Microtransit in Latin America and the Caribbean:

Governance, Operations, and Regulation for Socially Inclusive and Sustainable Urban Mobility

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Acronyms

AbT – App-based Transportation

AbCT – App-based Collective Transportation

B2B – Business to Business

B2C – Business to Consumer

CO_2 Emissions – Carbon Dioxide Emissions

IDB – Inter-American Development Bank

ITDP – Institute for Transport and Development Policy

LAC – Latin America and the Caribbean

NGO – Non-Governmental Organization

O-D Matrix – Origin - Destination Matrix

TNC – Transportation Network Companies

VKT – Vehicle Kilometers Travelled

Content

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Daniel Oviedo[ii]   Andrea San Gil[iii]   Orlando Sabogal-Cardona[ii]   Lynn Scholl[i]

Abstract

This document provides an overview of the current landscape of app-based collective transportation in Latin America and the Caribbean from the perspective of its contributions to social inclusion and environmental sustainability. The research builds on a review of the recent academic literature and a review of available secondary evidence from technical reports and policy documents. The analysis of secondary evidence is expanded upon through primary evidence from a stakeholder survey and semi-structured interviews with a select group of stakeholders in the transportation sector in the region. The manuscript shows the current situation in what remains an emerging industry in Latin America and the Caribbean, spanning from the terminology used by practitioners in different sectors to refer to app-based collective transportation, such as vanpooling, microtransit or micro transport, to the overview of different business approaches and regulatory responses in various contexts. The paper finalizes by presenting an evidence-based reflection of the prospects and expectations from different perspectives about the contribution of technology-enabled collective transportation to social and environmental challenges for transport in the region.

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1. Introduction

While they remain an emerging phenomenon in cities in Latin America and the Caribbean, App-based Collective Transportation (AbCT) services have gained ground in the urban markets in regions of the global north and south. Also known as Microtransit or demand-responsive transit, these digitally enabled on-demand shared transport services have emerged as a potential solution for a myriad of users seeking higher quality, safety, and comfort in collective services in exchange for a premium in the fare price, compared with traditional public transportation.

Microtransit, as a concept, refers to the utilization of technology to optimize the scheduling and routing of small-scale transport services, such as vans or shuttles. These services may be operated by private companies or public transportation agencies, and often employ smaller vehicles than traditional fixed-route bus or rail systems. The objective of AbCT is to provide more efficient and convenient mobility options in areas where traditional forms of transport may not be practical. Most experiences with microtransit come from the United States and Europe, and results suggest that it can be difficult and expensive to implement and integrate with larger transport systems, making it hard to be financially sustainable. Studies in Europe have shown that microtransit can have a positive impact on urban mobility, but evidence shows that the service has low occupancy rates and low load factors.

A recent report by the IDB has suggested that app-based transportation (AbT), and in particular microtransit, holds significant potential for social inclusion under the right circumstances, yet it also highlighted that the evidence in Latin American cities is scarce and that past and ongoing AbCT ventures have not been sufficiently studied in the academic literature (Oviedo et al., 2022). These innovations can not only increase the number of transport service options but if they were to be integrated with public transit systems, could provide potential new avenues for flexible on-demand, first-mile last-mile connections to public transit. Some hypotheses about microtransit include its potential to fill gaps in current public transportation operations, to incorporate informal transit services, and to address some of the negative externalities associated with the sector through incentives for vehicle upgrades, offboard payment, the ability to monitor speeds, locations, and optimize routing and scheduling. Less discussion is available regarding their social and environmental implications.

This manuscript presents a comprehensive examination of the current landscape of app-based collective transportation in Latin America from the standpoint of its impact on social inclusion and environmental sustainability. The research is based on a thorough review of recent academic literature and a synthesis of secondary evidence from technical reports and policy documents. Additionally, primary data was collected through a stakeholder survey and semi-structured interviews with key stakeholders in the transportation sector in the region. The manuscript covers a wide range of topics, including the terminology used by industry professionals to refer to app-based collective transportation (i.e., vanpooling, microtransit or micro transport) and an overview of various business models and regulatory responses in different contexts. The paper provides a detailed examination of the current state of this emerging industry in Latin America and the Caribbean. It concludes by offering an evidence-based assessment of the potential and expectations for technology-enabled collective transportation to address social and environmental challenges in the region.

2. Literature Review

App-based collective transportation is an emerging topic in the transport sector. Most related publications are less than a decade old, and very few publications date from before 2012. In a bibliometric analysis of research on shared mobility and informal transport between 2010-2021, Behrens et al. (2021) found that literature related to microtransit began to emerge in 2010 and continues to be an uncommon topic in research, with few yearly publications in the last decade and a minor proportion of publications in comparison to other fields of study in the transport sector (see Figures 1 and 2).

Figure 1. Annual publications by research field found by Behrens et al (2021)

Annual publications, by research field (N=2 961, 2010-2020)
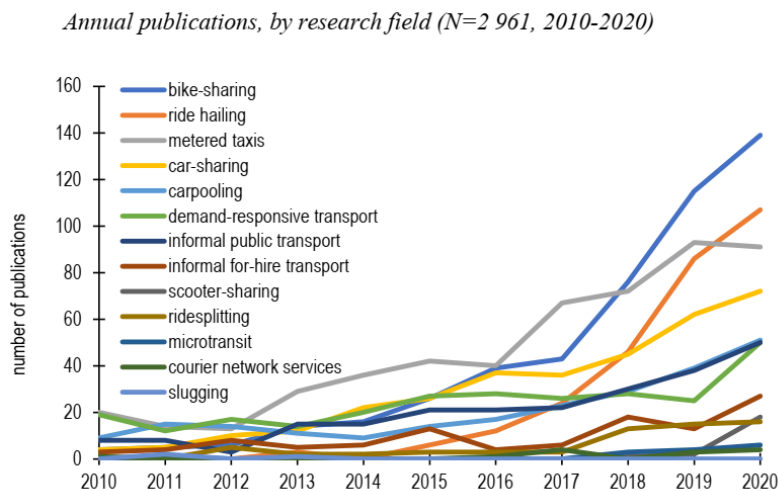
Figure 2. The proportion of publications in each research field explored by Behrens et al (2021)

Research fields (N=3 295, 2010-2021)
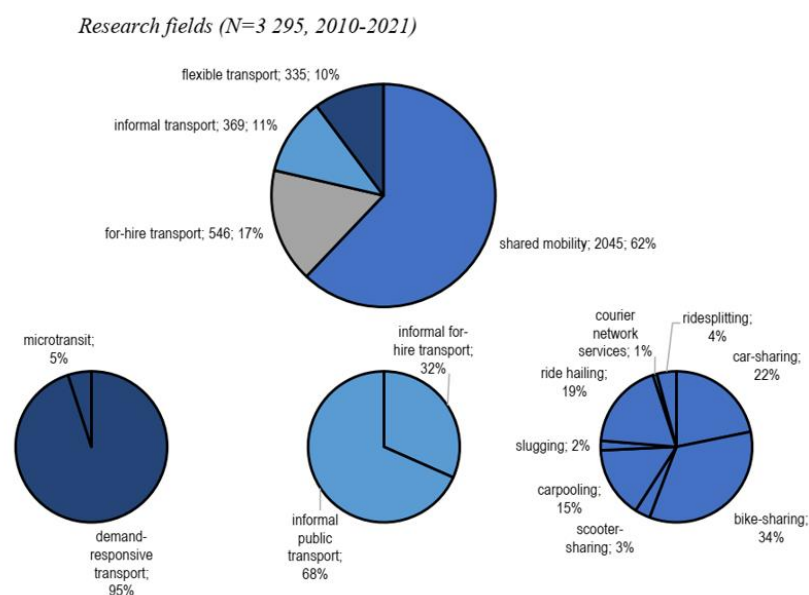
Research on microtransit has mainly focused on case studies and pilot projects in the United States, with service providers such as Chariot, Bridj or Via. Most of the existing literature on the topic focuses on the United States, followed by articles and case studies for Asia. Literature on app-based collective transportation that focuses on Latin America is scarce, with only a few articles published for case studies from Brazil with Via (Wiener-Brodkey, 2021; Wiener-Brodkey & Macadar, 2020) Mexican cities such as Mexico City and Toluca, with Jetty (Bustillos & González, 2020; Flores Dewey, 2019; Hernandez Romero, 2018; Tirachini et al., 2020) and a design exercise for a university in Colombia (Apolo-Matamoros & Rueda, 2021).

2.1 Terminology and definitions

Microtransit is a relatively new concept and service in the transportation sector. It is a type of **app-based transportation**, which covers demand-responsive collective transportation services that base their operations on smartphones or digital platforms (Oviedo et al., 2022; Shaheen et al., 2020). Microtransit has been defined as a privately owned and operated shared transportation system, usually using **minibuses or vans**, with **flexible routes** and **on-demand** scheduling, in most cases using an **app** or digital platform to coordinate or request trips (Westervelt et al., 2018). Microtransit services occupy a **middle ground between private transportation services and mass public transportation** characteristics like flexibility, price, comfort, and travel time (Wiener-Brodkey, 2021).

Figure 3. Characteristics of Microtransit Services
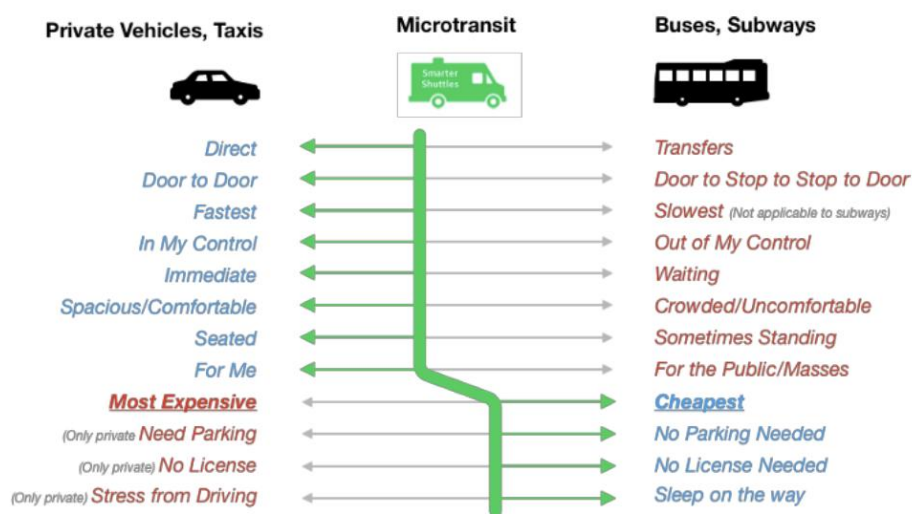
Source: Kim, N. Y., 2019 as cited in Wiener-Brodkey, 2021

Although the term microtransit is relatively recent, the academic and practice-oriented literature recognizes other terms to describe services that use microbuses or vans to provide flexible or demand-driven services for certain populations, such as **vanpooling** and **paratransit**. Vanpooling originated in the 1970s to enable collective commuting for people living in the same area and going to similar destinations (Kircher and Wapensky, 1978, as cited in Tirachini et al., 2020). Paratransit usually refers to door-to-door services targeted at people with disabilities, ageing populations or with mobility restrictions such as physical or cognitive disabilities (Garnier et al., 2020). Although many of these models have been in operation for decades, some have begun introducing technology to optimize and improve their operations (Garnier et al., 2020; Kheang Phun et al., 2018). It has been argued that microtransit services are simply a technologically enhanced version of **popular and informal**

transport services provided using minibuses that have existed for decades, particularly in the Global South (Cervero, 1998, as cited in Wiener-Brodkey, 2021).

Microtransit is now widely used to refer to collective transportation services enabled by digital applications, particularly in the United States. The term is still not often used to refer to these services in Latin America. Other terms used in the literature referring to pilots or projects in the LAC region are **app-based collective transportation** (Flores Dewey, 2019), **Transport Network Companies** or Empresas de Redes de Transporte in Spanish (referring to the companies providing the app services) (Bustillos & González, 2020; Hernandez Romero, 2018), **private collective transportation** (Hernandez Romero, 2018) and **shared mobility services** (Tirachini et al., 2020).

Service models

Microtransit services reviewed by existing literature have often emerged to provide a mobility option in areas with low public transportation coverage, in particular where low density or geographic constraints make public transportation with fixed routes unsuitable. Hansen et al. (2021) suggest three typologies linked to the purpose of microtransit services:

> a. Those that are designed to address **first/last mile** transportation needs, providing connectivity to fixed-route public transportation stations or stops.
> b. Those trying to **cover gaps in public transportation coverage**, particularly where there are no public transportation services or barriers to access.
> c. Those that **replace fixed-route public transportation services** reduce impacts to a community when these services are to be removed or reduced.

