobility, emerging research suggests there are large gender gaps in e-scooter users by gender, with young adult men being the most frequent users of this mode (Campisi et al. 2021). Hypotheses as to why these patterns seem to replicate across different contexts are related to affinity for technology, risk aversion, and lack of equipment on e-scooters for women's travel needs (e.g., there is no space to travel with bags or packages). In Latin America, this is still an emerging area of research, although it is important to incorporate a gender lens into the design and provision of micromobility services if they are to address the complex mobility needs of women in the region.

8.5 Conclusions and Ways Forward

The adoption of app-based transport services in Latin American and Caribbean cities is driven by needs and motivations that are unique to the region and often in contrast with those of users of ride-hailing, micromobility, and microtransit in other world regions. Analysis of the features of app-based transport based on the dimensions of transport-related social exclusion shows where app-based transport can make significant differences in the ability of specific population groups (e.g., women, car-less populations, the elderly) to overcome barriers such as fear of crime or forms of transport disadvantage such as the limited spatial or temporal coverage of conventional transit services.

This chapter has applied a tailored framework of (dis)advantage and social exclusion applicable to different forms of app-based transport and tested three types of app-based transport currently operating to different extents in Latin America and the Caribbean. It has illustrated that the diversity of characteristics and levels of (dis)advantage of both users and non-users of app-based transport can widen existing gaps in mobility and access already experienced by different social groups. The different dimensions of social exclusion applied to app-based transport help reveal specific concerns and the ways in which ride-hailing, microtransit, and micromobility can address them, leading to specific insights about issues such as coverage, affordability, safety, and discrimination, among other relevant concerns from an equality and inclusion perspective.

The use of a transport-related social exclusion framework also helps identify unique conditions and characteristics of the operation of app-based transport in Latin American and Caribbean cities, which could spark discussion on new policies and regulations across the region. Given the wide range of local regulatory environments and policies surrounding app-based transport in different countries, it is not possible to provide specific regulation or policy recommendations for individual countries or cities. Rather, this chapter points to considerations that are more pressing in any context from an inclusion perspective.

Some of the findings from the analysis of different dimensions of (dis)advantage and social exclusion reflect the unique challenges that app-based transport services pose for addressing urban transport inequalities in Latin American and Caribbean cities. Fear of crime in public areas and when using public transit is one of the strongest factors influencing both how app-based transport services operate and how different user segments engage with them. The technology incorporated in many of these services, as identified in ride-hailing-focused research – such as knowing your location in real time, sharing details of your trips, knowing who your driver is, having the opportunity to make electronic payments, and having access to a panic button – enhances perceptions of security. This is an important aspect of women's mobility, particularly under specific travel circumstances such

as late-night travel or after consuming alcohol. On-demand services are also addressing temporal and geographic dimensions of social exclusion by filling structural gaps in public transit systems and becoming a viable alternative for people with enough purchasing power to afford app-based transport-based trips. Affordability, however, remains one of the main challenges for these services. There is evidence of exclusion associated with pricing, particularly at high-demand times. The incentives and disincentives for drivers linked with higher or lower revenues for trips made at specific times of the day, or that either target or avoid specific areas, can adversely contribute to conditions of transport disadvantage.

Furthermore, app-based transport trips are often not regular work or study trips, but often serve purposes like health, mobility of care, or leisure. The occasional nature of the use of app-based transport by most users is linked with the distribution of the benefits of such services being skewed towards the higher end of the socioeconomic spectrum, while the distribution of burdens leans towards the lower end of the spectrum. Population groups that use these services remain limited to those that are educated, higher-income, and tech-savvy. In the right policy context, however, drivers and workers from all income groups can benefit from the contributions this new industry makes to both formal and informal economies. Although working as a ride-hailing driver is a form of semi-formal employment, and notwithstanding much of the regulatory debate as to whether transport network companies should treat drivers as employees, ride-hailing is a clear mechanism to produce income.

