WORLD RESOURCES INSTITUTE

CONFERENCE PROCEEDING

Shared mobility and a sustainable transport future in Latin American cities

May 2024 | Mexico City; Bogotá; Curitiba | Compiled by: Adam Davidson (Global), Daniel Cano (Colombia), Angelica Mazorra (Mexico), Francisco Pasqual (Brazil)

EXECUTIVE SUMMARY

Overview

- This document summarizes the views and issues addressed by invited speakers and discussants at the workshop series "Shared Mobility and a Sustainable Transport Future in Latin American Cities," hosted by WRI's Urban Mobility team from August through October 2023.
- Discussions were held in Bogotá, Mexico City, and Curitiba with local transport experts.
- The workshops set out to determine the opportunities and challenges of shared mobility in each city, particularly regarding the role of ride-hailing.
- Participants affirmed that data-driven shared mobility systems can be a tool for sustainability and decarbonization. This works best when ride-hail complements mass transport, walking, and cycling.
- Shared mobility systems in Latin America, leveraging lower car-ownership rates, could **significantly aid sustainability and decarbonization through partnerships** and focused efforts.
- Collaboration opportunities between government, operators, and civil society include establishing a means of ongoing cross-sector collaboration in the sustainable mobility ecosystem; developing an electric mobility strategy; fostering an understanding of data needs and availability, and identifying ways to bridge the gap between them; and formalizing ride-hail through flexible regulation that is part of a wider sustainable mobility system.

CONTENTS

These conference proceedings reflect the presentations and discussions of participants and do not necessarily represent the views of the World Resources Institute or other participating institutions.

Background

Transportation, especially in cities, accounts for 22 percent, or nearly a quarter, of global fossil fuel emissions.[1] Private passenger vehicles account for nearly half of all transport emissions.[2] To achieve the Paris Agreement's targets, which would limit global warming to 1.5 or well below 2 degrees Celsius, we need to shift travel to sustainable modes and scale vehicle electrification, focusing on providing safe, efficient access to jobs and opportunities.[3]

One way to do this is to create mobility systems that enable residents to live without owning a car, or reduce reliance on a privately owned vehicle. Shared mobility services, including ride-hail, can provide additional sustainable and accessible transport. "Shared mobility" as a term emerged as global positioning systems, smartphones, and data exchange converged to enable the sharing of rides and vehicles. The result was expanded accessibility to transport services as the shared mobility ecosystem grew, leading to the creation of innovative business models. This brought a sectoral expansion: ride-hailing expanded in taxis, car sharing made car rentals more flexible, bike sharing made public bicycle systems viable, and public scooters became popular. **Together with public transport, walking, and cycling, these modes can enable a robust ecosystem of options that reduce the need for personal vehicles.**

Delivering on a greater vision, where shared mobility is a pathway to sustainability and equity, requires collaboration among private and public transport stakeholders. To understand the current opportunities in the shared mobility ecosystem, three workshops with transport stakeholders and decision-makers were held across Latin America, in Bogotá, Colombia; Mexico City, Mexico; and Curitiba, Brazil. The selected cities' modal share is similar—private cars do not currently exceed 25 percent of all trips—meaning most residents use public transport, walking, bicycling, and for-hire vehicles to move around.

The selected cities are also pioneers in sustainable transport, taking actions to address climate and accessibility in cities. Some examples include creating the modern bus rapid transit (BRT) concept and improving public space in Curitiba; advancing BRT to a widely comprehensive system and increasing cycling in Bogotá; and a multimodal network of metro BRT, bicycle share, and pedestrian streets in Mexico City. On the country level, climate action plans for all three countries identify sustainable transport as a means to reduce emissions. Colombia, Mexico, and Brazil are also nations where car ownership is growing, but they are still well below levels of the many car-dependent cities in the United States. Considering this, we seek to understand a future where a panoply of modal choices, combined with electrification, can comprise a sustainable transport system that is efficient, safe, and accessible.

Conference proceedings

In this summary of conference proceedings, we provide key highlights and takeaways from the discussions among workshop participants. Participants included local experts involved in transport operations, management, research, or policymaking. We set out to contextualize shared mobility within a local and national lens in Latin America; identify how shared mobility (like ride-hailing services) can reduce long-term dependency on private vehicles; and gain insights into local perspectives on ride-hailing services and the promotion of integrated approaches to sustainable mobility systems. We facilitated discussions on opportunities and challenges within the topics of integrated transport systems, accessibility of jobs and opportunity, electrification and technology, and policy and governance. Detailed notes were taken in each workshop and summaries written on the topics discussed (see Appendix A).

Before discussion portions began, the avoid-shift-improve (ASI) model was used to frame the conversations. The ASI framework defines three main ways to go about transport decarbonization: avoid unnecessary trips or extra distance when possible; shift to sustainable modes such as public and active transport; and improve the efficiency of systems, such as through the electrification of fleets and personal vehicles.

While our aim was to explore responses to the wider question of how shared mobility can be part of a sustainable mobility system, the takeaways are linked with potential actions to offer a more structured dialogue between government, mobility operators, and community advocates in reaching this goal.

Key takeaways and actions

The workshops highlighted that **shared mobility systems, including ride-hailing, can be viewed as a strategic tool for decarbonization**. Achieving decarbonization, however, requires not only collaboration and partnerships among stakeholders but also leveraging of innovation through flexible regulations while simultaneously prioritizing equity and access, particularly for vulnerable groups. Finally, formalization of roles within clear regulatory frameworks is a baseline condition for further action. Based on these needs, the following key takeaways for moving forward were found across all three cities:

Establish a means of ongoing cross-sector collaboration in the sustainable mobility ecosystem. Discussions identified the need to support a reduced reliance on, or growth of, privately owned vehicles and travel; fill gaps in access to and from jobs and other opportunities; and prioritize public transport, walking, and cycling with improved programs and infrastructure. Areas for follow-up included the implementation of pilot projects that could foster changes in travel behavior, exploring pricing options or other models to improve accessibility, and continued collaboration on urban mobility planning and policies to meet these goals.

Develop and implement an electric mobility strategy. Participants identified the need for a collaborative approach on transitioning to electric mobility. Specific items discussed included offering electric vehicle options within ride-hail applications, including where some cities may be seeking to electrify taxi fleets, as well as the development of charging infrastructure for light-duty vehicles. Likewise, cities can explore ways that for-hire vehicles may become one early adoption mode for electric mobility—and include and engage with actors on shaping their electric mobility strategies.

Foster an understanding of data needs and availability and identify ways to bridge the gap between them. Participants discussed options for cities, shared mobility providers, and other stakeholders to engage on data. Included in this was engaging on data-driven policy, which could include collaborating on the use of data for tracking vehicle speeds, with specific mention of working together on pickup and drop-off area hot spots and complementarity with data sets curated by cities.

Formalize ride-hail through regulation as a part of a sustainable mobility system. If services are not recognized or are not part of an overall governance structure, it will be difficult to create an integrated network of services contributing to more sustainable transport. Participants discussed the need for regulatory frameworks to delineate responsibilities and boundaries among different actors to mitigate risks (such as uncapped or unspecified liabilities), engage on urban and mobility planning, and seek policies that emphasize safety and sustainability.

INTRODUCTION: TOWARD A SUSTAINABLE MOBILITY ECOSYSTEM

This document summarizes the views and issues addressed by invited speakers and discussants at the workshop series "Shared Mobility and a Sustainable Transport Future in Latin American Cities," hosted by WRI's Urban Mobility team from August to October 2023. The workshops were held to solicit expert views on whether and how shared-mobility tools, like bike sharing and ride-hailing, may support a sustainable mobility ecosystem. For example, among other areas such as safety and security, how can such services provide alternatives that support car-free and car-light households? The participants, drawn from industry, governance, finance, and civil society, explored whether and how shared mobility can become an integral part of a sustainable mobility ecosystem. They explored this theme using the definition of shared mobility discussed in Box 1.