The flexibility and scale of microtransit services allow for a diversity of uses and applications. These include, among other collective services in the same category as public transit, the provision of feeder services to mass transit, connecting low-density suburbs, and providing off-peak transportation services. AbCT can also serve as a tailored solution for specific population groups and travel purposes. These include providing accessible services for disabled or ageing populations, providing transportation services for shift workers, school, or airport drop-offs, or specific events or entertainment destinations (MaRS Discovery District, 2016, as cited in Wiener-Brodkey, 2021).

Depending on the case at hand, routes and operation models differ. Westervelt et al. (2018) identify several potential service configurations, including:

> a. **Fixed route/fixed schedule**: similar to conventional public transit, however, routes can be adjusted via crowdsourcing (user requests and suggestions)
> b. **Flexible Route/fixed schedule**: where users request services via an app, and although routes are flexible, there are fixed schedules.
> c. **Fixed route/on-demand schedule:** where users request services at any time via an app for a predetermined route.
> d. **Flexible route/on-demand schedule:** where users request a service at any time through an app, and like ride-hailing services, routes will be adjusted to respond to demand, traffic, etc.

In Latin America, documented experiences from Brazil and Mexico show different configurations, with key commonalities such as the use of pre-established pick-up and drop-off spots, the operation in key designated areas, and the use of demand data to adjust and provide feedback to stop and route design and planning, as shown in Table 1. In contrast with the typologies suggested by Hansen (2021), service models in Latin America tend to aim at either **attracting users back to public transportation** or providing a **higher quality**

collective transportation option to users whom public transportation is currently not serving and who would otherwise likely use private transportation options (Flores Dewey, 2019; Tirachini et al., 2020; Wiener-Brodkey, 2021).

The documented case studies for Latin America found that microtransit follows the typical **Business to Consumer (B2C) model** where even though companies might operate with certain partnerships, **services are provided directly to consumers**. Business to Business (B2B) models, where transport services are provided to another company or businesses, have been documented for other transportation fields, such as corporate car-sharing services for business travel (Clark et al., 2015) or logistics and freight services (Gil-Saura et al., 2018). No literature was found referring to B2B models for microtransit.

Table 1. Key characteristics of app-based collective transportation services in LAC

Characteristic	Goiânia	Fortaleza	Mexico City	Toluca[1]
Company	Via	Via	Jetty	Jetty
Partnerships	HP Transportes – existing public transportation operator	Sindiônibus - Urban and Metropolitan Passenger Mass Transportation Union of the State of Ceará	SVBus – existing public transportation operator Other jitney associations	Autotransportes del Valle de Toluca y Estrella del Noreste – transportation operators 4 public hospitals in the area IDB ITDP Mexico State Mobility Secretariat
Vehicle typologies	14-seat Mercedes Benz vans	13-seat Mercedes-Benz Sprinter vans	3-6 seat cars 12-19 seat vans 30-45 seat buses	Buses
Route/Stops	Nearby corner Public transportation stop Demand driven	"Virtual" bus stops defined by app Demand driven	Defined pick up and drop off stops Fixed routes (Adjusted based on feedback and demand)	Defined pick up and drop off stops Fixed routes Based on user survey (O-D)

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[1] This was a pilot project and not a permanent operation.

Coverage	Specified geographic area	Specified geographic area	Specific geographic area Peak hours (home-to-work trips)	Specified geographic area
Scale	80 neighborhoods 80,000 users.	17 neighborhoods	160,000 passengers in first year of operation	45 users from 4 hospitals
Model	B2C	B2C	B2C	B2C, limited to specific users
User profile	NA	NA	Middle-high income Highly educated Vehicle owners	Health workers 82% women
Amenities	Air conditioning USB chargers Security cameras Trained drivers	Air conditioning USB chargers Leather seats Trained drivers Use of exclusive bus lanes (speed)	Seat booking No standing passengers Security cameras Trained drivers Insurance Wifi Electronic outlets	Seat booking GPS location Exclusive to health workers Low % of occupation to for social distancing Disinfection and other sanitary measures
Pricing	Base fare + increase based on distance No dynamic fare	Proportional to number of riders Discounts No dynamic fare	Depends on route characteristics (e.g. tolls)	NA
Payment	App – credit card Onboard – cash or city card	App – debit or credit card	App – credit card	App – credit or debit card Top up via convenience stores for non-bank users

Sources: Bustillos & González, 2020; Flores Dewey, 2019; Hernandez Romero, 2018; Schlickmann, 2019; Tirachini et al, 2020; Tun et al., 2020; Wiener-Brodkey, 2021

2.2 Governance and Regulatory frameworks in Latin America

The possibilities for the design and operation of transport services depend highly on the regulatory environment in which they must operate and the stakeholders involved in funding, designing, operating, and executing them. Hansen et al. (2021) suggest two categories for service provision based on who funds and delivers app-based collective transportation services:

- **Independent:** where the service is funded exclusively by a public transit agency
- **Partnership:** where the service is delivered by the agency in partnership with external partners

These categories apply to much of the literature found in the United States, where microtransit pilots have been supported by state or local governments. However, in Latin America, projects and pilots using app-based collective transportation services do not receive funding from government agencies. Instead, they are mostly led and funded by **private operators outside of government structures.** In some cases, the initiative to incorporate technology into collective transportation services has come from existing transport operators worried about declining passenger demand, as is the case in Brazil (Wiener-Brodkey, 2021). In other cases, operators and authorities are approached by the TNC companies or international entities who suggest incorporating technology into public transportation operations, as is the case in Mexico (Bustillos & González, 2020; Flores Dewey, 2019; Hernandez Romero, 2018). None of the case studies to date show leadership or initiation coming from a government entity. Even so, research highlights the key role that state and local governments have in the success or failure of these operations, and in ensuring that they generate public value, innovation and improvement of public transportation services (Bustillos & González, 2020; Hernandez Romero, 2018; Wiener-Brodkey, 2021)

Regulation has also played a role in enabling or restricting the scale and coverage of operations for these types of services in Latin America. Mexico City was the first Latin American city to regulate TNC operations, allowing them to coexist with public transportation services, each with its own regulation. The Mexican regulatory framework categorizes TNCs as private transportation services. However, it was mainly designed to respond to individual transport models such as Uber, not collective ones. Despite this, the definitions in such legislation were open enough so that a microtransit operator such as Jetty can receive a permit as a private operator (Flores Dewey, 2019; Hernandez Romero, 2018).

The experience in Mexico also shows a strong influence from public transportation operators (both taxis and buses/jitney associations) on regulation and restrictions regarding how and where new models such as app-based collective transportation services can operate. These actors perceive new models as a threat and competition, requiring both authorities and new transport companies to negotiate and find a middle ground with them (Flores Dewey, 2019; Hernandez Romero, 2018). This has led app-based collective transportation operators to seek **partnerships with existing jitney and public transportation operators** to ensure the success of their businesses and the safety of drivers and customers while at the same time allowing them to scale up their operations and gain access to users, areas or routes that would not be accessible to them independently or as private transportation providers (Flores Dewey, 2019).

2.3 Social and environmental contributions

Research on app-based mobility, mainly on ride-hailing, has focused on the equity, accessibility, and sustainability implications of these types of services (Oviedo et al., 2022).

Several scholars within this literature have argued that pilots carried out for microtransit operations tend to focus mainly on elements, such as ridership, route optimization and revenue, excluding performance metrics regarding equity, social or environmental contributions (Barrett et al., 2019; Cevallos, 2020). However, those studies that have examined such elements offer valuable insights to orient decision-making and policy regarding this topic.

Studies on projects from the Global North have found evidence that microtransit services can serve as a **mechanism to increase social mobility**, with a potential to **address the mobility needs of certain disadvantaged populations,** including those who trip chain, who live in transit deserts, in suburban or peri-urban areas, the elderly, youth, etc. (Brown & Grossman, n.d.; Palm et al., 2021; G. Wiener-Brodkey, 2021). However, results also show that the implementation of these projects is often expensive, presenting difficulties for financial sustainability (Oviedo et al., 2022).

The lack of government funding for projects in Latin America results in stronger business-oriented goals for them, catering to **higher-income users** who can pay higher fares for a better-quality transport service (Flores Dewey, 2019; Tirachini et al., 2020; Wiener-Brodkey, 2021). This situation raises some equity and inclusion concerns, as it poses the risk that groups that have lower incomes, those that are less tech-savvy, or who might not have a bank account, might be excluded from these higher-quality services, deepening inequality (Bustillos & González, 2020; Tirachini et al., 2020).

In terms of environmental contributions, because of the narrow population group that microtransit services currently tend to serve, they have shown effectiveness in **reducing the use of single occupancy vehicles and consequently reducing CO2 emissions** due to a modal shift and VKT reduction (Tirachini et al., 2020; Wiener-Brodkey, 2021). In Brazil, studies have shown that 81% of microtransit users for the project CityBus 2.0 would have chosen individual modes of transportation (Wiener-Brodkey, 2021), while in Mexico, 58% of Jetty users would have travelled by private car, taxi or ride-sourcing services (Flores Dewey, 2019).

Studies that have addressed other social contributions of microtransit services have focused mainly on their impacts on personal safety and an overall **improvement of the quality and user experience of public transportation services**. Flores Dewey (2019) attributes the success of microtransit services in Mexico to the provision of an alternative in a context where public transportation is unsafe, uncomfortable, unreliable, and inconvenient. They argue that a lack of subsidies and strict regulation to tariffs for jitney operators that serve most of the trips in Mexico City, results in operators cutting operational costs, such as insurance, maintenance, fleets, driver hiring and compensation. Beyond an app, they argue that Jetty contributes to an improvement of the service in terms of labor (proper contracts and training to drivers), adequate insurance, safety, and comfortable vehicles (Flores Dewey, 2019). User surveys analyzed by Tirachini et al. (2020) indicate that users perceive attributes such as the possibility of booking a seat, security against theft, trip duration and travel time reliability as the most valuable assets offered by the service.

Recent studies have developed **indicators and evaluation frameworks** to assess the performance of microtransit services, including metrics to monitor sustainability and equity outcomes. Hansen et al. (2021) carried out a scan of best practices for performance evaluations for transit agencies operating microtransit or on-demand services. They developed an evaluation framework and service standards for microtransit services for a metropolitan transport agency to make informed decisions on service planning and any corrective actions needed. Buenk et al. (2019) developed a series of sustainability indicators for microtransit. For Latin America, Bustillos & González (2020) carried out an assessment of a Jetty pilot in Toluca, Mexico, measuring indicators such as CO2 emissions, number of users, registrations, number of driver training, user and operator ratings, recurring use (per day and

times), tickets per route and stop, cancellation rates. Wiener-Brodkey (2021) adapted a framework to assess the potential for the public value of microtransit projects. These frameworks can help guide the design, planning and assessment of microtransit projects with a broader lens that includes equity, inclusion, and sustainability.

3. Methodology

3.1. Expert survey

This study followed methods from previous research and publications on public transportation governance and performance that tap into the criteria of experts and assesses the level of concordance between their insights (Cafiso et al., 2013; Hirschhorn, 2018). A commonly used technique to acquire these insights is Delphi surveys, where researchers develop a set of questionnaires to identify and categorize perceptions, problems or trends based on experts' knowledge to reach a consensus and aid the decision-making (Habibi et al., 2014). Delphi techniques focus on articulating different expert visions into a tool to support the solution of complex policy matters (Turoff, 1970 in Hirschhorn et al., 2018). It is understood that the validity of results from this exercise will depend on the selected people being knowledgeable and experts in their field. However, it is recommended to have a panel of experts from different specialties (Habibi et al., 2014). The number of experts varies. Initially, Delphi methods used small samples (5-10 experts), but variations of the methodology allowed for larger samples to collect wider views (Hirschhorn et al., 2018).

Considering microtransit is an emerging topic in the transport sector, with very few experiences and projects in Latin America, the scope of people available to offer insights on this particular topic, particularly in the region is limited. Therefore, it was decided that the survey would not be targeted to a large sample, but rather to a select group of experts in the field of transportation, including experts from:

- Microtransit projects and companies in the LAC region
- Transport Network Companies (or Ride Hailing companies)
- International cooperation agencies and development banks
- NGOs or civil society groups
- Local and national governments
- Academia
- Consulting agencies

Considering the systemic character of public transportation and its intersections with other transport modes and systems, the scope of experts was purposely not restricted to microtransit but to different related fields and sub-sectors within the transportation sector. The selection of the experts themselves and the related fields, followed conventional approaches suggested by literature (Hirschhorn et al., 2018), such as sampling based on actor types (seeking representativeness from a diversity of affiliations and views), where actors were identified from the literature review, news articles, publications, or the research team's existing networks. Afterwards, the initial group of stakeholders was extended via snowballing (asking interviewees to recommend other potential participants).

