



Maximizing Micromobility

UNLOCKING OPPORTUNITIES TO INTEGRATE MICROMOBILITY
AND PUBLIC TRANSPORTATION



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Gabriel L. Guerrero,
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To maximize the benefits of micromobility, cities must integrate these modes with public transportation.



INTRODUCTION

1

Micromobility is an affordable, efficient, low-carbon transportation option that has become an attractive alternative to private vehicles for short trips. Micromobility refers to small, lightweight devices that:

- Typically operate at speeds below 25 km/h (15 mph),
- Can be human-powered or electric,
- Can be shared or personally owned, and
- Are ideal for trips up to 10 km.

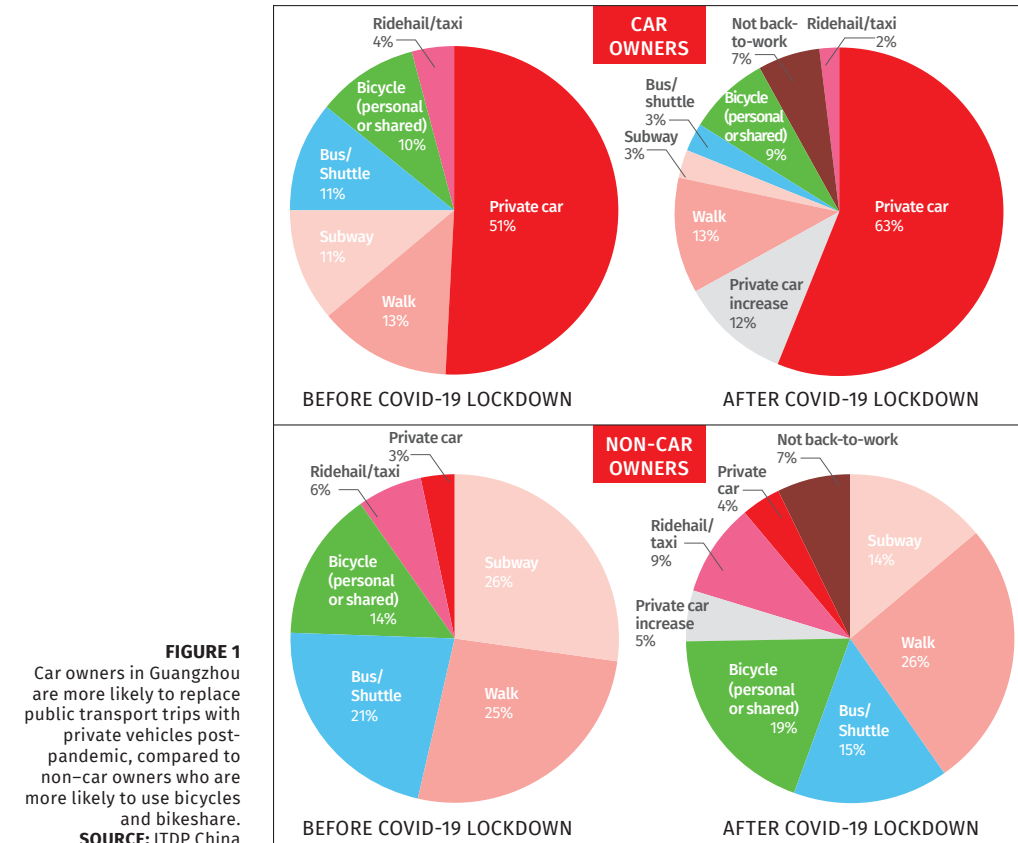
Micromobility is used for a variety of trip types, from short commutes, to first- and last-mile connections with transit, to inter-/intra-neighborhood trips. Devices such as electric scooters, bicycles, skateboards, cargo or freight bicycles (those with built-in spaces for carrying large loads), and cycle rickshaws are considered to be micromobility. Mopeds and motorcycles, however, are not considered to be micromobility because they are not lightweight and have top speeds above 45 km/h.