Transport is interrelated with climate, health, and equity

The need to identify solutions to enable sustainable mobility has never been greater. In 2019, transportation accounted for 22 percent of global fossil carbon emissions.[4] Land transport accounts for three-quarters of transport emissions, with private vehicle travel in cities responsible for a large share. Private passenger cars account for nearly half of all transport emissions, including aviation, maritime, and freight.[5]

To meet the goals of the Paris Agreement, which aims to limit global temperature rise to 1.5 degrees Celsius, researchers have recently called for doubling the share of fossil-fuel-free land transport by shifting travel to more sustainable modes and electrifying vehicle fleets, while also converting energy sources to renewables.[6] If the world is to meet this goal, transport in cities will need to be centered on sustainable, urban mobility systems that both reduce private vehicle travel and electrify all vehicles from public buses, cars, trucks, and fleets.

Above all, sustainable transport issues are interwoven with safety, health, and access to jobs and opportunity. In many cities traffic crashes are the number one killer of youth, accounting for almost 1.2 million fatalities each year globally.[7] Meanwhile, analyses have noted, for example in Mexico City, that residents cannot reach jobs and other opportunities within a 60-minute travel window.[8]

BOX 1 | What is "shared mobility" and how is the term used here?

A common definition put forward by the Shared Use Mobility Center is "transportation services and resources that are shared among users, either concurrently or one after another."[a]

Some modes have always been shared by that definition, like mass transit and taxis, but there is more to the term. "Shared mobility" as a term came into prominence in the last decade as global positioning systems, smartphones, and data exchange converged to enable the broad sharing of rides and vehicles. This brought a sectoral expansion: ride-hailing expanded among taxis, car sharing made car rentals more flexible, bike sharing made public bicycle systems viable, and public scooters became popular. Thus, the term is most commonly used to cover a wide variety of mobility services where both broad access and some medium of coordination are essential.

In this series of workshops, participants focused on application-enabled local shared mobility like car-based ride-hail and bike- or scooter-based micromobility. However, their conversations also covered services not enabled by applications, like mass transit and other for-hire-vehicles, where they met complementary goals.

Note: [a] Shared Use Mobility Center, "What Is Shared Mobility?," n.d., https://sharedusemobilitycenter.org/what-is-shared-mobility/.

Studies have established the need for robust transport systems in cities that allow people the choice to not own cars, systems based instead on a panoply of services including public transport, ample and safe walking and bicycling networks, and options such as ride-hail and taxis—based on electrification—that can meet residents' travel needs when other modes are not available or do not fit the needs of passengers, such as those with disabilities (see Figure 1).[9]

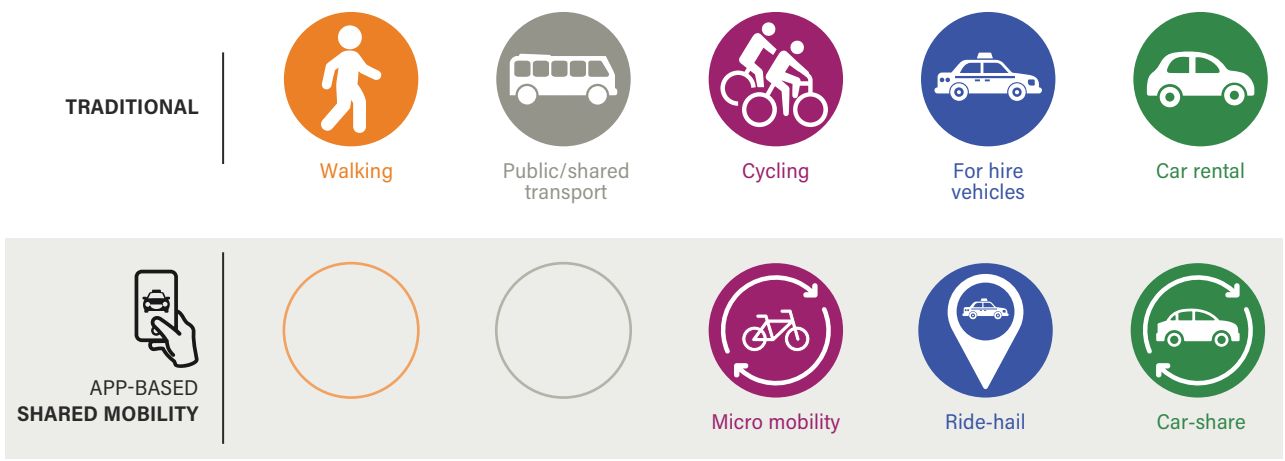
Having many transport options fits into the broader idea known as the avoid-shift-improve (ASI) framework for sustainable mobility.[10] By *avoiding* unnecessary trips and distance traveled; encouraging a mode *shift* to greener options like walking, mass transit, and shared vehicles; and *improving* existing transportation methods, communities can cut emissions while increasing access. These measures not only enhance environmental sustainability but also, when paired with public attention and good regulation, can foster healthier, more equitable communities through accessible transportation for all.

The ASI framework is especially relevant in Latin American cities: while many residents use public transport, car-ownership is rising and city transport systems face challenges around rising emissions, congestion, traffic fatalities, and limited access to opportunity.

Countries in Latin America are including transport in their agendas to address climate change. For example, in their nationally determined contributions (NDCs) to meet the goals of the Paris Agreement, Mexico and Brazil included mitigation actions to reduce emissions from transport through promoting vehicle efficiency and improving public transport infrastructure.[11] Colombia outlined measures to accelerate the transition toward electric mobility, build charging stations, and provide subsidies to make electric public transport vehicles cost-competitive.[12] However, NDCs do not fully capture countries' transport strategies, such as Mexico's 2022 Mobility and Road Safety Law, which declared mobility a human right and ensured better access to sustainable transport services.[13]

The question for these three cities now is how they can provide mobility systems that support economic activity and address equity and sustainability through a variety of modal options.

FIGURE 1 | Low/no car households rely on a variety of transport modes for mobility; shared mobility services can bring additional access to some traditional modes



Source: Author.

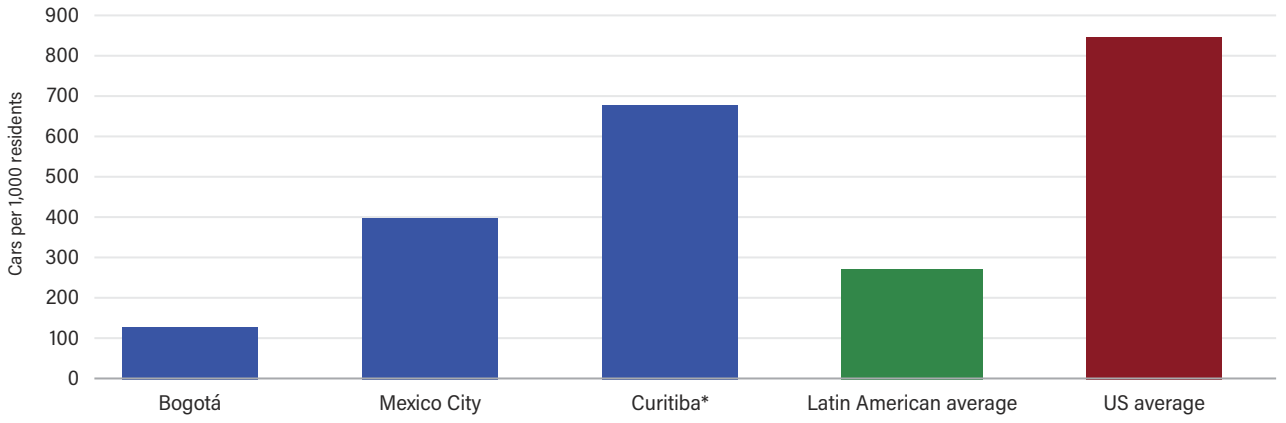
The opportunity

The expansion of shared mobility as a complement to mass transit offers a significant opportunity, enabling improved transport access without necessitating vehicle ownership. Bike sharing and ride-hailing services facilitated by application-based platforms have expanded access and mobility as they have removed impediments to arranging transport. A by-product of this ease of access is to put off vehicle purchases.[14] Bike sharing systems became a new public mode once schemes involving mobile payment and GPS technology made the platforms scalable. With ride-hail, a key feature of the applications is to remove the friction that characterized initiating traditional taxi-metered trips—like opaque pricing, the difficulty of getting service outside of popular areas, and unreliable wait times. As ride-hail and bike share alleviated many barriers, it became significantly easier, and thus more popular, to accomplish trips with a for-hire vehicle. However, the popularity and benefits of these services also come with challenges to sustainability, equity, and governance.