The research team developed a questionnaire in Spanish and English using Maptionnaire[2], which was reviewed, tested, and adjusted to improve its clarity and precision and set up an email so respondents could reach out in case they had any questions. The survey was sent directly to each point of contact in an email or message explaining the purpose of the survey and suggesting that the contacts share the survey with other experts in the field to gather as many insights as possible. The research team and project partners also posted the survey link

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[2] The survey can be found at the following link: https://new.maptionnaire.com/q/7jj2d6avb4h6

on social media (namely Twitter and LinkedIn) and other expert groups, mailing lists and networks to increase its reach and gather opinions from other potential experts not identified on the initial scan.

The processing of the survey responses was carried out using mixed methods (qualitative and quantitative) depending on the type of questions and the number of responses.

Figure 4. Landing page for the stakeholder survey

The expert survey was carried out in November 2022. In total, 69 respondents started to fill out the survey. Nevertheless, more than 50% of respondents stopped answering it before reaching the midpoint of the survey. Those who remained in the survey did not answer all questions. As a consequence, the sample size can change from one question to another, though on average sample size is around 23 respondents. Most people that answered the survey have more than ten years of experience in the transport sector (21 respondents). Most respondents were from Colombia (8) and Brazil (5), although they also represent other parts of the region, such as *Cono Sur* (Argentina and Uruguay), North and Central America (Costa Rica and Mexico) and the Caribbean (Barbados).

Regarding the sector where the company of the respondents operate, 28 respondents declared that their company works in the planning sector with some overlap with consultancy or technical assistance (in 17 cases) and research (in 12 cases. Eight respondents said that their company was a conventional transit service operator, and 11 stated that their company was a regulator.

3.2. Semi-structured interviews

To acquire deeper knowledge and understanding of the relationship between different actors and institutions linked to microtransit in the region, the research team carried out semi-structured interviews following the methods and recommendations of previous research in the transport field (Harpham & Boateng, 1997; Hirschhorn, 2018; Stough and Rietveld, 2004).

To determine the sample of stakeholders, sectors, and people to interview, the team developed an initial scan of:

- Existing microtransit projects and companies in the LAC region

- Other stakeholders related to microtransit projects or linked to the transport sector, particularly TNCs and transport digitalization, including academia, international cooperation agencies, development banks,

Stakeholders and their contacts were identified from the literature review, news articles and other non-academic publications on the matter, and the research team's existing networks and expertise. Snowballing from initial contacts and interviews with the first project interviewees was also carried out when necessary. The initial sample for the interviews consisted of one person by relevant sector, however considering the need to carry out case studies for Mexico and Colombia, the team tried to interview actors specifically related to microtransit operations for these countries, to acquire more details on perceptions, regulations, operations, etc.

Ahead of the interviews, the research team prepared a semi-structured interview protocol with a set of questions for each stakeholder group. Before each interview, the research team carried out a brief scan of background information regarding the operations, projects, or any detail relevant to the organization/person that they would be interviewing. Interviews were carried out via Microsoft Teams and were approximately 1 hour long. These were recorded, with automatic transcripts generated by Microsoft Teams to capture a more precise picture of the interviewee's views and for future referencing (Bryman, 2001). The team also took notes to complement the interview transcripts if necessary.

The team extracted key language, messages, and insights from the transcripts in thematic categories derived from the project research questions and the literature review findings. This coding system facilitated the extraction of insights relevant to the project's research questions (Mayring, 2000).

Interviews were carried out between November 2022 and January 2023, with a total of 14 interviews and 18 participants as shown in Table 2 below. Interviewees are located or work in LAC countries such as Costa Rica, Brazil, Argentina, Mexico, Colombia, Uruguay, Barbados, and Venezuela.

Table 2. Detail on the number of interviewees and their sector of operation

No.	Sector	No. of participants in the interview
1	Aggregator App	1
2	AbCT Operator	1
3	AbCT Operator	1
4	Civil Society	2
5	AbCT Operator	3
6	Aggregator App	1
7	AbCT Operator	2
8	Cooperation Agency	1
9	Cooperation Agency	1
10	AbCT Operator	1
11	Global Think Tank	1
12	Trip Aggregator	1
13	Global Research Organization	1
14	AbCT Operator	1

3.3. Secondary data sourcing

Apart from the information derived from the interviews and surveys, the research team also collected secondary data on AbCT that could be useful for this study. Most of these sources were either derived from the papers and articles read during the literature review or suggested by interviewees during the interview process. These sources include news articles, interviews, op-eds, blog posts from AbCT companies, surveys, databases, or regulations. These resources were reviewed to identify relevant insights into the reality of app-based collective transport in the LAC region.

3.4. Research limitations

This research examines the landscape of AbCT in Latin America and the Caribbean using mixed methods targeting a sample of practitioners across the industry, public sector, development agencies, and non-government organizations. While the sample allows for sufficient diversity in the responses and perspectives reported in this manuscript, it is acknowledged that a larger sample would improve the depth and scope of the findings shown below. More responses from the Caribbean and non-Spanish-speaking countries can contribute to building a wider view of the regional challenges and the nuances in each specific national context. Furthermore, it is also relevant to acknowledge that the sample of the expert survey is self-selected and reflects a set of practitioners with comparatively higher awareness of microtransit than those not working in the industry.

4. Findings

4.1. App-based collective transportation (AbCT): terminology and definitions in practice

Microtransit is a term that has been coined mainly in literature and case studies from the Global North. Interviews found that in many cases, even though interviewees were all involved in the transport sector, the concept of microtransit is not a term that is currently used and adopted by them. For several participants, it was necessary to define what the research team meant by microtransit, or app-based collective transportation to frame the conversation. Interviewees were familiar with terms like **ride sharing and ride-hailing**, but not microtransit. In some cases, practitioners were not aware of the existence of app-based collective transportation (Interviewee 9). In line with local regulations and because of their business model, the study found microtransit operators that identified themselves simply as **special services, private or corporate transportation providers** (Interviewees 2, 5, 14). Another term that has been used for pilots led by a global Think tank in Latin America and certain AbCT operators is **vanpooling** (Interviewees 3 and 11). However, these have different characteristics in terms of routing, with more of a door-to-door focus**.**

The expert survey received 26 responses providing definitions for microtransit. Of those responses, five explicitly referred to active mobility (walking or cycling), or to transport services using vehicles with a capacity of fewer than four people, suggesting confusion with the term micro-mobility. The rest the of definitions did come closer to the accepted definition to microtransit, mentioning the use of mobile devices, digital platforms, apps, vans, etc. The

following word clouds show the diversity of words and phrases used in these definitions and the ten most relevant and repeated words:

Figure 5. Word cloud with a diversity of words used to define microtransit in the expert survey

Source: Authors using data from expert surveys

Figure 6. Word cloud with the 10 most used words to define microtransit in expert survey

Source: Authors using data from expert surveys

4.2. Approaches to AbCT: examples of service models and strategies

Based on the interviews and survey responses, the research team were able to identify microtransit projects and pilots in 17 different cities in Latin America and the Caribbean. Not all of them are currently in operation and some of them have been temporary pilots. There is a diversity of experiences and operations happening in the region linked to microtransit.

Figure 7. Map of microtransit projects identified in the LAC region based on interviews and expert survey
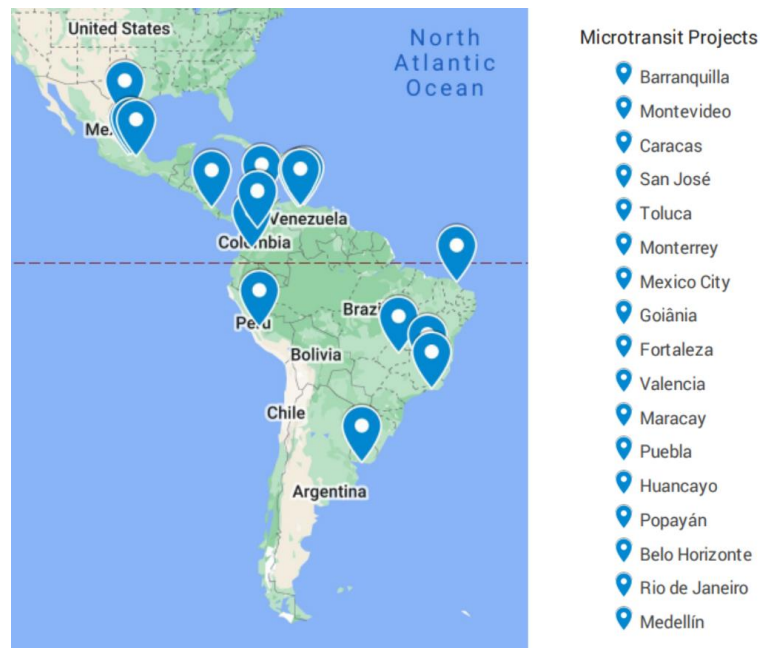
Source: Authors using data from expert surveys and semi-structured interviews

4.2.1   Business models: Business to Consumer (B2C) or Business to Business (B2B)

Most of the LAC case studies found in the literature are Business-to-consumer (B2C) models, where AbCT companies offer their services directly to users. Our interview process confirmed this trend. Although many AbCT companies work in partnership with other stakeholders -for instance transport operators who seek them out to deploy technology in their operations (see Table 3 and the following section for more details)-, **AbCT companies tend to keep a direct relationship with their customers**, who coordinate their trips and pay via the app.

The research found two AbCT operators in the region, however, that are working under Business-to business (B2B) models. Our findings suggest that this choice responds to regulatory restrictions or operational risks. **In countries where regulation is stricter or where operators have faced the most restrictions to operate, AbCT operators tend to adopt B2B operations**, working directly with companies providing corporate commuting services (Interviewee 2, Interviewee 10). In this type of model, operators are usually paid by companies to provide transportation services for their employees, and technology is used for users to book their seats, plan routes, etc. There is also evidence of projects linking the development of corporate sustainable mobility plans in the region with the provision of microtransit services for workers (Interviewee 11). Interviewees from trip aggregator apps also

suggest that corporate transportation services could be incorporated into the app and appear only to corporate workers as an option when trip planning (Interviewee 1).

Interviewees also suggest a potential for B2B operations for special events, student transport and touristic activities (Interviewees 1, 3). Although these remain largely untapped markets so far. Beyond price, **using technology sets these transport providers apart from traditional private transportation operators** for touristic, corporate, or student transport because of the traceability of information, rapid feedback for decision-making, facility of payment, the possibility of generating exclusive access codes for users, etc. (Interviewees 2, 5 and 11).

While the choice to operate under the B2B model offers opportunities, interviewees recognize that there are still significant limitations in providing these services. Operators mention that **regulation for corporate and touristic services is less flexible**, not allowing much demand-responsiveness. In some countries, operators cannot provide the same service to different companies at the same time. They are required to file for separate permits and have individual operations for each company. Tariffs for these services are also regulated and cannot be adjusted easily. Restrictions also include not being able to pick up people at public transportation stops and not being able to pick up passengers who attempt to hail a ride (Interviewees 2, 5 and 10).

In some cases, interviewees suggest that **although there is potential in a B2B model, it is not sustainable in the long term** and would either require subsidies, additional private investment, or a combination with B2C models to ensure an adequate scale and demand (Interviewee 10 and 11). An alternative suggested by an interviewee would be making existing regulations more flexible for private transportation services to maximize demand, benefits, and improve the service (Interviewee 10).

4.2.2   Partnerships to scale up operations in LAC

Making app-based collective transportation work in Latin America depends highly on the partnerships between actors. Usually operating without government support, AbCT operators seek to establish partnerships to reduce risk, increase demand, and scale up their operations. Table 3 below shows some of the ways they are doing this.