Micromobility can yield benefits such as improved air quality and health outcomes, pollution reduction, last mile connectivity, and economic development. However, despite these potential benefits, many cities have not significantly integrated micromobility into larger sustainable transportation plans. Since the explosion of privately operated shared micromobility in 2017, most cities have opted to strictly regulate micromobility, only loosely in alignment with—or, in some cases, completely separate from—local transportation goals. Adoption and management of shared micromobility in many cities has not considered how the system could be most effective, convenient, and reliable for users. In other words, integration with other transport modes and within the broader transportation system has not been a priority. This may be preventing scaling that would improve the quality and reliability of shared micromobility services.

The COVID-19 pandemic has forced cities to rapidly rethink their transportation networks, and micromobility has emerged as a critical mode for moving people and goods while minimizing physical contact. Many cities have identified shared micromobility as an essential service and are implementing infrastructure and policies that will support micromobility in the short term.^{1,2} However, public transport ridership remains lower than before the pandemic and private vehicle use is on the rise.³ For example, commuter surveys in Guangzhou show that car owners were more likely to replace public transport trips with private vehicles post-COVID, while non-car owners were more likely to use personal and shared bicycles (see Figure 1).⁴ Perception surveys about mode shift preferences conducted in more than 50 Indian cities show an anticipated 49% increase in cycling trips to work or school and a 66% increase in cycling for other trips.⁵

OPPOSITE PAGE:
Pop-up cycle lanes, like this one in Jakarta, Indonesia, have supported widespread use of bicycles and other micromobility during the COVID-19 pandemic, and could help to catalyze multimodal integration.
SOURCE:
ITDP Indonesia

1 [Bike Share & Car Share Companies Step Up Cleaning Practices Since Onset of COVID-19.](#)
2 [Milan Announces Ambitious Scheme to Reduce Car Use After Lockdown.](#)
3 [Post-Pandemic, Chinese Cities Gradually Reopen Transport Networks.](#)
4 [The Impact of COVID on Urban Traffic in China.](#)
5 [Changing Travel Patterns in Post-COVID India.](#)



Survey of Commute Modes in Guangzhou Before and After COVID-19

The surveys in Guangzhou also found that China's three largest bikeshare operators saw a 150% increase in ridership. In India, multiple cities, including Bengaluru, Chennai, and Mumbai, have reported increased bicycle sales, with some bicycle retailers seeing increases of 400% in July 2020. Similar data for bikeshare use and personal bicycle sales in other cities show an overall increase in demand for the flexible, physically distanced mobility micromobility offers. **This increased demand and urgency to provide more public space for people to travel safely positions cities to better integrate services—like micromobility—that provide an alternative to public transit in the near term and complement transit down the line.**

Globally, cities are fast-tracking cycling and other micromobility infrastructure as a response to COVID-19 travel restrictions. These responses can help to catalyze micromobility integration, as detailed in the next table.

MICROMOBILITY RESPONSE TO COVID-19	HOW THIS COULD CATALYZE INTEGRATION	CITY EXAMPLES
Temporary cycle lanes and slow streets	Connecting cycle lanes to transit stations increases the population who can access public transport by extending the network and increasing safety Cycle lanes along key transit corridors can facilitate intermodal trips	Cycle lanes: Ahmedabad , Bangalore , Bogotá , Cali , Jakarta , Lima , Mexico City , Paris , Quito , multiple cities in the Philippines Slow streets: Oakland , Portland, OR
Temporary infrastructure at transit stations (parking, repair stations)	Increased (sense of) reliability can increase propensity for multimodal trips	Grand Rapids (MI, USA) , Lima , Paris , Lisbon
Increasing access to shared micromobility (free/reduced fares, more devices/stations)	More micromobility users expands the constituency calling for integrative measures	Bogotá , Budapest , Cali , Detroit , Jakarta , Madrid , Mendoza (AR) , Portland
Increasing access to personal micromobility (subsidies for purchase or maintenance)	More micromobility users expands the constituency calling for integrative measures	Paris , Lisbon , Italy
Allowing micromobility devices onboard public transport	Enables users to easily transfer between public transport and micromobility or to rely on public transport as a backup in case of emergency, inclement weather, etc.	Buenos Aires
Fast-tracking plans to expand micromobility infrastructure and restrict vehicle use	Reviewing existing plans could raise opportunities for integration where it was not considered previously	Beijing , Kampala , Milan , Montreal , Pune (and many other Indian cities with Cycle4Change and Streets for People challenges)
Fast-tracking legalization or classification of micromobility as non-motor vehicles	Legalizing certain micromobility devices, such as e-scooters, allows for new modes that could fill gaps in the existing network and offer new opportunities to link to public transport	United Kingdom