The availability of for-hire vehicles is one modal option that can enable car-free households by providing reliable access to service (see Figure 2). This can include access to areas not served well or often by public transport, easy connections to rapid transit stations, service for persons with disabilities, convenient travel for users carrying large equipment or packages, and increased protection from gender-based violence, late-night travel, and other concerns. In sum, ride-hail can be part of a mobility system that prioritizes the ability of households to not rely on private vehicle ownership while providing access to its benefits. These opportunities exist so long as technological access and affordability are addressed when needed, while broader coordination within the regional mobility ecosystem is pursued.

As these systems have grown, questions have emerged about how they can fit into and contribute to a broader strategy of sustainable transport in these cities. There is active debate about the varying emissions profiles from such rides and the ability of ride-hail to substitute for or complement mass transport networks.[15] It is clear that the business model provides improved access to mobility, which may lead to additional trips, but there is also evidence that access to for-hire vehicles can also allow households to avoid owning or replacing private vehicles.[16]

FIGURE 2 | Unlike in the United States, the majority of people in Latin America do not own personal cars



Notes: * Some of the vehicles in Curitiba may be attributable to rental car companies' practice of registering their vehicles in the city, where they pay lower fees.

Sources: 2023 Household Survey (Bogotá); Secretaría de Desarrollo Agrario, Territorial y Urbano, 2022 (Mexico City); DETRAN PR, 2022 (Curitiba). Regional data from D.A. Quistberg et al., "Building a Data Platform for Cross-Country Urban Health Studies: The SALURBAL Study," Journal of Urban Health 96, no. 2 (2019): 311–37. US data from "State Highway Travel" at bts.gov.

These issues surround questions into how ride-hail and other data-driven shared mobility can be integrated with other sustainable modes. There is opportunity in areas like first- and last-mile connections to public transport; how the services may support gender and social equity, safety, and security; and how the city's overall governance and planning takes into account the role of and engagement with the for-hire vehicle industry.

To understand the current opportunities and challenges in the Latin American shared mobility ecosystem, three workshops were held to convene transport stakeholders and decision-makers in Bogotá, Colombia; Mexico City, Mexico; and Curitiba, Brazil. The purpose of these workshops was to contextualize shared mobility as a tool for sustainability through the perspectives of local and national experts in Latin America. The discussion focused on opportunities and challenges for shared mobility and ride-hailing services to reduce long-term dependency on private vehicles, including regional perspectives on ride-hailing services and the promotion of the integrated approaches to mobility systems.

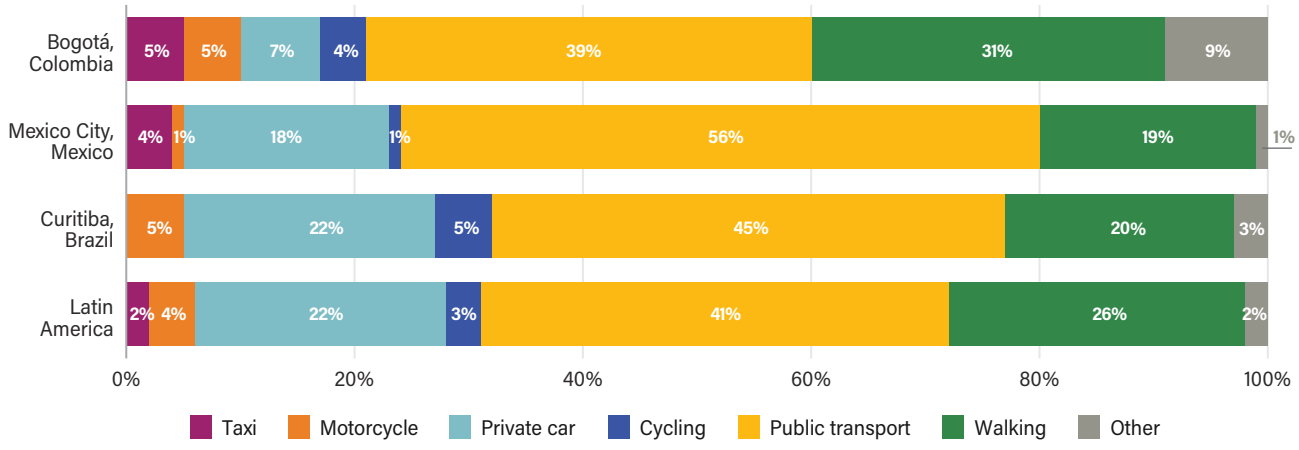
TRANSPORT IN BOGOTÁ, MEXICO CITY, AND CURITIBA

These three cities have all, in one way or another, been leaders in sustainable mobility while still experiencing challenges to reduce emissions and improve access to jobs and opportunities for residents. All three cities have significant public transport networks. Mexico City has 12 metro rail corridors and seven BRT lines. Curitiba is known as the city that invented modern-day BRT, with five corridors traversing the city. Bogotá, which is seen as the city that took BRT to the next level, has 12 corridors with over 140 stations totaling about 115 kilometers. The city is constructing its first metro rail corridor that will stretch 24 kilometers and include 16 stations.

Furthermore, cycling has risen in popularity in these cities in recent years. Bogotá, for example, has nearly 600 kilometers of cycling lanes and has been a pioneer of the Ciclovía concept, closing an additional 121 kilometers of major streets to car traffic and opening them to bikes and pedestrians every Sunday.

With significant public transport networks, these cities' modal shares show that at most only a quarter of urban trips rely on private car ownership to move around (see Figure 3). However, while that number has grown over the years, their car ownership rates remain far below those of the United States, a country with significant dependence on the private car (see Figure 2).

FIGURE 3 | In much of Latin America, including our three focus cities, more than 60 percent of trips are made using public transit or walking



Source: ICLEI, Local Governments for Sustainability, "Our Impact," https://sustainablemobility.iclei.org/our-impact/, accessed February 2024; Instituto Nacional de Estadistica y Geografia INEGI . Mexico, 2018.

Like elsewhere in the world, ride-hailing applications were introduced in these three cities in the middle of the last decade and disrupted a regulatory framework that did not anticipate the service model. Since then, the services have grown in popularity and utility in each market, but the regulatory response has differed. Bogotá is still vacillating on its regulatory priorities, leaving rideshare to operate without full formalization. Mexico City is hindered by jurisdictional issues and coordination with its massive population spread across three states, but the capital has recently seen progress as the national government passed a constitutional reform in 2019 that establishes mobility as a right. This was followed by the General Law of Mobility and Road Safety (LGMSV) in 2022. The LGMSV does not define shared mobility explicitly, but it is implied through the regulation of mobility technologies and platforms. Curitiba has made more explicit progress in integrating ride-hail into its mobility ecosystem. A Brazilian national law in 2018 legalized ride-hailing under the National Policy of Urban Mobility. Under this law, Curitiba can enforce local regulations focusing on vehicle and driver requirements. The city has further articulated a vision for future mobility through upcoming Mobility-as-a-Service pilots, as well as a new set of data-driven tools and repositories known as Urban Hipervisor. It is within this context that we convened stakeholders on these key topics in the three cities.

Goals

We aimed to elicit expert opinions from stakeholders in Latin America about key areas of sustainable urban transport linked to shared mobility and ride-hailing in three countries' mobility frameworks. Our goal was to understand various perspectives on shared mobility among key players who shape and oversee urban mobility systems through robust and structured discussions, and how shared mobility can contribute to more low-carbon, healthy, and equitable transport in cities. Local experts included individuals involved in transport operations, management, research, or policymaking.

Approach

The basic methods below were repeated independently by teams in Bogotá, Colombia; Mexico City, Mexico; and Curitiba, Brazil. Each team used this generalized framework and adapted it to the team's working context. Appendix A offers a more detailed description of our approach.