Table 3. Main types of partnership configurations for app-based collective transportation in the LAC region

Partners	Purpose	Configuration	Observed in:
Existing public collective transportation operators	- Increasing current (captive) demand - Leverage existing permits, routes, stops (public transportation permits) - Reduce risk of conflict with operators and authority - Improve operations (define or improve routes, stops, customer service, etc.)	AbCT company can contribute: • Technology • Training for drivers • Support in data analysis Transport operator provides: • Operational permit • Vehicle fleet • Drivers • Existing demand	Mexico - Mexico City Brazil – Goiania, Fortaleza

Existing private transportation operators	- Leverage existing permits (private/special services permits) - Reduce risk of conflict with operators and authority - Aggregate demand and maximize the use of assets (vehicles) - Improve operations (define or improve routes, stops, customer service, etc.)	AbCT company can contribute: • Technology • Training for drivers • Support in data analysis • Clients and demand aggregation Transport company provides: • Operational permit • Vehicle fleet • Drivers	Costa Rica - San José / Great Metropolitan Area Uruguay – Montevideo Colombia – Barranquilla Venezuela - Caracas, Valencia, Maracay
Local businesses and commercial centers	- Increase transport connectivity - Attract demand for both businesses (commercial ones and transport) - Maximize existing infrastructure (parking spaces, private bus stops, etc.)	AbCT company can contribute: • A solution to mobilize the companies' personnel or customers • Potential new clients for businesses by setting up pick up points there Businesses can contribute: • Demand for microtransit services (workers) • Discounts or benefits for microtransit users or even for operators (car parts, maintenance, etc.) • Infrastructure - spaces to wait for the transport service or parking so microtransit users can leave their cars there and commute using the app based collective transportation (park-and-ride models). In some cases, this also includes spaces for operators to park near where they need to pick up users	Colombia – Barranquilla Venezuela – Caracas, Valencia, Maracay Costa Rica - San José / Great Metropolitan Area Brazil – Fortaleza

Government	- Modernize and adapt regulation to new models	AbCT company can contribute: • Data on demand, travel trends, etc. • Know-how on new business models and technology Governments can contribute: • Know how on political and regulatory processes	Venezuela

Source: Interviewees 2, 3, 5, 7, 10, 14

As regulation does not recognize app-based collective transportation in most LAC countries, partnering up with existing public transportation providers has become essential for these new companies. In some cases, like in Brazil, **it is the public transportation operators who approach microtransit companies** because they recognize that they are losing demand, that ride-hailing apps have affected their business, and that they are not being able to satisfy customer needs. These operators consider that introducing technology to their operations will help attract or bring back lost users (Interviewee 7). In other cases, as in Mexico, **AbCT companies have sought out existing public transportation operators** and convinced them about the benefits they can gain by introducing technology into their operations. Cautious, and having learned from the pushback ride-hailing has had amongst transport operators, they present themselves as allies rather than competitors, offering to improve the service demand, rather than substitute it (Interviewee 10). Overall, partnering with public transportation operators provides important benefits for AbCT companies: (i) they do not need a permit to operate, (ii) they are able to pick up customers at public transportation stops, and (iii) they will have a certain level of initial demand rather than building it from the ground up.

Some AbCT companies have opted for or pivoted to operating as private services to avoid conflicts with public transportation operators or authorities (Interviewees 2, 3, 5, 10, 14)**.** In cases such as Uruguay, Costa Rica, Colombia, Venezuela, and Mexico, they approach and **work with existing private transportation operators** that provide vehicle fleets and drivers, while the AbCT company provides technology and data to guide and improve operations and link with clients to aggregate demand.

Finally, the cases of Venezuela and Brazil offer interesting insights in terms of **partnerships with non-transport sector businesses**. AbCT companies approach these businesses to create a network of places where their vehicles and users' vehicles can be parked, where users can wait for microtransit services safely and receive benefits such as discounts. In Venezuela, an atypical partnership model has been developed between the AbCT company and the main training center for flight attendants. This has allowed them to recruit personnel, what they call "Marshalls", who oversee customer service in the units, check user's IDs, help them board, etc. The operator mentions this has also allowed them to integrate more women into a male-dominated sector (Interviewee 14).

4.2.3   Where and how do AbCT companies operate? Defining scale, zoning, and routes

AbCT operations in the LAC region vary according to the context, regulation, and scale of each city. Most companies define where they are going to operate based on criteria such as existing public transportation supply (either as partners to these operators or to avoid competing with them), density, and travel demand (origin-destination matrixes for the city or

creating their own origin-destination matrixes based on customer requests). Configurations for route and stop typologies vary from fixed routes with designated pick-up stops to defining an ideal route and a buffer around it to allow for flexibility (semi-flexible routing), including options for designated stops or door-to-door pick-up for a different price. An account of the differences in these types of configurations found for each country can be found in Table 4.

Table 4. Differences in routing and stop configuration for AbCT operators in LAC countries.

Country	Criteria for defining routes	Route Typology	Stop typology
Mexico	- Customer requests - Partner transport operator's current operations	Fixed	Designated pick-up spots (fixed)
Uruguay	- City O-D matrix - Low density areas with low access to public transportation - Partner transport operator's current operations - Avoiding competition with public transportation operators	Semi-flexible	Designated pick-up spots (fixed) Door-to-door (flexible)
Colombia	- City O-D matrix - Customer requests - Areas poorly covered by public transportation	Fixed	Designated pick-up spots (fixed)
Costa Rica	- Customer requests (corporate O-D matrix)	Semi-flexible	Designated pick-up spots (fixed) Door-to-door (flexible)
Brazil	- Intermediate density areas - Socio-economic criteria (people who can pay for the service) - Partner transport operator's current operations	Fixed and Flexible	Designated pick-up spots in public transportation stops and surroundings (fixed)
Venezuela	- Customer requests (own O-D matrix)	Flexible	Designated pick-up spots (fixed)

Source: Interviewees 2, 3, 5, 7, 10, 14

4.3. Current governance and regulatory landscape

Governance and regulation around app-based collective transportation have been characterized by interviewees as marked by a **lack of knowledge** about these new

technologies and business models, in addition to fear of them competing with existing transport operators (Interviewees 7, 11). Interviewees from different countries agree that the **regulatory framework in LAC is obsolete** and it is not advancing at the same rate as technological innovations for the sector (Interviewees 1, 6). Several suggest that **governments are slow or unwilling to innovate or regulate this new type of services due to pressures** or special interests in the public transportation sector (Interviewees 2, 4, 11, 12, 14).

Some AbCT companies have been successful in leveraging this closeness between the traditional public transportation sector and the authorities. By **convincing the transport operators first** about the benefits of shifting towards technology and more demand-driven services and setting up operations jointly with them as a complement to public transportation (instead of competition) have made transportation authorities more open to changes, in some instances even adopting a supporting stance (Interviewee 7, 10). In these cases, particularly in Mexico and Brazil, the requirements from the government have sought to avoid changes in tariffs and keep it a public service, to ensure that the service remains open and accessible for everyone.

Another strategy adopted by AbCT companies facing a lack of regulation is **operating at the margins of current laws or adjusting their model to existing regulated models**, such as the private or special services model (Interviewees 2, 3, 5). In this way, they can avoid conflicts with both authorities and public transportation operators. In these cases, AbCT companies usually meet with authorities, inform them of their intentions to operate, and if applicable, obtain the required permits to operate. This model, however, often poses limitations in terms of government support (private services receive no subsidies), pricing (some regulations require them to be more expensive than public transportation), where they can operate, stop, who they can pick up, etc.

One AbCT operator reported that because of their successful operations in Brazil, transport **authorities in the region have started to become interested in the service**. They see this as an opportunity to improve public transportation under a regulated system.

4.3.1. Perceptions about AbCT regulation in the LAC region: Findings from the Expert Survey

General perceptions from transport experts in the region show that existing regulation that can be linked to AbCT is **mostly focused on limiting the geographic areas where these companies can operate and on regulating fares** (Figures 8 and 9). Most agree that regulation is in fact **increasing fares** (which is consistent for instance with the case of Barranquilla where regulation requires private transport fares to be higher than public transport fares), and that regulation is not assigning public funds or subsidies to microtransit pilots. The survey also found that most experts perceive a **lack of institutional capacity to enforce regulations**, however there are mixed perceptions regarding whether companies are complying with regulations. Regulations are perceived often as **unclear, not focused on inclusion, or seeking to reduce GHG emissions**. Experts consider that current regulation is benefitting companies involved in vehicles sales, private vehicle drivers, and the government itself the most (Figure 10). The expert survey asked about perceptions about transport regulation in a general fashion, however, further research is necessary for a more

in-depth understanding of the characteristics, details and consequences of the relevant regulation in different countries and cities in the region.

Figure 8. General perceptions about regulation in Expert Survey (averages)

General perceptions about regulation
Average value presented
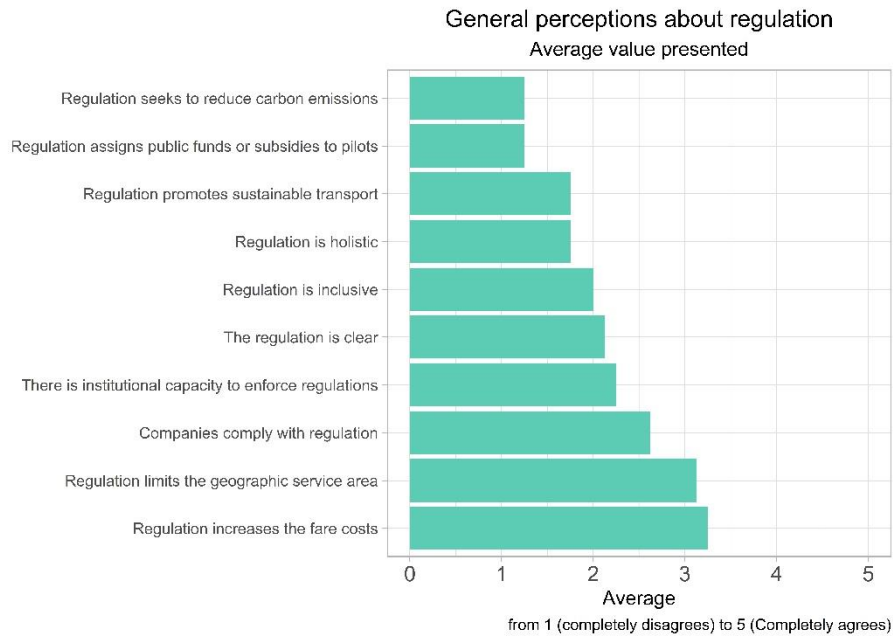
Source: Authors using data from expert surveys

Figure 9. General perceptions about current transport regulation affecting microtransit in the Expert Survey (proportions)

General perceptions about regulation
Proportions for agreement or disagreement
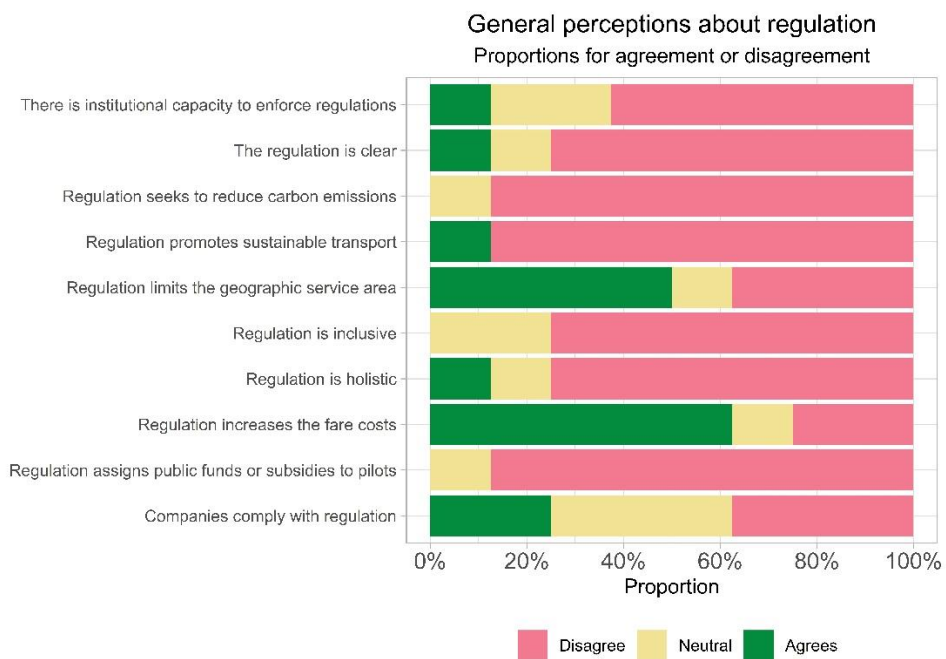
Source: Authors using data from expert surveys

Figure 10. Average perceptions from Expert Survey regarding beneficiaries of regulation in LAC