Indeed, cities can proactively reclaim space and adopt policies that better integrate micromobility and public transport while vehicle volume is low due to the pandemic. Doing so could lay the foundation for micromobility to operate at scale, initiate a shift away from vehicle use, and improve resiliency in the face of future crises. Without well-integrated micromobility options, cities may face a marked increase in personal vehicle use, resulting in congestion, air pollution, and greenhouse gas emissions at even higher levels than before the pandemic.

E-bike riders in Guangzhou enjoy the dedicated infrastructure that runs alongside the Guangzhou BRT.

SOURCE: ITDP China



Bicycle riders and pedestrians of all ages enjoy an Open Street event in Jakarta, Indonesia. This program expanded during the COVID-19 pandemic, as in many cities globally.

SOURCE: ITDP Indonesia

1.1
WHAT IS MULTIMODAL INTEGRATION?

Multimodal trips are characterized by the use of multiple modes of travel to reach a destination. Multimodal integration brings together physical infrastructure, payment, information, and/or institutional management across multiple transport modes to improve the multimodal trip experience for users.

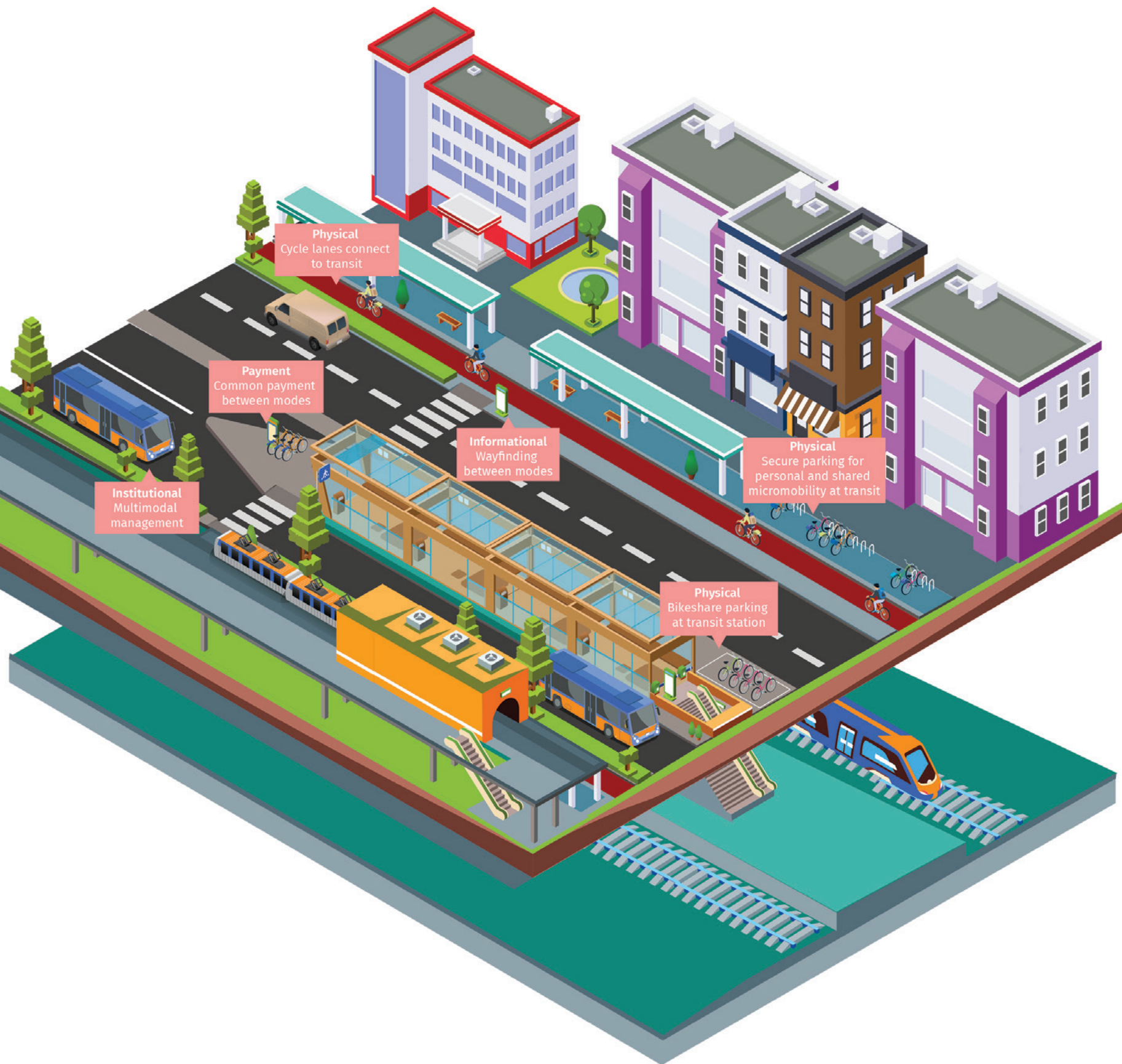


FIGURE 2
Image adapted from
ITDP Indonesia.

PHYSICAL	PAYMENT AND FARE	INFORMATIONAL	INSTITUTIONAL
Infrastructure and access points for different modes are in close proximity to facilitate convenient transfers	A single platform or system enables users to reserve, transfer between, and pay for multimodal trips	Information about fares, times, and transfers between modes is clear and easily accessible so users can make well-informed decisions	Improved cooperation between agencies or levels of government increases operational efficiency and standardization

EXAMPLES	- Protected micro-mobility lanes that connect to transit - Secure micro-mobility parking at transit stations - Bicycle repair stations at transit hubs	- Mobile wallets and payment platforms RFID/smart cards for multiple modes - Simplified fares - Free/reduced-fare transfers between modes	- Multimodal trip-planning apps - Wayfinding directions across modes - Maps with integrated modes	- Multijurisdictional public bikeshare - Single entity manages multiple transport modes