Expert stakeholder information was gathered in two phases:

1. One-on-one or small-group online interviews with stakeholders in influential or insightful subdomains and organizations.
    - These discussions were important to gather depth of thought in four important subdomains:
        - Governance focused on regulation and planning of transport
        - Private companies that offer shared mobility services
        - Financial institutions that engage in development of transportation services
        - Researchers or academic experts who enable informed decision-making in mobility
2. An in-person workshop with many experts utilizing the "World Café" format to generate group insight from conversation.
    - World Café involves small-group discussions where participants rotate between tables and topics.
    - Participants contribute insights and build upon previous discussions, leading to a synthesis of ideas.

The interviews in the first phase informed our framework for the discussions in the second phase. Those discussions are the focus of these proceedings.

Takeaways

These three cities, and urban areas in Latin America generally, have a few things in common. First, they are large cities that struggle with connectivity from the urban center to the periphery. Second, they often have a history of informal transit and are working to update their systems to be safer, more centralized, and more dependable. Third, all three have been pioneers of new business models, financing mechanisms, and local policies to reduce greenhouse gas emissions and improve accessibility.

Despite these similarities, there are key differences in the three markets. While Curitiba has a very engaged local government that is keen on partnering with the private sector, Bogotá has not yet established a formal approach to ride-hailing. Mexico City has many of its own challenges too, as the metropolitan area is governed by three different entities, making it difficult to build coalitions.

This document seeks to summarize the key findings from the workshops hosted in Bogotá, Mexico City, and Curitiba. We will highlight overall themes, challenges discussed, and key recommendations that emerged from the workshops with specific actions.

The workshops that took place in these three cities in the fall of 2023 revealed which opportunities can be capitalized on and brought several key themes to light. By acting with purpose and coordination focused on complementing other sustainable transport, shared mobility providers can leverage their services to contribute to the goal of sustainable, safe, and inclusive cities and reduce reliance on personal cars as part of an integrated system of public transport, walking, cycling, and shared vehicles.

The workshops consisted of stakeholders from the city, private sector, civil society, and academia. The diversity of thought allowed for nuanced conversations about the decarbonization of local transport ecosystems. A main takeaway, which will be explored in further detail in the recommendations below, was the challenge that while shared mobility platforms have broadened access to mobility services, addressing climate change and social equity necessitates an integrated approach to mobility with a combination of public and private sector support to produce a resilient, sustainable, accessible transport ecosystem.

Strategic needs and recommendations

Overall finding: Shared mobility can be a significant tool to achieve sustainability and decarbonization. All three workshops identified the need to use shared mobility as a tool to promote sustainability and decarbonization, foster cooperation between the private and the public sector, and raise public awareness of the impacts of transport choices. Shared mobility systems are seen as tools that have the potential to mitigate and monitor the environmental impact of transport. However, sustainability is an opportunity—not a default property of the technology—and the most benefit may come from seeing the services as part of a broader system of integrated modes.

To advance beyond the workshops, we have synthesized four actions discussed by the participants to increase engagement between government, private mobility companies, civil society, and other interested parties. These actions are provided below with additional specific steps.

1. **Establish a means of ongoing cross-sector collaboration on the sustainable mobility ecosystem.** The experts believed that private shared mobility companies, civil society organizations, nongovernmental organizations (NGOs), and academic experts on transport should actively engage with cities on sustainable mobility systems. They noted that the workshops themselves showed that a dialogue between city stakeholders and shared mobility providers can lead to opportunities for collaboration and capacity building. Workshop participants generated the following recommendations:

- **Support reduced reliance on (or growth of) privately owned vehicles**. Supporting the reduction of vehicle kilometers traveled, promoting car-free and "car-light" lifestyles, and optimizing the use of private vehicles are all areas where shared mobility companies can play a significant role, as one mode in a menu of options that do not require one to own a car. The workshops offered a space for cities and private stakeholders to have a dialogue on these issues, and a continued open dialogue on achieving these goals would be valuable to identify areas for collaboration. While there may be a range of ways to explore this, one idea discussed in Curitiba was the deployment of pilot projects that foster changes in travel behavior. Advancing toward collaborative opportunities could foster trust between the public and private sectors as well as address transport integration barriers in the city.
- **Fill gaps in access to and from jobs and other opportunities.** Ride-hail can be an option to complement public transport, providing first- and last-mile links, access to rural or peri-urban areas, opportunities for fare and payment integration, route planning, active mobility, and curb management. In Mexico City, the group discussed how shared mobility options could include flexible pricing, payment, and operation models to improve transport coverage in underserved areas that could improve accessibility and reliability of services. Such services can be crucial in complying with a recent national law providing for the right to mobility.
- **Advocate for investment in public transport, prioritizing cycling and walking** on city streets, with cities also actively engaging with shared mobility stakeholders on these plans and policies. Cities in Latin America may often have several different transit providers with differing tickets, so creating more interoperability among systems, including ways to integrate ride-hail and perhaps leverage technology platforms to facilitate improved connection, was noted. Furthermore, participants in all locations stressed the need for policies to support public transport, cycling, and walking, as these modes carry significant mode share in these three cities, as well as across Latin America. Some policies that have been successful in Latin America and elsewhere globally include Ciclovía, congestion pricing and *pico y plata*, where license plates limit who is able to drive during rush hour on certain days.

2. **Develop and implement an electric mobility strategy.** Given the challenges the experts cited for both policies and technological innovation in shifting to electric mobility, they believed that shared mobility companies can work with cities on introducing a first wave of electric vehicles. To facilitate this modal shift, a collaborative approach will be necessary, where cities use policy instruments to facilitate the creation of electric mobility infrastructure. Cities likewise may explore ways to make for-hire vehicles an early adoption method for electric mobility, such as including ride-hail vehicles, charging infrastructure, and related needs in their plans for implementing electric vehicle fleets, often called electric vehicle roadmaps. Latin American cities have low rates of light-duty vehicle adoption thus far, and ride-hail fleets are a ripe area to make progress. Experts identified the following key items as actions:

    - **Advance policies and financing to support the transition.** The private sector should work alongside policymakers and other stakeholders to set vehicle phase-out targets with, when applicable to rideshare, incentives that assist drivers in making the transition. One of the most challenging aspects of the electric vehicle transition in the Global South is the up-front costs and lack of opportunities to secure financing or loans without an established credit history. The private sector will be vital in helping to de-risk investments in the electric vehicle transition, such as offering commitment to electric vehicle supply and guarantees on utilization.
    - **Include electric vehicle options in ride-hail apps.** In Curitiba and Mexico City, participants noted that the city is undertaking an effort to electrify taxi fleets, and such vehicles could be included in ride-hail platforms as an electric mobility option. In Bogotá, they also mentioned that applications could communicate the emissions benefits of low- and zero-emission rides. Since two- and three-wheelers are

prominent features of many Latin American cities, electrifying motorcycle taxis and other two- and three-wheelers could help decarbonize more affordably. This is an example of where collaboration will be vital; it is important to have decision-makers at the table with civil society organizations and academia to develop a safety plan for the inclusion of modes like motorcycles.

- **Support the development of charging infrastructure for light-duty vehicles.** The need to develop charging infrastructure arose in all three cities, particularly as urban residents (and thus ride-hail drivers) in Latin America often live in multifamily housing where electric vehicle charging may be a challenge. "Right to charge" policies can help ensure that everyone has access to a charger within a reasonable distance of their residence.

3. **Foster an understanding of data needs and availability and identify ways to bridge the gap.** Set up an ongoing product, knowledge, and data insights exchange where city stakeholders, including ride-hail companies, can share ways that new products and data could be used to improve sustainable mobility. Workshop participants identified that potential topics may be tracking emissions in various ways for carbon or air pollution, identifying locations where charging infrastructure is needed, and improving curb and street design to ensure the safety of cyclists and pedestrians.

   - **Engage with cities on data-driven policies.** Collaborate between shared mobility companies and cities to establish a goal for piloting evidence-based policymaking by effectively using knowledge and data insights for planning purposes. Look to successful examples from Latin America and create clear work plans outlining the purpose and successful deployment of shared data. In Curitiba, participants expressed interest in developing data-oriented policy, and while the details of this could apply to several areas, one example mentioned was collaboration on hot spots for pickup and drop-off locations that could ease curb management.