Who is benefitting from current regulation?

from 1 (a little) to 5 (a lot)
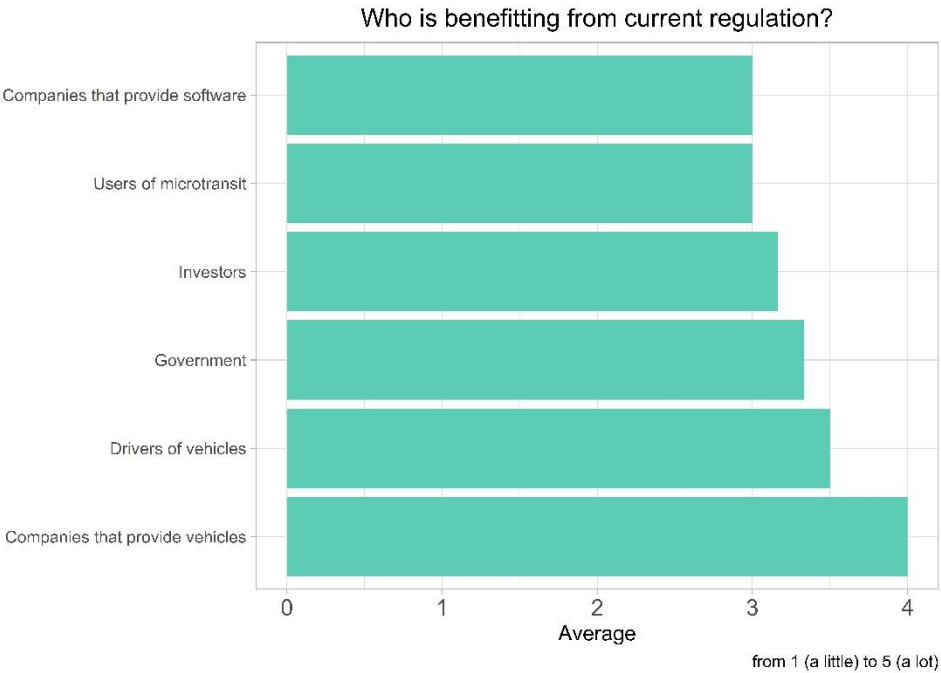
Source: Authors using data from expert surveys

4.4. Social and environmental contributions

The following section identifies who the users of AbCT are, what kind of trips they are using microtransit for, their reasons to use it and in what areas this new type of transport service might be contributing to reducing social inequalities and environmental impacts.

4.4.1. Who is using app-based collective transportation in LAC?

Interviews with a range of transport experts found that there are three main types of users for app-based collective transportation summarized in Figure 11.

Figure 11. Types of user profiles linked to income and modal choice before their use of microtransit
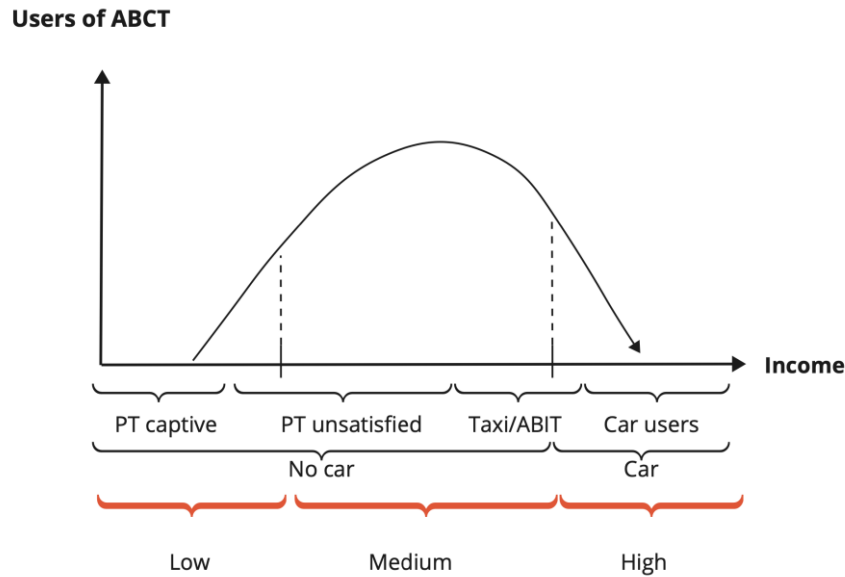
Source: Authors

As shown above, there are clearly defined groups that share common characteristics of income and transport mode use:

- **Private transportation users that are unlikely to use public transportation or have little access to it**: these are mid or high-income users that might live in low-density areas or gated communities, usually users of private transportation (their vehicles or ride-hailing services) (Interviewees 3, 7).
- **Current public transportation users that are unsatisfied with the quality of the service and are willing to pay a premium for better-quality public transportation**: Findings suggest that many of these users are unsatisfied with public transportation but are not comfortable paying the high fees for ride-hailing services. Microtransit is therefore an intermediate alternative to satisfy this demand (Interviewee 10).
- **Corporate workers[3]:** often working office jobs in Free Trade or Industrial Zones in the city that generate a lot of demand and might not be adequately served by public transportation. Microtransit companies establish business relationships with the companies they work with, and these transport services provide an opportunity for a safe, comfortable, and efficient way to get to work. These services are often exclusive to these corporate workers and not open to the public (Interviewees 2, 9, 10 and 11).

Several operators confirm that **their target is not a lower-income segment**. They rather target potential users that are willing and capable of paying for an option that is "in-between" public and private transportation in terms of comfort, flexibility, amenities, and price (Interviewee 10, Interviewee 3). Data offered by an AbCT operator suggests that up to 80% of users of these services were former private transportation users (drivers, ride-hailing, or

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[3] A pilot mentioned by an interviewee included a specific exercise providing transport services to hospital workers who were suffering from discrimination in public transport during the pandemic (Interviewee 11)

taxi users), only 15% were using public transportation before switching to microtransit, and a very low percentage was walking or using other modes (Interviewee 7).

Experts participating in our survey consider the main users of app-based collective transportation to be mainly **workers or students.** Expert perceptions suggest users are from mid-low to mid-high-income levels. In terms of gender, some suggest that most users are women. In terms of age, experts suggest that the average age of users is between 20-50 years.

4.4.2 What travel needs can AbCT address?

The expert survey asked how useful experts considered microtransit services are (or could become) for certain trip purposes. The main types of trips where experts find the most potential for microtransit are **riding in groups**, **work or study trips**, and **care trips[4].** Findings from interviews show how most microtransit services in LAC have a strong focus on work commutes, connecting free trade (*zonas francas* in Spanish) or industrial zones or providing exclusive services for workers (Interviewees 2, 3, 5, 14). Some interviewees mentioned seeing potential and actual applications for microtransit for riding in groups such as in tourism, special events or student transport (Interviewees 1, 3, 11), but it is not their focus. Most interviewees do not see current microtransit services as a feasible option for care trips, although they are making certain efforts to cater for these types of trips (Interviewees 3, 7, 14). More detail on the potential and contributions of microtransit for care trips can be found in section 4.4.4.

Figure 12. Types of trips where experts find the most potential for AbCT services
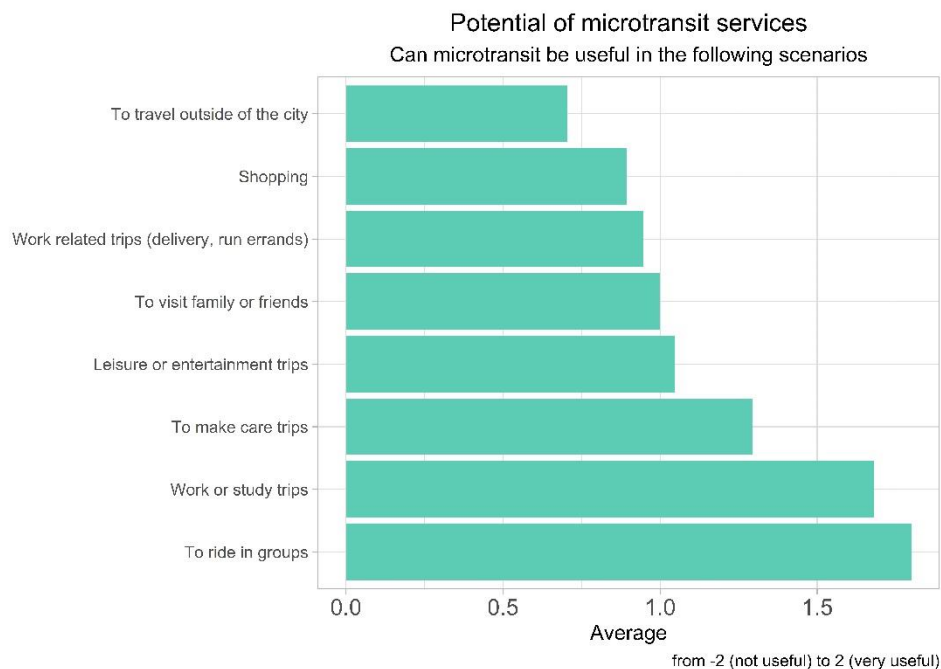
Source: Authors using data from expert surveys

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[4] Care mobility is a term coined Inés Sánchez de Madariaga in 2008. It comprises all trips carried out by adults to tend to responsibilities related to the care of others and to running a home.

Semi-structured interview participants also perceive microtransit as a solution for increasing the coverage of transit systems and improving transportation connectivity in cities where it operates. Interviewees see significant potential for microtransit to enable **trips connecting areas with low access to public transit,** usually in the peripheries or suburban neighborhoods in metropolitan areas (Interviewees 1, 3, 4). Interviewees also mentioned the potential for serving the demand for **trips during the night**, when there are fewer or no options to travel using public transit. This perception is shared not only by operators but also by interviewees from civil society and international development agencies (Interviewees 4, 8, 14).

"People use it to go to areas where there is not much transport access. It is often used by students or workers that have extended work hours with no public transportation options during the night" – Interviewee 4, Civil Society

"We've extended our service to what we call 'night circuits'. We've discovered a lot of businesses such as restaurants or movie theatres for which they're useful. There is an enormous gap because public transportation during the night is insecure and has a lower frequency" – Interviewee 14, AbCT Operator

Some interviewees suggest a potential for microtransit for increasing **multi-modal trips**, for instance as a first- or last-mile connector to metro or bus stations, or by including bike racks on microtransit vehicles. However, they still see barriers and difficulties for this to be implemented successfully, such as a lack of preparedness from both microtransit and public transportation operators to facilitate this integration, and a lack of infrastructure to enable inter-modality in cities where these services operate (Interviewees 1, 11, 14).

4.4.3. Why do users use microtransit?

The expert survey also provided information about perceptions[5] regarding the types of attributes offered by microtransit that might be the most relevant for users. Experts consider that **flexible service hours, safety from crime, and service reliability** are the most relevant characteristics for users (see Figure 13). Issues such as road safety, eco-friendly technologies or using mobile applications were considered the least relevant. More detail on how AbCT operators seek to improve the user experience from their operations in several of these key areas are shown in the following sections.

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[5] It is important to note that these perceptions are from experts in the field. User perceptions will be presented in a forthcoming study on this topic.

Figure 13. Expert perceptions on AbCT characteristics that might be most relevant for users
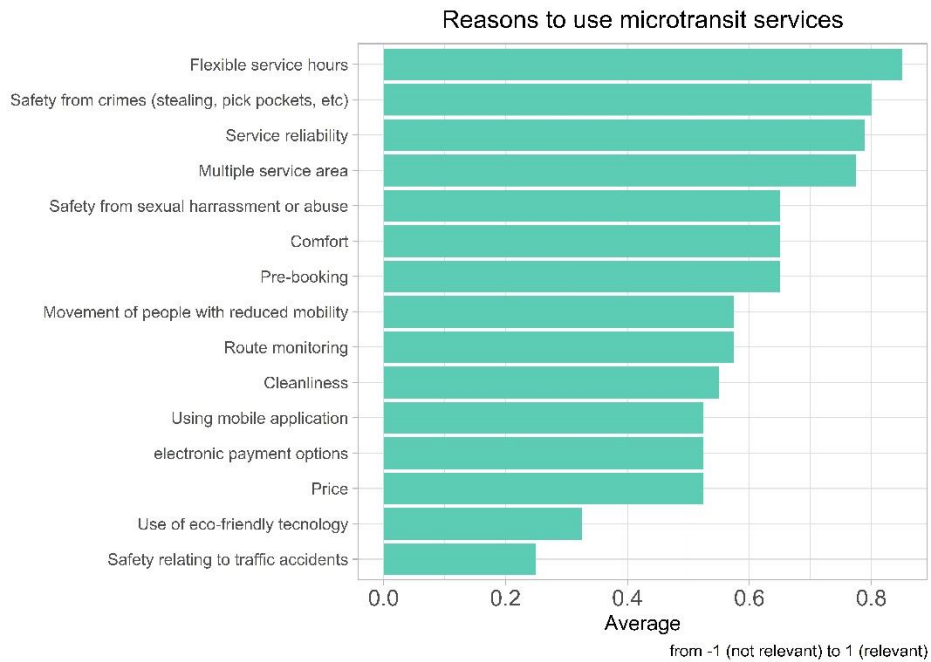
Source: Authors using data from expert surveys

4.4.4. Potential for Social and Environmental contributions

Both the semi-structured interviews and the expert survey showed that overall, the perception of the potential for social and environmental contributions of microtransit in the LAC region is positive. The areas where experts perceive the most potential are in terms of safety against crime, congestion reduction and road safety (Figure 14). Perceptions regarding the contribution of this transport mode to reducing GHG emissions, noise pollution and improving air quality are quite mixed, therefore suggesting a need for more clarity and insight regarding these topics. The following sections will go into detail about the insights and perceptions regarding different types of potential contributions of this transport mode for the environment and society.