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BENEFITS	↓ Users - more convenient and faster trips; simpler payment, reduced wait times, reduced confusion, and easier system use Operators - higher revenue from increased user demand and optimized usage (reduced costs) Government - increased demand for public transport, walking, and cycling; reduced duplicated services; increased operations/planning efficiency Environment - reduced emissions as vehicle trips decline, reduced low-density development
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1.2
THE BENEFITS OF MULTIMODAL INTEGRATION

Multimodal integration has been shown to improve efficiency and quality of transportation service, yielding environmental, social, and economic benefits. Cities that integrate transportation modes can expect to see:

- Expanded station service areas:** People previously outside of the catchment area for public transport (whether for physical distance or financial reasons) may be able to access the network more easily or affordably.
- Increased use of public transport, walking, and cycling:** More reliable and flexible travel options available across a larger service area encourages use of sustainable modes for more trips rather than driving a personal vehicle.
- Improved experience for users:** Safe, convenient connections to fixed-route public transport services can make users feel more comfortable that their mobility needs will be met by the transportation system regardless of their destination. This creates goodwill by improving user perceptions and experiences.
- Reduced congestion and air pollution:** Mode shift away from private vehicles reduces congestion and pollution while improving air quality and road safety. Fewer trips made by private vehicles also reduces parking demand, freeing up on-street parking spaces for higher-value uses.
- Improved equity and quality of life:** Integrated multimodal trips can shorten travel times and lower the cost of longer-distance trips. This can improve quality of life, particularly for low-income residents who tend to live farther from the city center and spend more time and money to reach destinations and services.⁶