   - **Support innovative solutions, data repositories, or data platforms with cities.** Data from shared-mobility platforms creates an opportunity to better inform a wide range of decisions. This could include details on emissions, multimodal connectivity options, or speed and congestion data, to name a few. Potential partners, such as civil society organizations and academia, can facilitate communication about external data opportunities, limitations, and uses while safeguarding privacy through data insights. Curitiba is launching Hipervisor Urbano, which aims to provide an integrated view of urban planning data about the city from otherwise disparate sources.[17]

   - **Demonstrate impact.** Shared-mobility firms should be ready and able to demonstrate their contributions to sustainability and equity by providing verifiable data on their impacts that can help demonstrate accountability and commitment to project success.

4. **Formalize ride-hail through regulation as a part of a sustainable mobility system.** The experts at the workshop identified that if services are not recognized or are not part of an overall governance, it will be difficult to create an integrated network of services contributing to more sustainable transport. This means including ride-hail in pushing broader goals of reducing emissions, increasing access, and improving safety when shaping relevant rules and regulations.

   - **Formalization is legalization.** Cities should ensure that shared-mobility technologies have a legal pathway to provide operations when meeting local standards. For example, in Bogotá, where the rules on ride-hailing are murky, participants discussed how innovative solutions are challenging to pursue. They desired regulations designed to promote the creation of new solutions and business models but that also include elements to protect users, service providers, and the environment. They also discussed the need for transparent regulatory frameworks to delineate responsibilities and boundaries among different actors to mitigate risks.

- **Encourage experimentation**. Innovation is needed not only in urban mobility but also in supporting other urban infrastructure, such as integrating sensors in vehicles to identify maintenance needs. A finding from the Mexico workshop was the need to encourage the creation of corporate mobility plans to promote behavior shifts among the workforce. Curitiba is keen to experiment with pilot projects that foster behavioral changes through Mobility-as-a-Service work to better integrate the city's sustainable transport ecosystem.
- **Build multidisciplinary policy teams**. Assemble the policy and technical expertise to co-design user-centric public policies that prioritize safety and sustainability. The Curitiba workshop findings indicated interest in the development of a public policy based on data insights shared by new mobility players. In Mexico City, participants discussed in general terms the need for decision-making based on the law, and for multidisciplinary teams with technical capacity.

CONCLUSION

Latin American cities are at an inflection point. In the cities studied, walking and public transit are the primary ways that people get around. Yet private car usage is growing. Giving people options to enjoy the benefits of car travel for high-value or otherwise difficult trips, without the sunk cost of ownership, could dissuade further and faster growth in vehicle kilometers traveled and thereby reduce future emissions impacts and demand for sprawl.

Advice from the workshops coalesced around common needs to bring the private and public sector together to collaborate on how to best address localized mobility challenges, better utilize data and technology platforms, and work toward intentionally reducing greenhouse gas emissions while improving access to opportunities for all.

The opportunities and challenges identified in these workshops demonstrate both the range and complexity embedded across Latin America in data-driven shared mobility services. All three workshops demonstrated that shared mobility concepts are now recognized as useful mobility tools to riders and regulators. Yet incorporating shared mobility services as an explicit tool to increase sustainability will require intentional trust-building and collaboration between not only the private and public sectors but also civil society members, NGOs, academia, and others to realize the potential benefits and leverage opportunities.

The three workshops served as an entry point to this conversation around sustainable transport ecosystems, which work to address decarbonization through improved access, especially in Latin American cities with dense centers and metropolitan sprawl. To amplify the impact of public and active transport, shared mobility is essential to closing the first- and last-mile gap, providing an accessible and safe alternative to other forms of transit, and paving the way to create data-informed transportation policies. As we approach 2030, decision-makers should prioritize collaboration within sustainable transportation ecosystems, electric vehicle partnerships, innovation, and data exchange, as well as the formalization of ride-hailing to solidify the private sector as a vital partner in decarbonizing transport and advancing sustainable mobility. If the key findings from these workshops are put into action, we will be on the right path to realizing a vision for multimodal, integrated, sustainable, and accessible transportation systems.

APPENDIX A. PROCEEDINGS OF THE THREE WORKSHOPS

Detailed methodology

The workshops were a qualitative method designed to collect expert stakeholder information and advice through a two-phase approach.

First, one-on-one or small-group online interviews were conducted with stakeholders representing influential or insightful subdomains and organizations. Each one-on-one discussion focused on challenges and opportunities for shared mobility within the interviewee's domain expertise. The information gathered here is included in each country report and was used to inform questions relevant at the in-person workshop.

These discussions delved into four crucial subdomains:

- Governance focused on regulation and planning of transport
- Private companies that offer shared mobility services
- Financial institutions that engage in development of transportation services
- Researchers or academic experts who enable informed decision-making in mobility

Next, each team developed their in-person workshop around the World Café methodology. World Café involves small-group discussions where participants rotate between tables, engaging in 20-minute conversations around a central theme or question managed by a facilitator. As they move, they contribute insights and build upon previous discussions, allowing for diverse perspectives to emerge, leading to a collective exploration and synthesis of ideas. At the end of the rotation, one person was chosen from each table to summarize the main findings.

The workshop started with a contextual presentation on shared mobility tailored to each country; this was used to provide background and framing for the discussions.

The objectives of the World Café were as follows:

1. Identify mobility problems that can be addressed through data-driven mobility technology, as well as challenges and opportunities for its implementation.
2. Generate an understanding of the role of technological developments in mobility, especially in the transition toward sustainable urban mobility.
3. Define and map challenges and opportunities so that technological developments in mobility contribute toward enabling sustainable transport systems.
4. Evaluate the existing plans and public policies in the city in relation to technological developments in mobility.
5. Prioritize actions toward the promotion of data-driven mobility technology that contribute to the goals of sustainable urban mobility in the city.

Table A-1 shows the division of the tables and the potential topics addressed.

Throughout the interviews and World Café workshop, project staff took notes to capture key quotes, ideas, conflicts, challenges, and opportunities. Those notes are the basis of these conference proceedings.

TABLE A-1 | Template of roundtables and topics addressed

TABLES	TOPICS
All tables ▪ Barriers and opportunities ▪ Actions	All discussions included time to identify barriers and opportunities, and to then offer actions to address them
Integrated transit systems	First- and last-mile connectivity, seamless mobility choices, use of data and information
Sustainability for all	Differences in mobility patterns, gender and social equity, safety and security, transport service gaps, and accessibility
Electrification and technology	Opportunities in the shared mobility space with the electrification of vehicle fleets, reduction in greenhouse gas emissions, incentives or partnerships with fleet providers, and access to charging infrastructure
Policy, governance, and financing mechanisms	Policy mechanisms to support decarbonization goals, federal vs. local regulatory issues, adapting to mobility innovations
Optional: Smart Cities	Operationalizing mobility innovations through data and technologies, as well as the creation of new travel demand management policies

City- and national-level context and discussions

Bogotá, Colombia: August 4, 2023

Context

Although Colombia has a recent history of creating model transport programs in public transit and in cycling, the country has had a much more difficult time integrating shared mobility. The success of Bogotá's TransMilenio BRT system (opened in 2000, with a current daily ridership of about 1.8 million people on 12 lines) and its Ciclovía program (75 miles of streets closed to cars every Sunday) have inspired hundreds of similar programs and projects around the world.

New mobility services entered Colombia starting around 2013 (today this consists of rideshare, bike share, scooter share, and even door-to-door delivery services). Like elsewhere, rideshare service entered Colombia in a legal gray zone—unlike other places, it has remained there.

Rideshare has been technically banned in Colombia since 2020 after a lawsuit by taxi companies. Yet the rideshare sector still widely operates in a legal gray area. Despite attempts to regulate it, a clear regulatory framework remains elusive. Rideshare platforms have rebranded as vehicle rental search engines to circumvent the ban. Confusion persists as to how to classify rideshare services, leading to informalization and concerns about safety and legality. These concerns permeate other related and popular services like app-based door-to-door delivery. However, there is ongoing dialogue in the city regarding potential solutions to address these issues.