Figure 14. Expert perceptions about the social and environmental impacts and contributions of microtransit

Perceptions about impacts of microtransit
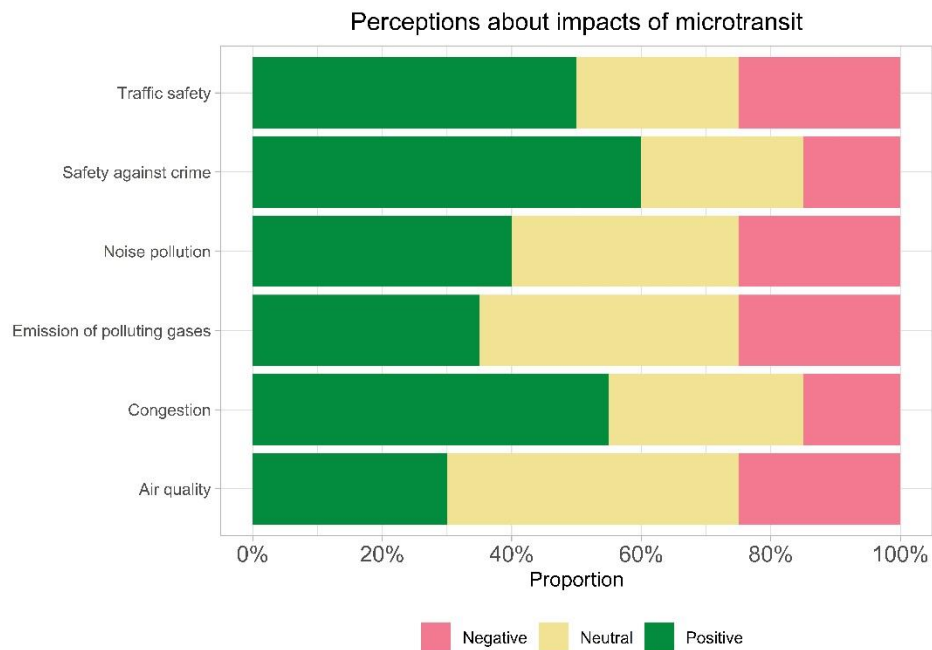
Source: Authors using data from expert surveys

4.4.4.1. Potential for Social Contributions

a. *Personal security*

As shown in Figure 14, personal security, both from crime and from sexual violence is perceived by experts to be one of the key reasons why users might prefer to use microtransit services. This perception was confirmed by several of our interviewees, one of them suggesting that a large part of the credibility of these transport platforms depends on them being safe (Interviewee 9). Some of the elements that interviewees believe contribute to an increased perception of security among microtransit users include:

- Being able to **know who the driver is**
- Users must register and have a **user profile**
- Presence of **security cameras** onboard
- The app offers the **possibility of reporting** any safety issue and companies having **protocols** to follow up on these incidents
- Being able to know when the transport unit is coming and **not having to wait outside** for it for a long time

(Interviewees 2, 4, 6, 10, 11, 14)

An additional element that was mentioned several times for microtransit services focusing on private or special transport, is not having to worry about who is boarding the bus since **everyone is part of the same organization**, company, or university. Pilots carried out in Mexico City and Puebla confirmed that microtransit users felt safer while travelling, and in addition to the possibility of being able to report any safety issue and not having to wait for the bus, this was one of the key reasons that made users feel safe (Interviewee 11).

"In public transportation, trips are anonymous. You don't know who is traveling or who is driving. With our app, you can know who the driver is, who is riding, and who is sitting where. This generates a better sense of security… Users that have inappropriate behaviors have their accounts shut down. The same with drivers… The app enables a communication channel with users at any time. Any problematic behavior can be easily detected and handled" – Interviewee 10, AbCT Operator

Regarding safety for women, microtransit seems to offer an alternative that feels safer than riding public transportation. Several AbCT operators reported that most of their users are women (up to 80% depending on the city) and that they are especially willing to pay a higher fee if that helps them travel safely between work and home. Some additional measures taken by these operators to ensure a safe environment for women include:

- **Training drivers** to handle any situations involving sexual harassment or violence
- Offering the possibility of **a door-to-door service for women at night**
- **Hiring women** to provide customer service onboard the units
- Planning trips so that there is **no overcrowding** in the units

(Interviewees 5, 7, 10, 14)

Some interviewees are hopeful but hesitant to trust that these types of measures will be effective, considering how even ride-hailing services see cases of sexual violence and harassment:

"How did Uber start? Women in general feel insecure in public transportation. But now, now they even feel unsafe in Uber, because of cases… that have ended up very serious… Maybe there is hope with microtransit companies that are a bit smaller and with a bit more control over operations than public transportation or Uber" Interviewee 4, Civil Society

b. *Accessibility for people with disabilities*

The interview process found that most AbCT operators have the intention or are making efforts to make their services more accessible, mainly for people with mobility impairment or in a wheelchair. Companies with no accessible services are those that are in their initial operational phases. Both mention that they have the intention of incorporating accessible vehicles into their fleet to increase the accessibility of their services (Interviewees 3 and 5). In the case of Costa Rica and Brazil, operators have some vehicles and measures to improve access for people with disabilities, for instance offering a door-to-door service to these users and helping them board. However, companies or users themselves must notify their special needs ahead of time to ensure the dispatching of the vehicle and adjustment of routes (Interviewees 2 and 7). Venezuela has developed a door-to-door vanpooling system specifically for people with disabilities or reduced mobility, however it doesn't use accessible units (Interviewee 14). In Mexico, a pilot was carried out with electric and accessible units in Puebla for university students (Interviewee 11).

Table 5. Level of wheelchair accessibility in AbCT services in the LAC region

Country	No accessible services yet	Some vehicles and measures (on-demand)	Special service for disabled users
Uruguay	x		
Mexico			x
Costa Rica		x	
Brazil		x	
Venezuela			x
Colombia	x		

Source: Interviewees 2, 3, 5, 7, 11, 14

Increasing app accessibility is another way in which microtransit services can become more accessible to people with disabilities. For instance, an AbCT operator mentioned that for people with visual impairments, their app allows for audible instructions (Interviewee 7). An interviewee from a trip aggregator app that has incorporated microtransit services into their trip planner suggests that it is possible to make the entire travel experience more inclusive for people with different types of disabilities from the planning stage. The app has been designed to make it more accessible in ways such as using colors that can be distinguishable for those with color blindness, including software that can give instructions in audio version for those who are visually impaired, providing information about which are the most accessible routes or services for a trip according to user requirements, or making adjustments in the travel times if the person requires extra time for moving from place to place (Interviewee 1).

Several interviewees agree that accessibility is overall a topic that is still emerging in the transport sector, not only for microtransit, and that the biggest challenge is being able to pay for the adjustments and infrastructure required to make the system more accessible. However, considering microtransit services receive no government funding in LAC and remains unregulated in many countries, there are hardly any requirements or incentives to make the service accessible (Interviewees 8, 11, 14).

c.   Care mobilities

The interviews provided insights on the potential of microtransit to become an alternative to provide flexibility and facilitate care mobilities in the LAC region. Some examples of ways that microtransit is seen to facilitate care mobilities are:

Table 6. Examples of ways in which microtransit is facilitating care mobilities

Country	Examples
Montevideo	- App allows for parents to transfer money to their children's account so they can take trips and parents do not have to drive them - Designing routes that include stops in high schools
Costa Rica	- Making the route flexible so that users can connect with other transport modes and stop wherever they need to
Brazil	- Parents usually use the service to order trips for their children to travel safely without the need of them having to drive them everywhere
Venezuela	- Pilots for specific services for high schools

	- Stops and routes covering malls and shopping centers

Source: Interviewees 2, 3, 7

One operator suggested that using **microtransit services exclusively for care activities and trip chaining might neither be easy nor cheap**, considering that they have a base tariff and a price based on kilometers on top of that base price and because their routes are still linear, as opposed to a network that can enable trip chaining. For care mobilities, they consider **vanpooling** might be a better option since its door-to-door configuration might make it easier for users to be able to get where they need to go (Interviewee 3). An AbCT operator from Costa Rica, however, suggests that even though their routes are linear, they can contribute to trip chaining by **providing enough flexibility** so that users can connect with other transport modes or stop wherever they need to along the way (Interviewee 2).

4.4.4.2. Potential for environmental contributions

Experiences with microtransit in the LAC region also show a potential for environmental contributions mainly in two areas:

- The modal shift towards collective transportation modes and avoiding a modal shift towards individual transport modes
- Improving vehicle efficiency

a. Modal shift and increased ridership in collective modes

Considering that the target audience for many microtransit services in the LAC region is individuals who would otherwise **use private individual transportation modes**, one of their main environmental contributions is **getting them to shift into collective transportation** (Interviewees 3, 7, 11). In some cases, AbCT companies have been sought by public transportation operators for client retention: keeping passengers from moving away from collective transportation. Public transportation operators have seen a decrease in demand and a shift towards ride-hailing or driving, therefore some of them are opening up to new ways to **not only attract new demand but keep existing demand**.

"From our experience, we could say that these types of services can help make a comeback to public transportation. It is a way in which public transportation can get new users that would normally have used ride-hailing or private vehicles" – Interviewee 7, AbCT Operator

The **use of technology in this type of service is seen as a tool to incentivize people to use public transportation**. Interviewees mention how navigating public transportation in LAC cities is complex and difficult due to a lack of information for users, suggesting that commuters who use public transportation do so because they already know how to use them. Such a lack of information can be a barrier for new users. Having access to information via a mobile device and making it easy to plan a trip, book a seat, and know where and when your bus is coming is seen as a tool for more people to decide to use collective transportation (Interviewees 4 and 6). The fact that microtransit also operates using "virtual stops" means that any place can be

a node in the service network, bringing transportation to places where public transit might not stop. By doing so, microtransit operators create an incentive for more people to use it, especially in places where people would have to walk long distances to access public transportation (Interviewee 1).

These findings are aligned with perceptions from the expert survey (see Figure 15), which see microtransit as having significant potential in contributing to a sustainable mobility transition, especially in areas such as substituting the use of taxis and ride-hailing services, the use of private cars, and improving connectivity with mass transit stations.