8.5.1 Policy Considerations

Shared mobility can potentially either alleviate or reinforce specific dimensions of social exclusion in urban areas across Latin America and the Caribbean. Different practices of private providers, public sector agencies, users, and non-users have been shown to have both positive and negative effects on the degree to which different dimensions of app-based transport are influenced. A thorough understanding of such practices and the incentives and disincentives that can lead to more inclusive, equitable, and sustainable behaviors associated with on-demand transport that can inform policy and regulation is a priority for transport planning research and practice in Latin America and the Caribbean. In general terms, but more so from a perspective of equality and inclusion, regulating app-based transport services to shape their evolution instead of just responding to it becomes more pressing as companies expand rapidly in the region. Ad hoc approaches, such as banning operations by one company only to spark the expansion of another, are ineffective. Promoting discussions on inclusive app-based mobility services that inform decision-making are needed. Opening spaces for more structural conversations on governance and regulation to maximize their positive effects is paramount and time-sensitive.

Two policy challenges in particular need to be addressed in Latin America and the Caribbean. On the one hand, it is necessary to reduce crime on public transit, make women feel safer, and facilitate the transition from public transport to app-based transport. As issues of sexual harassment and gender violence on public transit remain unsolved in the region, app-based transport is rapidly becoming seen as an alternative. On the other hand, it is important to explore how technology similar to that used by transport network companies can be exported and adapted to public transit so that people can commute safer. At present, most micromobility and ride-hailing customers are occasional users who make a small number of trips per month and otherwise use other transport modes for their regular commutes. However, there is concern that ride-hailing and microtransit could eventually directly compete with public transit. A limited amount of evidence suggests that there may be complementarity and substitution effects, depending on the context.

Finally, there is demand for micromobility services and other quality, on-demand, last-mile services that can be quickly summoned with a cell phone by existing users and young adopters. This suggests that a shift towards these modes is possible, and it falls to the regulators to ensure that these services are equitable and desirable. The supply of these services is often confined to attractive areas and demand segments with higher purchasing power, which opens the possibility that services such as shared electric scooters and bicycles could contribute to the exclusion of specific areas and populations. It is the role of the public sector to set clear policy stances and regulations that make supply distribution more inclusive both spatially and economically. Furthermore, leveraging these transit modes to harness new data and improve efficiency and equity beyond that guaranteed by traditional systems is well worth the research.

From an affordability perspective, people are willing to engage more in ride-hailing if their income increases. Thus, ride-hailing can increase congestion at peak hours, adversely affecting users of other modes of transport, which suggests the need for policy responses. New regulations should consider additional taxes for ride-hailing trips that were do-able by walking, cycling, or public transit (Young, Allen, and Farber 2019). That is, when travel times are comparable, then ride-hailing trips should be considered as direct competition to other (more sustainable) transport modes, in which case a tax make sense. On the other hand, services with schedules when public transit is not operating, in areas with no coverage of public transit, or in high-crime-rate areas (where walking and cycling might be considered dangerous) should not be affected by price increases associated with taxes and levies on this type of transport.

8.5.2 Need for Further Research

Ride-hailing services have been on the Latin American and Caribbean mobility landscape for almost a decade now, and in many cities, they have already consolidated market share. That is not the case for most micromobility services and certainly is not yet the case for microtransit, which is limited to Mexico and Chile and has a comparatively small market share. From a perspective of social inclusion, it is relevant to examine these services further to ensure that they provide access to key opportunities at an affordable fare and with extended geographic coverage. More pilot programs are needed to create common knowledge on how these services should be implemented and regulated, as well as how to move from a pilot to a large-scale functional system.

More research is needed to fill gaps in knowledge about users and non-users, understand the impact of shared mobility partnerships, and identify existing policy barriers to piloting and implementing equitable shared mobility services. Under the assumption of complementarity, all these services are useful for mobility and even for public transit. However, their actual impact on sustainability and inclusion depends in part on how these services interact with other transit modes. This requires further research to determine which transit modes are most effective in different circumstances.

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