Participants

INTERVIEWS	
Sector	**Actors**
Government	Secretary of Transportation of Bogotá
Mobility companies	Tembici
Research and academia	Universidad del Rosario, Despacio
WORKSHOP ATTENDEES	
Sector	**Actors**
Government (5 attendees)	Secretaría Distrital de Ambiente Defensoría del Espacio Público Ruta N
Private companies (7)	Uber Hoop Carpool Inmotion Group BiciClick
Nongovernmental organizations (4)	Liga Contra la Violencia Vial Despacio Probogotá

Table 1: Technological developments in mobility and integrated transport systems

Participants at this table explored the concept of integrated mobility, which involves catering to the diverse needs and preferences of users by offering a variety of transport modes and services, while ensuring connectivity, accessibility, and safety. The city of Bogotá was identified as facing several challenges in this regard, including urban sprawl, a lack of data, poor planning, and a low utilization of technology. To overcome these challenges, several proposals were put forth. These included the sharing of data between the public and private sectors, improving planning with a regional vision, integrating fares and payment methods, and enhancing citizen participation. These measures aim to leverage technological developments to create more integrated and efficient transport systems.

Table 2: Mobility for All: Comprehensive access to sustainable urban transport

The theme of "Mobility for All" underscores the importance of comprehensive access to sustainable urban transport. The participants concluded that this concept is centered on ensuring mobility rights for everyone, irrespective of their income, gender, age, or ability, and fostering equity and inclusion within transport systems. Bogotá was identified as facing several issues, including inadequate infrastructure, cultural and security barriers, and limited access to collaborative economy platforms. Participants noted that having access to shared mobility can reduce the need to own a private vehicle, but that security and trust are countervailing issues. Several proposals were suggested. Communication is key, and one solution includes the use of screens to display information on transport modes. Additional ideas include piloting shared vehicle schemes for events and to serve individuals with reduced mobility, as well as differentiating fares by trip or user characteristics. These measures aim to promote inclusivity and accessibility in urban transport systems.

Table 3: Zero-emission mobility and decarbonization

Participants at this table identified that the objective was to mitigate the environmental impact of transport, particularly air pollution and greenhouse gas emissions, by using cleaner, more efficient technologies and modes. They recognized that Bogotá faces several hurdles, including the high cost of technology, irregularity of services, and a lack of monitoring data. Participants identified potential solutions as well. These encompassed sharing chargers, conducting studies on hydrogen, fostering cooperation between academia and the public sector, and effectively communicating the environmental implications of transport choices. Finally, as elsewhere, the public use of data for decision-making was seen as very important in this sector.

Table 4: Regulatory mechanisms to encourage innovation in technological developments in mobility

Participants at this table emphasized the need for public policies that not only regulate platform operations but also foster ecosystems of oversight and participation, and clarify actor liability and responsibility. While Bogotá has policies promoting sustainable mobility, these can be siloed and challenged by bureaucracy. Medellín was cited as a city effectively using science, technology, and innovative policies to boost mobility innovation. Proposals included making regulations more flexible while safeguarding the public, rethinking public administration by focusing on common interests, and prioritizing initiatives to pool resources across institutions.

Common challenges and opportunities

The challenges and opportunities below are summarized from discussions at the four tables. Each challenge and opportunity was believed to have an impact on government and other sectors. Not surprisingly, a key challenge is adopting a stable regulatory framework in Colombia. Noted opportunities exist in the use of data for improved decision-making and enabling more efficient services.

CHALLENGE	IMPACTED SECTOR/ACTOR *Government and...*	EXPLANATION
Regulatory frameworks: Lack of flexibility, specificity, and continuity of public policies and regulations	Mobility companies	Current regulations do not clearly promote or restrict technological developments in mobility. This hinders innovation and experimentation, while discouraging coordination.
Lack of data and information for decision-making	Mobility companies, research and academia	Government or official agencies do not collect enough data about users of their systems to understand barriers, especially for vulnerable and marginalized users.
Inequity due to urban structure	Marginalized groups	Informal urbanization and regional growth create inequity in access to services and vulnerability for marginalized populations.
Social acceptance and comfort using technology by some sectors	Civil society, mobility companies	Elderly and low-income people are not comfortable with new technology; security concerns will require special thought and consideration.

OPPORTUNITY	SECTOR/ACTOR *Government and...*	EXPLANATION
Creating an integrated multimodal system	Transport authorities, mobility companies	The technology introduces a pathway to combine mobility systems.
Improved data sharing between public and private actors	Transport authorities, mobility companies	Data must be identified and shared to better supply services, inform users, and enable integration.
Using data to optimize resources	Transport authorities, mobility companies	Use real-time data to chain trips, reduce the number of vehicles on the road, and create more attractive business models.

Mexico City, Mexico: October 4, 2023

Context

Mexico City and Guadalajara have the most established services for shared mobility modes such as bicycles, cars, and vanpools. A major challenge for shared mobility in Mexico is the lack of systematic data on how *much* it is used, *how* it is used, and *what impact* it has. Public data sets for some platforms provide information such as annual earnings and city availability, but there is not enough detail on how different modes of shared mobility are used and how they compare to other ways of traveling.

While data-driven shared mobility entered Mexico in the early 2010s, the country has made significant progress since 2019 on a regulatory framework with technical guidelines for micromobility systems. The constitutional reform in 2019 **established mobility in Mexico as a constitutional right**, governed by the publication of the General Law of Mobility and Road Safety (LGMSV) in 2022. The LGMSV does not define shared mobility explicitly, but it implies a definition through the regulation of mobility technologies and platforms. To harmonize the LGMSV regulations, local and executive authorities need to adapt them to their contexts, which can be challenging due to the different timelines of the formal and executive phases. **This context suggests opportunities to define and consolidate specific concepts of shared mobility in Mexican regulations, at both the national and subnational levels.**

During the workshop developed in Mexico City, a key finding was that shared mobility performs several roles in the urban mobility system, serving as a means of transportation in areas with low coverage of public transport, connecting mass transit networks, and acting as a link for the first or last mile. However, its consolidation in the system faces challenges related to public infrastructure, regulatory norms, data management to ensure privacy and security, and social equity challenges.

INTERVIEWS	
Sector	**Actors**
Government	AMIM Jalisco IMEPLAN Guadalajara Metropolitan Area SEMOVI CDMX
Mobility companies	All Ride
Development banks	Inter-American Development Bank
Research and academia	Mexican Institute of Transport (IMT) Institute of Policies for Transport and Development Policy (ITDP), Diego Antero (independent mobility consultant)

WORKSHOP ATTENDEES	
Sector	**Actors**
Government (2)	Ministry of Mobility of Mexico City (SEMOVI) Environmental Commission of the Megalopolis (CAME)
Private companies (4)	Uber All Ride GRIN (former employee) Kolors/Urbvan
Nongovernmental organizations (3)	ITDP International Council on Clean Transportation (ICCT) C40
Research and academia (2)	IMT Unidad Profesional Interdisciplinaria de Ingeniería y Ciencias Sociales y Administrativas—Instituto Politécnico Nacional (UPIICSA–IPN)
Bank companies (2)	BANORTE CAF

Table 1: Integrated transport

The group discussion highlighted that the public infrastructure for shared mobility in Mexican cities requires dedicated and secure spaces for various service types, particularly at modal transfer centers. Participants saw opportunities in the implementation of infrastructure dedicated to active mobility and enhanced connectivity at transport nodes.

On the topic of data usage, participants agreed on the challenges of establishing clear data sharing terms and complying with data-protection laws. They saw opportunities in setting clear objectives for data usage, anonymizing information, and considering the monetary value of the data generated during negotiations and regulatory actions.

Participants acknowledged that shared mobility services generate a wealth of data, which can be instrumental in planning, monitoring, and evaluating the impact on the mobility system and urban environment. However, they noted that these data are not easily accessible or useful outside of the providers. Furthermore, standardized and transparent methods are lacking for data collection, sharing, and analysis. This presents an area for potential improvement in the shared mobility ecosystem.