Figure 15. Expert perceptions on the potential for microtransit to contribute to a more sustainable mobility.
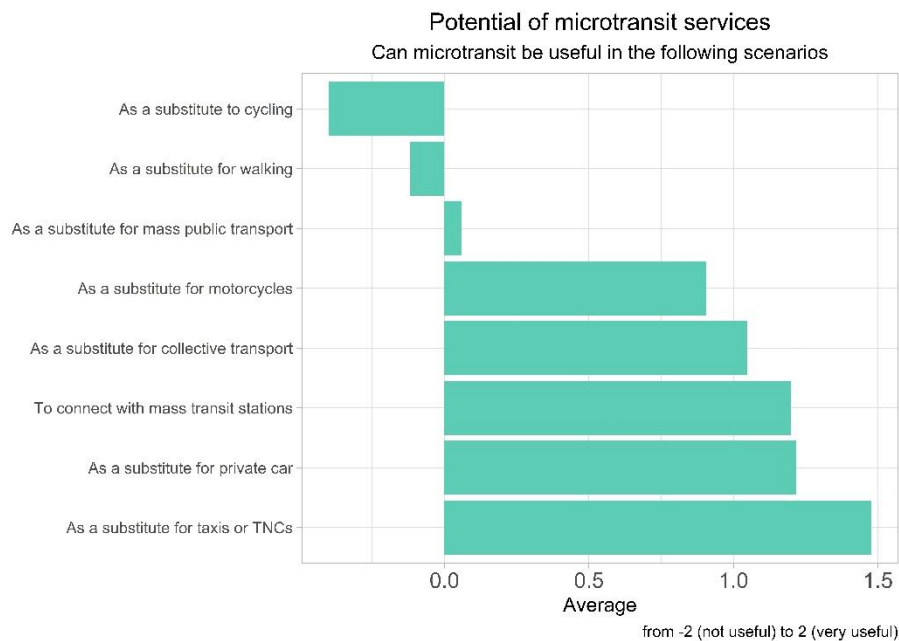
Source: Authors using data from expert surveys

Figure 16. Expert perceptions on the potential for microtransit to contribute to a sustainable mobility transition.
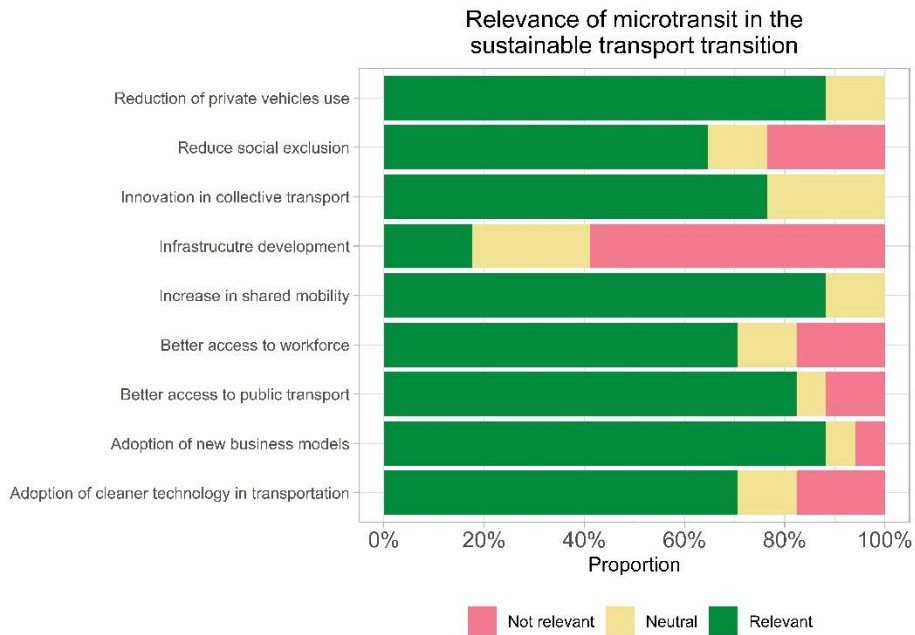
Source: Authors using data from expert surveys

Several interviewees highlighted how the emergence of microtransit and the experiences in the region with these services opens a conversation about the potential for using technology to **improve public transportation systems** in LAC. This, in the view of many participants, is a necessary step to sustain demand and increase modal shifts towards collective transportation modes. This aligns with the perceptions captured in the expert survey, where microtransit is perceived as having the potential to contribute to the **adoption of new business models** and to **innovation in the collective transportation sector** overall (Figure 16).

"Public transportation in the region is still being operated as it was decades ago when there was no technology… we would like to contribute to the conversation of how to use technology to improve the public transportation service. To serve other populations, to improve public transportation indicators" – Interviewee 3, AbCT Operator.

Different actors, including interviewees from international development agencies and trip aggregator apps, see this potential specifically in using technology to **collect data and user feedback to improve transport planning, and increase service flexibility and demand responsiveness** (Interviewees 1, 8, 10).

*"For LAC, the great opportunity for microtransit lies in the use of technology to improve existing transportation services. **Technology allows users to participate in defining what is the service that they want**. Routes, stops, drivers, schedules, prices, etc. It's a bidirectional communication channel between users and operators... Public transportation is*

*a rigid system. It is always the same route, the same tariff. Technology gives you choice… For the same route, **you could use small vehicles when there's less demand, and larger vehicles when there's higher demand**. You could deviate from the route if needed without losing the certainty that you will be arriving at a certain hour. Users can always know where you are. **You can't offer the type of service that people want to maintain public transportation's rigidity.** If you do, you are forcing those that want flexibility to move towards private mobility, to buy a motorcycle or a car. With technology, you have a lot of possibilities to make small interventions that break a bit of that rigidity from public transportation… Absolute flexibility can be chaos, but some flexibility can help transport providers to experiment and try new things" Interviewee 10, AbCT Operator*

Finally, some interviewees suggested there is potential for a stronger ridership in collective transportation through inter-modality with other active modes such as bicycles. However, there are still significant barriers to this potential to be achieved. A pilot in Mexico tried incorporating racks in some buses with little success and insufficient feedback from users as to why they were not using them, suggesting a need for further exploration. Interviewees suggest that factors such as not all units having bike racks, legislation restricting public transportation vehicles to have racks in some countries, and a lack of public cycling infrastructure in the cities where these services operate make it **difficult to promote intermodal transport** (Interviewee 2 and 11).

b. *Vehicle modernization and electrification*

Very few experiences have introduced electric vehicles to microtransit operations in LAC. One example is a pilot in Puebla (Mexico) that used electric vehicles for a microtransit project for a university implemented by the Institute for Transportation and Development Policy (ITDP). An AbCT operator mentioned that they are planning a new service that will open in Punta del Este in Uruguay with an electric bus. The service is still not operational, but the fact that it will introduce electric mobility into an area with no public transit has generated **interest in the local authorities**, who ensured the operator they will get a license to operate because of this (Interviewee 3).

Nonetheless, overall, the move towards vehicle electrification is still seen as an aspiration, not a reality, by AbCT operators. They see **few incentives** to electrify their vehicles. **Little financial viability** due to electric vehicles being more expensive and less available than ICE ones, and structural barriers such as a **lack of robust charging infrastructure networks** in cities where they operate, are among the main challenges to widespread electrification (Interviewees 7, 11). An operator working with corporate clients mentioned that being "green" used to be a more competitive advantage. However, after the pandemic, **clients are prioritizing prices**. They consider there is a need for more incentives so that more priority is given to services that are greener in tenders and contracts (Interviewee 2).

"In microtransit, for units to be electric, you would need external funding, the model cannot be economically sustained only with the income from ticket sales" – Interviewee 11, Global Think Tank

"We're seeing an energetic transition in transport and demand-based transport is not the exception…But there are certain issues, for example in terms of vehicle technologies…there are certain types of vehicles that don't exist for certain types of fuels, that don't have a hybrid model or electric model…In Mexico City…the charging infrastructure doesn't allow us to operate completely electric vehicles, so we're being limited to hybrid ones… Overall we aim to use technologies that reduce the most emissions as possible" – Interviewee 7, AbCT Operator

In the meantime, operators are focusing their efforts on **using modern vehicles** that are as efficient as possible. In some countries, they use units that are not older than seven years and pass local inspections (Interviewee 8). However, in other countries like Venezuela, where there is weak environmental regulation and no required vehicle inspections, maintenance and efficiency standards are up to the AbCT company (Interviewee 14).

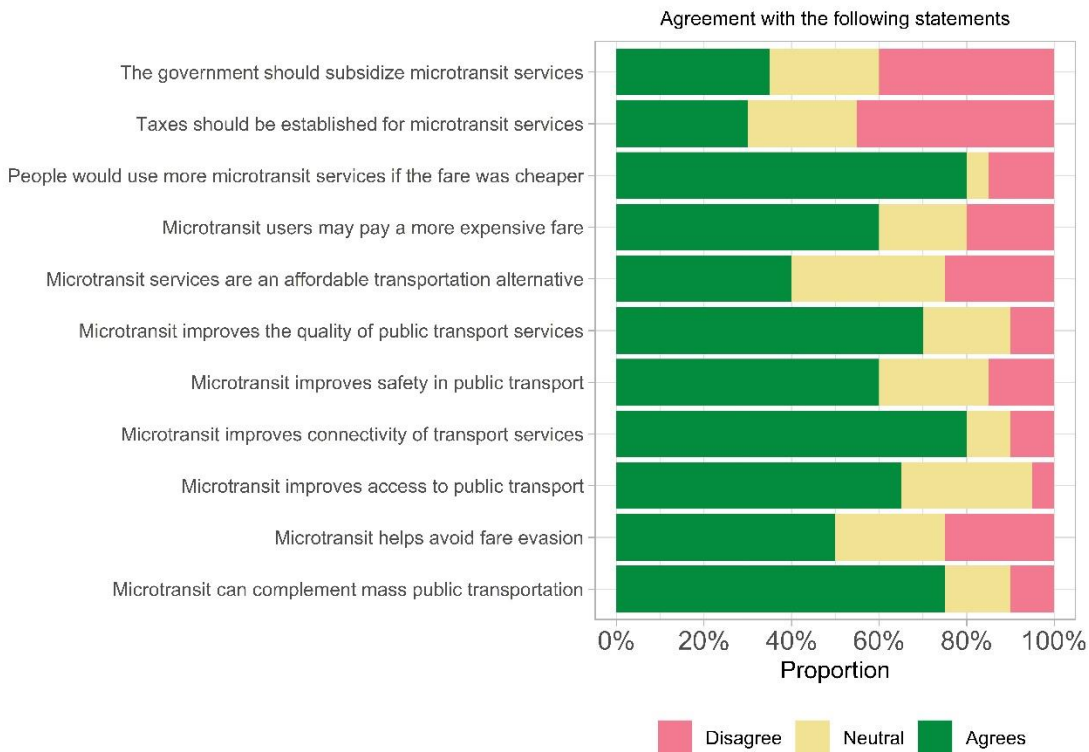*4.4.4.3. Challenges and concerns for an inclusive and sustainable microtransit in LAC*

Although overall perceptions regarding the potential social and environmental contributions of microtransit are positive, certain challenges and concerns should be considered to make microtransit feasible and sustainable for them to attain their potential positive social and environmental impacts in the region.

a. <u>Affordability</u>

Microtransit services in the region are currently more expensive than regular public transit services (some by choice, others because of regulation requirements), but cheaper than ride-hailing options (Interviewees 3, 5, 7, 10). In countries such as Colombia, for example, the regulation requires private transportation services to be up to 30-40% higher than public transit (Interviewee 5). In Uruguay, on the other hand, microtransit operators aim to set prices that are 50% lower than Uber (Interviewee 3). Because these services are considered private transportation providers in most LAC contexts, they are not subject to public transportation subsidies and therefore operational costs are transferred directly to user tariffs, making them less affordable than subsidized services (Interviewee 7). In some pilots carried out in the region, the demand was not enough to cover operational costs, and delivering the services was only possible due to other private partners (such as insurance companies or pharmaceuticals) contributing funds to support these projects (Interviewee 11). Interviewees see it as unlikely that governments will choose to subsidize or invest in these types of services in the short term, especially considering the need for investing in existing public transportation services (Interviewees 3, 11).

Interviewee perceptions are consistent with the perceptions from the expert survey. The survey found that 62.5% of the experts participating in the expert survey for this study agree that "regulation increases fares" (as shown in Figure 8). In addition to this, almost 80% of them agree that people would use more microtransit services if the fare was cheaper (see Figure 17).

Figure 17. Level of agreement of experts with statements about microtransit

Agreement with the following statements

Statement	
The government should subsidize microtransit services	
Taxes should be established for microtransit services	
People would use more microtransit services if the fare was cheaper	
Microtransit users may pay a more expensive fare	
Microtransit services are an affordable transportation alternative	
Microtransit improves the quality of public transport services	
Microtransit improves safety in public transport	
Microtransit improves connectivity of transport services	
Microtransit improves access to public transport	
Microtransit helps avoid fare evasion	
Microtransit can complement mass public transportation	

Proportion: 0% 20% 40% 60% 80% 100%

Legend: Disagree · Neutral · Agrees

Source: Authors using data from expert surveys

Concerns about the affordability of microtransit services have also been raised among those in the civil society sector (Interviewee 4), who see these services as a short-term solution that offers a better-quality service only accessible to those who can afford it. They argue that under the current model, AbCT services are maintaining the status quo of a failed public transportation service and deviating attention from addressing the existing challenges faced by public transit. Operators also expressed concerns regarding existing pricing regulations for public transportation, considering them "artificially low." They argue that overly controlled tariffs do not recognize the operational costs associated with service provision, and therefore force operators to cut costs in areas such as insurance, maintenance, and vehicle renewal, among other costs, making the service deficient and unsafe for workers, users, and operators (Interviewee 10).