Table 2: Sustainability and equity

This discussion revealed specific challenges related to social equity. These challenges encompass coverage disparities within urban areas and a noticeable technological access gap. Challenges also include coverage gaps in urban areas and a significant technological access divide. However, they also present opportunities to bridge this gap, integrate payment methods, ensure universal accessibility, and promote flexible transportation options in underserved areas. Shared mobility services offer an alternative to irregular informal transport for marginalized communities. Yet barriers like tariff strategies, physical limitations, and digital disparities hinder accessibility and affordability. To truly benefit society in reducing emissions and improving equity, services need enhanced efficiency and accessibility, especially for vulnerable groups.

Table 3: Electrification and technology

Participants at this table centered their discussion on technology and innovation. Participants pinpointed several challenges, including the absence of a systemic vision and the substantial costs associated with implementation. Despite these challenges, they recognized numerous opportunities. These included further technological innovation, the electrification of public transport, enhancements to information platforms, the generation of clean energy, and the creation of corporate mobility plans. The participants also noted that the swift pace of technological evolution in shared mobility introduces its own set of challenges, particularly in the adoption, interoperability, and security of these innovative solutions.

Table 4: Policy and governance

During the workshop, participants pinpointed regulatory norms as a significant issue. They observed that Mexican cities face the challenge of enhancing clarity and coordination between public and private entities. However, they also identified opportunities, such as the establishment of clear communication channels, evidence-based decision-making, and a regulatory framework that encourages a diverse and accessible range of mobility services. The participants expressed the belief that shared mobility services require a robust regulatory framework. This framework should clearly define the rules of engagement and the roles and responsibilities of various actors, as well as provide coordination and collaboration channels between the public and private sectors across different government levels. This would ensure the integration and sustainability of shared mobility systems.

Key takeaways

Common challenges and opportunities identified in Mexican shared mobility:

CHALLENGE	SECTOR/ACTOR	EXPLANATION
Robust regulatory framework needed	Government	There is a need for clear rules of engagement.
Open data availability and quality	Government, research	Data from shared mobility systems are not readily made available or made useful.
Defining government contributions	Government, private companies	Government support of systems is haphazard and unclear.
User acceptance of new modalities	General public	Shared mobility business models have significant trial and error phases.
Financial obstacles, including funding and financial innovation	Finance, private companies	Transport is a low-margin, high-volume business with risky capital investments.
Service integration	Transport system	Shared mobility is operated as a new system and is not well coordinated with existing services.
Operational complexities	Operators	Operators face many logistical challenges in deploying daily service.
Socioeconomic and technological access / comfort barriers	General public	Notable segments of the population cannot experience shared mobility due to physical limitations, cost, or poor access to devices and internet.

OPPORTUNITY	SECTOR/ACTOR	EXPLANATION
Creating an integrated multimodal system	Government, transport authorities, mobility companies	The technology introduces a pathway to combine mobility systems.
Implementing real-time information technologies	Government, transport authorities, finance, mobility companies	Real-time information eases trips by making people aware of existing supply.
Public-private partnerships	Government, finance, private companies	Better risk-mitigation through new partnerships is possible.
Transitioning toward sustainable mobility	Government, general public, mobility companies	New habits can be formed around sustainable modes.
Pathways to enhance efficiency, accessibility, and equity	Government, local communities, mobility companies	The tools of shared mobility can fill some equity gaps, especially if geared to do so.

Curitiba, Brazil: October 31, 2023

Context

National evolution of shared and digital mobility

Shared mobility began in Brazil with the introduction of docked bike sharing in Rio de Janeiro in 2010.[18] Since then, the whole sector, which also includes ridesharing and real-time transit, has expanded significantly, but with notable growing pains.[19]

Ridesharing gained popularity between 2014 and 2016 with the introduction of ride-hailing platforms across major cities. Despite initial attempts to ban or limit these services, a national law in 2018 legalized ride-hailing under the National Policy of Urban Mobility, Law 12.587/2012. Presently, most large cities enforce local regulations focusing on vehicle and driver requirements, dominated by Uber and 99 (owned by DiDi).[20]

Docked bike sharing has grown successfully, while dockless systems have struggled. Docked systems are set up in 10 state capitals and several medium-sized cities. Typically, an external sponsor covers capital costs (often a bank), while companies like Tembici and Serttel manage operations at no cost to municipalities. Dockless bike sharing has been less successful. Micromobility companies like Yellow and Green (which later merged into Grow) attempted dockless bicycles and electric scooters in 2019 but faced challenges like vandalism and the COVID-19 pandemic, leading to discontinuation in most cities.

Commuter experience apps like Cittamobi, Moovit, and Mobilibus have been prevalent for a decade in major cities, often partnering with local transportation for real-time GPS data sharing. While some private Mobility-as-a-Service (MaaS) initiatives have been attempted through private companies like Quicko, none have been sustained in cities.

Curitiba's experience

Curitiba is well known for innovating in mass transportation. It is popularly known as the birthplace of the BRT concept and for using it to influence urban growth. In Curitiba, ride-hailing services started in 2016 and faced attempted bans until local regulation in 2017 stabilized operations. Curitiba established its docked bike sharing system even more recently, just launching in 2023. Notably, half its 500 bikes are electric. As in other cities, previous attempts at dockless scooter and bike sharing were short-lived.

Curitiba plans to pioneer an open platform MaaS pilot project, an unprecedented initiative in Brazil, slated for deployment in the coming years. A tendering process will select the technology provider to integrate diverse mobility options into a single platform, offering integrated payments and incentives for user behavior. The city also introduced Hipervisor Urbano this year, integrating data from various departments to aid urban planning and foster data-driven decision-making.

Finally, Curitiba is pushing for electromobility, with a pilot project for electric buses already testing seven vehicles in daily operations. By mid-2024, the aim is to have 70 electric vehicles running, and a full electric fleet by 2030 as part of the upcoming tendering process. Additionally, six electric taxis have covered 125,000 kilometers since June, slashing over 14 tons of carbon dioxide emissions.

Participants

INTERVIEWS	
Sector	**Actors**
Government	Institute of Research and Urban Planning of Curitiba (IPPUC) Urbanização de Curitiba S/A (URBS), local transport authority
Mobility companies	Uber Tembici
Development banks	Inter-American Development Bank (IADB)
Research and academia	André Turbay—professor and researcher at Pontifícia Universidade Católica do Paraná Luis Fumagalli—professor and researcher at FAE Centro Universitário and member of the local Urban Mobility Council of URBS

WORKSHOP ATTENDEES	
Sector	**Actors**
Government (16 attendees)	IPPUC URBS, Agência de Curitiba (innovations and economic development public agency) City Transit Department, City Environment Department
Private companies (5)	Uber Volvo COPEL (state electrical energy supplier)
Nongovernmental organizations (6)	WRI Brasil
Development banks (2)	Inter-American Development Bank
Research and academia (4)	Universidade Tecnológica Federal do Paraná Federation of Industries of the State of Paraná
Public transport operators (6)	CWBus Sorriso Glória

The Curitiba discussion

Table discussions

Table 1: Integrated systems

The participants identified several challenges to achieving more integrated mobility systems, such as policy, economic, technology, and safety barriers. Some of the main issues were the lack of metropolitan planning, conflicts of interest between different actors, difficulty of technological integration and interoperability, and lack of public safety and trust.

Workshop participants recommended actions to overcome the barriers including optimizing system integration, such as by deploying pilot projects to test the solutions and obtain data; creating a shared governance structure between public and private actors; improving the integration of the public transport itself; and updating the legislation to provide more room for innovation.

Table 2: Electrification and efficiency

The workshop identified key barriers to promoting low-carbon transportation, including the need to increase awareness and acceptance of its benefits among professionals and the public. Financial challenges, like high costs requiring government support and a lack of technical expertise in traditional systems, also hinder progress. Additionally, insufficient infrastructure, limited technology availability, and rigid municipal policies pose significant obstacles.

On the brighter side, these experts highlighted various opportunities and solutions for advancing low-carbon mobility. They emphasized the potential for result-driven governance and innovative approaches like the avoid-shift-improve model. Diversifying and integrating mobility options could significantly improve efficiency. They also stressed the importance of impactful political actions, such as implementing incentives and restrictions. Real-time data on infrastructure and energy, user-oriented policies, and fostering collaboration among all involved parties were identified as crucial steps forward.

Table 3: Mobility for All (gender and social equity)

Workshop participants pinpointed key barriers to equal access. They highlighted planning oversights that neglect diverse mobility needs, particularly between genders. Poor infrastructure for walking or cycling further discourages usage. Lack of updated passenger data hampers necessary actions, alongside harassment incidents on public transport, especially affecting women.

To overcome these barriers, the participants proposed actionable solutions. They suggested an integrated transport system offering varied modes for accessibility and choice. Tailoring fare ranges to individual needs could incentivize usage. Detailed passenger profiles, including harassment records, would inform decisions. Installing cameras at insecure bus stops could boost security. Educational campaigns and measures aiding hearing-impaired individuals using public transport were also recommended.

Table 4: Policy mechanisms

The workshop pinpointed several significant barriers affecting policy implementation. They emphasized the challenge of limited public participation in shaping and assessing policies, stressing the necessity for a more inclusive framework. Additionally, they highlighted the strained relationship between public and private sectors, especially in transparent data sharing for urban planning. Fragmented legislation across government levels emerged as a major hurdle that hindered coordinated strategies and funding for mobility solutions. Finally, the lack of a cohesive national sustainable mobility plan was identified as a critical barrier that limited innovation guidance among cities.

The participants proposed solutions centered on inclusive governance structures that encourage public engagement and transparent collaboration between the public and private sectors. They suggested aligning legislation across government levels for cohesive strategies and funding mechanisms. Urging the creation of a national mobility plan, they emphasized the need for city networks to share successful approaches and integrated policies among municipalities for unified mobility strategies.

Table 5: Smart Cities

Participants at this table identified key barriers in the areas of Smart Cities and data. They discussed the lack of alignment between urban planners and mobility platforms, emphasizing the need for shared objectives. They highlighted challenges stemming from the perception of data as a resource rather than a strategic asset and the struggle to convert data into actionable plans. Issues such as the absence of a structured governance framework, insufficient public sector resources, and the absence of standardized data sharing formats were also highlighted. Legal compliance and the need for updated regulations were cited as further obstacles.

However, workshop participants also felt that there were many opportunities and potential smart solutions within the shared mobility ecosystem. These included implementing real-time data tools for transport planning, integrating sensors in vehicles to pinpoint urban infrastructure needs, and optimizing curbside management for ride-hailing services. They emphasized the importance of using shared data to inform policymaking and proposed innovative strategies, like "gamification," to influence commuter behavior positively. Furthermore, they advocated for involving key public authorities in understanding transportation needs, utilizing unconventional data sources, and promoting uniform adherence to shared rules among market players to advance sustainable mobility policies.

Identified barriers and priorities

Reflecting the city's history of innovation in mass transport, Curitiba's workshop participants demonstrated a readiness to try new systems when they could lead to positive outcomes. Within this context, the workshop altered "Challenges and Solutions" to "Barriers and Priorities"—a distinction that allowed participants to focus more closely on planned or anticipated actions. The city is already engaging in several digital mobility pilots that it identified as priorities, including Mobility-as-a-Service and Transport-as-a-Service concepts, payment integration, and a data-driven decision-making project.

At a broad level, the barriers identified in Curitiba's shared mobility ecosystem involve integrating systems, ensuring fairness and equity, and building trust between sectors. Participants recognized difficult technology integration and poor data sharing regimes as hinderances to progress. They also expressed concerns about public awareness and safety, as well as gaps in infrastructure for electric vehicles. One participant highlighted the need for behavioral change: "We need to raise the awareness of the population about sustainable urban mobility and promote a behavioral change similar to the one that happened with solid waste management and recycling."

As a method to move forward, another participant stressed collaborative partnerships over restrictions: "Public-private partnerships should be based on incentives and collaboration instead of prohibitions."

Barriers

BARRIERS/CHALLENGE	IMPACTED SECTOR/ACTOR *Government and . . .*	EXPLANATION
Integration and trust issues	Mobility companies	Challenges remain in integrating payment systems, procuring private companies, and building trust for data sharing between public and private sectors.
Service availability and equity	Private actors	Shared mobility services predominantly operate in central, high-demand areas, leaving out citizens in peripheral, economically disadvantaged regions.
Technological integration	Private actors, research and academia	Integrating different platforms is made more difficult by varying standards, formats, or protocols.
Trust and data sharing	Mobility companies, research and academia	Shared mobility companies are reluctant to share their data, while the public sector lacks capacity to fully use the data.
Public awareness	Research and academia, civil society	The public needs to be made more aware of their travel options.
Infrastructure for electric vehicles	Private actors, civil society	Urban charging infrastructure for electric vehicles is lacking.
Public safety and road safety	Mobility companies, civil society	Vandalism or theft of shared vehicles and road safety are concerns for users of scooters or bicycles.
Short-term public policies	Civil society	Many public policies only cover terms of office and are not permanent.
Building a framework for Mobility-as-a-Service (MaaS) and using it to attract providers	Civil society, mobility companies, banking actors	A clear and consistent institutional framework is needed for the operation of MaaS to overcome the difficulty in communicating with and attracting new MaaS companies.

Priorities/solutions

PRIORITIES/SOLUTIONS	IMPACTED SECTOR/ACTOR *Government and . . .*	EXPLANATION
Upcoming new payment forms and integration opportunities	Public transport operators, users	Curitiba is preparing to launch a new payment form for public transport, which will allow credit cards and integration with the bike sharing system. This can leverage the complementary benefits of both systems.
Using platforms to build awareness and shift behaviors	Private sector, users	Some actors suggested that platforms can influence awareness about sustainable urban mobility and become a facilitator for a change in habits. Gamification, rewards, or information can encourage users to choose more sustainable modes of transport.
Data sharing and application program interfaces (APIs)	Private sector	An API is beneficial for data sharing. Participants imagined using the data for better curb and travel management.
Multimodal integration with M**o**bility-as-a-Service (MaaS) and Transport-as-a-Service (TaaS) pilots	Private sector, development banks, users	Curitiba is planning a MaaS and a TaaS pilot. MaaS and TaaS platforms can attract new users to public transport and promote complementary modes.
Workplace travel plans and trip reduction ordinances	Private sector, research and academia, users	New mobility solutions can help make workplace travel plans and trip reduction ordinances feasible. New mobility platforms can offer incentives or alternatives for workers to commute more sustainably.
Micromobility solutions for first and last mile	Mobility companies, research and academia, civil society	This can enhance the connectivity and accessibility of public transport by creating larger catchment areas for core transit services.
Public-private partnerships	Private sector, banking	Encouraging partnerships based on incentives and collaboration rather than prohibitions can foster innovation.

Strengths, weakness, opportunities, threats (SWOT) for the shared mobility industry to enhance sustainability

The following SWOT analysis considers issues faced by the overall shared mobility industry (including ride-hail, bike share, other micromobility, and car share, but not public transit). It is informed by the workshops to identify issues that could help or hinder the greater adoption of these services as part of a sustainability plan.

STRENGTHS	Offers more options, convenience, and efficiency for urban transport. Reduces the need for private vehicles which could foster sustainability and equity. The technology makes shared mobility a natural point for collaboration, and offers easily imagined visions of efficiency and new models of service.
WEAKNESSES	The willingness of shared mobility companies to do business despite a lack of clear regulatory frameworks presents a risk to the companies and the public where those conditions exist (gray-zone operation). Gray-zone operation also makes it difficult to incorporate into a sustainability ecosystem. Weak data sharing regimes are due in part to legitimate privacy concerns. Issues have emerged in delivering on spatial and social inclusion, and divergent public acceptance.
OPPORTUNITIES	Desire for improved regulation that integrates and balances shared mobility services into the wider transport ecosystem. Leverage technological developments and partnerships to create more integrated and multimodal systems. Enhance the connectivity and accessibility of public transport. Promote behavioral change and awareness among users. Support the transition toward zero-emission mobility and decarbonization by using cleaner and more efficient technologies and modes.
THREATS	Still new and unstable government regulation may change. The shared mobility industry faces competition and resistance from other transport modes and actors, such as taxis, informal services, and private car owners. Basic security and safety issues, such as vandalism, theft, or road accidents, can affect the reliability and trustworthiness of the services.

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