Certain operators are making efforts to develop offers and packages to make services more affordable to users. For instance, La Wawa, operating in Colombia and Venezuela, offers weekly, biweekly, and monthly passes that make services more affordable than paying for each ticket individually (Interviewee 5).

Other affordability issues were found regarding how these services can be inclusive for individuals with care responsibilities. Because of how they are being designed and planned (their focus on individual trips, linear mobility, and corporate destinations, in addition to pricing schemes based on km travelled), it will be more expensive to use these services to trip chain or to travel with family (Interviewee 3).

b. Technological gap

Technology is one of the main differentiating features of AbCT services compared with traditional public transportation services. However, the use of technology has raised some concerns and found some barriers that need to be addressed to ensure their success and inclusivity.

- **Tech savviness and preparedness for the use of technology**: AbCT companies have found some difficulties in limited familiarity with the use of apps or technology by transport drivers, operators, and users. Below are some examples of barriers and how companies are aiming to overcome them.
  - Some argue that the public currently using ride-hailing apps is mid-high income and not necessarily public transportation users. Public transportation users are not accustomed to using these technologies and therefore require guidance and support to overcome this lack of familiarity (Interviewees 4 and 5).
  - Cooperation agencies consider that the level of knowledge around the use of technology in the transport sector in LAC is very low. Most public transportation services still avoid using technology for providing users with information, which constrains the adoption of more sophisticated technology-enabled features (Interviewee 8).
  - Although informal transport providers could benefit from using technology or partnering with microtransit companies, these actors could be left behind or excluded because of their lack of technology use and their fear that using GPS or other technologies will open the door to persecution and control by the government (Interviewees 6 and 9).
  - These barriers have led microtransit operators to focus on designing simple and easy interphases in their apps, organizing training and community visits to guide and explain to drivers and users how to use their technology or sending information to WhatsApp groups about the new service and how to use the apps. (Interviewees 3 and 4).
  - Some actors argue that there is a need for extensive digitalization not only of transport companies, but also of government and local authorities to allow for the integration of different transportation providers, apps, and tools (Interviewee 1).
- **Mobile data affordability and accessibility**:
  - Although there is significant smartphone penetration in LAC, mobile data plans are not necessarily affordable for people who are currently public transportation users. Some technology providers have tackled this by creating agreements with data companies so that data packages can include illimited use of their apps (Interviewee 1).
  - There are also concerns about internet coverage for certain communities in rural or peri-urban areas. Ensuring access to these types of services in those communities would therefore require government investment to close the gaps in internet coverage (Interviewee 9).
- **Outdated regulation regarding technology use in the transport sector**: Technology is always ahead of regulation, and a lack of adequate regulation can allow for different social and safety issues for drivers, and users (Interviewee 9).

4.5. An ideal scenario for microtransit in the region?

Different actors mentioned that an ideal scenario would be for **microtransit to become part of a robust and robust transport ecosystem that offers a diversity of options for users**. Microtransit is not seen as a substitute for public transportation, but rather a complement and an option for users when it fits better with their travel needs (Interviewees 2, 9, 10). Microtransit is seen as an opportunity to change the way we think about, plan, and use collective transportation in the region. Such a change should be supported by a positive user experience, increased safety conditions, and access to data and information about schedules and routes, with comfort and dignity (Interviewees 5, 6, 9, 10).

Without the involvement of transport and urban authorities, many actors in the transport ecosystem consider that microtransit and app-based collective transportation is only a palliative and temporary solution, not a transformative one (Interviewees 4, 8). Therefore, one of the key elements seems to be an **active involvement and investment from authorities**. Different stakeholders agree that this would help make these innovations more scalable, sustainable in time, and inclusive (Interviewees 7, 10). This involvement is perceived as necessary in different ways, from subsidizing public and private transportation services to improving transport-oriented development, land use, public spaces, and better city planning in general, to these actors being the ones who lead the provision of microtransit services to underprivileged communities, areas with low public transportation coverage, or smaller cities with emerging transport networks (Interviewees 4, 8, 1). Some suggest that this involvement needs to go beyond transport integration and digitalization, and involve improved regulation, and support to local entrepreneurship and innovation ecosystems to continue to push for technological transformations in this sector (Interviewee 1).

Beyond the involvement of the public sector, different actors mentioned the need for allies such as multilateral banks and international cooperation agencies. They visualize these actors providing support in the development of pilots, in providing technical and financial support to make these services more inclusive and sustainable (Interviewee 7).

Finally, several users argue that policy makers should develop tailor-made solutions and models that recognize and meet the mobility needs specific to the urban populations in the LAC region, **rather than replicate or adopt models coming from Europe or the United States**. The involvement of different stakeholders in creating a common vision for the future is necessary so that models will work in the context of different countries, cities, and regions according to their needs. (Interviewees 4, 10, 12).

5. Discussion

While still an emerging issue in the region, the examination of AbCT in the Latin American context building on qualitative primary evidence has provided a sizeable amount of evidence to construct a comprehensive view of the state of the industry in the region. One key observation made during the study was the lack of a clear, consistent definition of AbCT across the full breadth of stakeholders. Participants in the research expressed varying interpretations of the concept, with some confusing elements of microtransit with aspects of micro-mobility. Notably, practitioners in research, civil society, and advocacy did not always view AbCT as a solution for collective transportation, while practitioners in the private sector more frequently referenced aspects of commonly accepted definitions found in the academic literature. However, it was also noted that these standard definitions were often nuanced by the specific characteristics of the Latin American urban market, with some recognizing the relationship between AbCT and traditional public transit and most associating AbCT with organizations in the private rather than the public sector.

In addition to these findings, the study also noted the rapid expansion of AbCT in local markets of various sizes throughout the region, despite limited previous research on the topic in the academic literature. This suggests that AbCT services have been adopted on some scale by cities of varying sizes and scales with 17 mapped cities. These, however, are distributed only in a handful of countries. Such a fact recalls the diverse, and often complex, regulatory and policy environments across the region, which have posed challenges for previous adoption of AbT services such as ride-hailing (Oviedo et al., 2021).

Current policy and regulatory environments have not only inhibited the introduction of microtransit in specific urban and national contexts; they have also shaped the relationships with the state and other agents in the market that define the business models adopted by AbCT operators. This is reflected in the main approaches identified in the evidence for microtransit provision in LAC, where AbCT operators either introduce digital technologies to existing collective and public transportation or design and deliver services for private hire or corporate transportation. These models respond to different criteria for the definition of routes, some of which carry implicit social, technical, or political implications. For instance, the allocation of services in areas with low provision of public transit or the definition of routes that do not compete with existing public transportation corridors responds to both a need not to antagonize incumbent operators and to tap into underserved demand.

Strategies for entering new markets are also a reflection of a significant contrast between AbCT and other forms of on-demand transportation. The development of alliances with private companies seeking solutions for white- and blue-collar workers or the provision of services in mid-to-high-income areas where public transportation is not available illustrate the principles of reducing friction and filling gaps, which have been adopted by most AbCT operators interviewed. While this has enabled some successful experiences with microtransit in the region, it also has constrained the scale and nature of innovations, with many of the potential positive contributions of AbCT to social and environmental outcomes remaining unrealized.

The enabling environment for AbCT is therefore one that requires significant local and international support, not only in terms of financial backing and regulatory reform but about structural changes in the way we approach and use collective transportation. Both the public and private sector involved in the business of public transit seem resistant to change and the experiences of many actors with the introduction of ride-hailing have resulted in an environment where decision-makers are extra cautious of disrupting the status quo of transport services, making it difficult for other transportation technology ventures to enter LAC markets as strongly as Uber and others once did.

6. Conclusion

This study aimed to provide a rigorous examination of the state of on-demand, small-scale transportation services, commonly referred to as AbCT, in Latin America and the Caribbean. The research was based on qualitative data collected from a diverse range of stakeholders across the transportation industry, including private companies, city governments, international development agencies, and research groups operating in various urban contexts throughout the Americas and the Caribbean. In addition to this primary data, the study also utilized findings from an online stakeholder survey to further inform the research, providing a more holistic view of the challenges and opportunities these services provide for cities in the region.

The research concludes that AbCT's entry to the LAC market has been greatly influenced by the diverse and often conflictive experiences stakeholders in most sectors had with the introduction of ride-hailing in local urban markets. Such an influence can be identified across

many of the themes covered in this paper: regulation, partnerships, governance, and business models. This is a unique feature of Latin American and Caribbean contexts since it has limited the diversity and scale of microtransit ventures in cities in the region.

The above, however, does not suggest there is no innovation and a large potential for microtransit to play a socially and environmentally relevant role in the region. By targeting populations in transition to automobility and individual on-demand transportation, AbCT holds significant potential to contribute to a more environmentally sustainable and inclusive urban mobility transition. It can also play a role in filling structural gaps in public transit supply, particularly for vulnerable populations such as women and persons with disabilities, for whom challenges for using collective transportation persists despite considerable efforts in public transit reforms and new progressive policies being implemented in cities across the region.

The study also shows that the state of our knowledge about these modes of transportation in research and practice is still very limited. This is reflected in the diversity of definitions and the occasional incongruencies observed in both surveys and interviews. While terminology may not be the most salient priority, the lack of a common language for regulation and policy may play a constraining role in the evolution of current frameworks and the sharing of experiences. Furthermore, despite emerging research, knowledge of who uses and does not use microtransit services needs to be expanded. It is recommended to incorporate these new on-demand collective services in household travel surveys and other planning data raised by public authorities to track their evolution over time. Further lines of research in this space can explore in detail the experiences, practices and perspectives of users and non-users of microtransit across different contexts in the LAC region, as well as expand on the sample of this study to capture more diverse perspectives and reflect further on the social and environmental contributions of microtransit. Moreover, it is necessary to develop research examining the potential and challenges for regulation and governance of microtransit in cities in the region and the opportunities of incorporating digital technologies into collective transport.

Finally, public and international development organizations can play a bigger role in establishing networks and partnerships with current and emerging AbCT ventures, enabling a more dynamic and mutually beneficial relationship with these new players in the urban mobility landscape. As demonstrated in this paper, partnerships are essential for the success of pilot experiences, and the construction of a wider network of actors for the exchange of knowledge and experiences may make the difference in the successful adoption of these new modes of transportation and their adaptation to the needs and priorities of LAC cities.

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8. Appendixes

    a. Sample Interview Protocol

1. General:
   a. Can you tell us a bit about your project/organization, where and how it operates, what your role in the project/organization is, and what's your previous experience in the transport sector?
2. Microtransit:
   a. Are you familiar with the terms app-based collective transportation or microtransit?
   b. What is your perception about this type of transportation service?
   c. What do you think are the main benefits and challenges associated with this type of transportation service?
3. Relationship with authorities:
   a. What has been your relationship with local or national authorities?
   b. In your experience what is their perception regarding microtransit services?
   c. What is the regulatory landscape in your city/country regarding the transportation services you provide and what impacts has it had on your operations?
4. Affordability
   a. Who is the main user of your services?
   b. What are the main challenges you face to make these services more affordable?
5. Coverage
   a. How are routes, hours and areas of operation defined?
   b. Are there specific areas where there is demand but you currently don't offer services? Why?
   c. What are the main challenges to improve the coverage of your service?
6. Crime, fear and sexual harassment
   a. What are the main challenges you see in terms of improving the perception of safety in transportation services?
   b. What type of strategies or benefits does your service offer for users to improve their perception of safety?
7. Accessibility, disability, and reduced mobility
   a. What are the main challenges you see in terms of providing more accessible services to people with reduced mobility or disabilities?
   b. What type of strategies or benefits does your service offer for users to improve accessibility for these populations?
8. Gender and care responsibilities
   a. What are the main challenges you see in terms of providing services that cater to the needs of women and other users with care responsibilities?
   b. What type of strategies or benefits does your service offer for users to better cater to these users' needs?
   c. Does the service allow for trip chaining, does route planning include places like schools, hospitals, supermarkets, etc.?
9. Sustainability

    a. How do you think this type of transportation service is or could be contributing to sustainability goals?

    b. What are the main challenges for these services to be more sustainable?

    c. What type of strategies does your company/project implement to be more sustainable

10. Future scenarios

    a. What do you think the ideal scenario would be for microtransit in the future?

    b. What do you think the main challenges are to be able to get there?