EXISTING REGULATION AND WHY INTEGRATION MATTERS

2

Cities have taken different approaches to regulation in response to rapid adoption of privately operated shared micromobility in 2017 and 2018.⁷ Some opted for little to no regulation, while other cities instated complete or partial (e.g., nighttime) bans, right-of-way permits, pilots, or demonstration periods. Regulation of micromobility ranges widely, and devices such as electric bicycles and scooters can fall in a legal gray area.^{8,9}

Many cities have erred toward strict regulation of new shared micromobility offerings, but few have used micromobility regulation to make progress toward broader city transportation, environmental, and socioeconomic goals. This regulatory approach stands in contrast to traditional city-managed bikeshare programs, in which the city owns the physical assets (bicycles, station infrastructure) and contracts with a single private operator to conduct daily operations. In this structure, the city has a clear stake in the success of the bikeshare program and may be motivated to align it with other city-managed programs to encourage use and growth. In contrast, new fully privately operated systems are not owned by cities, so the city has less of a stake in operations and little motivation to align a private service with long-term city plans and targets. Instead of entering into a contract, privately owned and operated shared micromobility systems have primarily been required to participate in pilots or apply for time-limited permits to operate legally in cities.

Despite the promising role that micromobility may play in sustainable transportation, most regulatory approaches have not explicitly encouraged integration into transport networks. This may be because cities have been primarily focused on operational challenges, such as public space management and safety. In some cases, operators may push back on integration, especially in and around public transport stations or hubs that do not match their user target. While regulation of shared micromobility operations was (and continues to be) critical for establishing standards for use, operations, and quality of service, cities must now move beyond only regulating daily operations and ensure that micromobility is an affordable, efficient, and accessible transport option that is well-integrated with other modes.

Bicycle lanes, like in Vancouver, Canada (OPPOSITE PAGE) and Lima, Peru (RIGHT), can expand public transit station catchment areas, reduce congestion, and improve urban quality of life. SOURCES: Paul Krueger, Flickr, and Carlos Felipe Pardo, Flickr



⁷ [Guidelines for Regulating Shared Micromobility.](#)
⁸ [MOD Learning Center: Micromobility Policy Atlas.](#)
⁹ [Guidelines for Regulating Shared Micromobility.](#)



Jakarta's dockless bikeshare pilot includes parking areas along Transjakarta BRT lines. **SOURCE:** ITDP Indonesia

	WHAT CITIES CAN DO WITH REGULATION	OUTCOMES WITH INTEGRATION
ACCESS	Require micromobility-supportive infrastructure (e.g., designated parking areas)	- Connect micromobility infrastructure to other sustainable modes - Expand the reach of transit by making first-last mile trips more feasible
EQUITY	- Require operators to provide real-time data on shared-device locations - Set minimum fleet goals with incentives for underserved and/or lower-demand areas to ensure equitable distribution - Require operators to offer discounted fare programs and cash payment options for low-income users	- Enable trip planning for shorter, more convenient multimodal trips - Enable common payment with public transport and facilitate reduced-fare transfers between modes - Reduce inequitable financial burden by simplifying fares across modes
ENVIRONMENT (HEALTH + CLIMATE)	- Set minimum requirements for shared device production and operations, which contribute the largest share of lifecycle emissions¹⁰ - Require use of low-emission vehicles for collecting/rebalancing shared devices	Create a network that encourages more sustainable trips (single-mode and multimodal) and fewer private vehicle trips
SAFETY	- Set maximum speeds and areas of operation - Ban unpermitted modes/operators - Require operators to provide insurance, safety training for users - Ban and/or fine operators or users for consistent unsafe behavior	Fewer traffic crashes as sustainable, multimodal trips become safest, most convenient, and most cost-effective compared to driving
RESOURCE EFFICIENCY	- Set fleet caps (can be a flat cap or performance-based) for shared vehicles - Charge reasonable fees to operator(s) for city time reviewing permit applications, addressing violations	- Reduce administrative inefficiencies in multimodal management and payment structures - Reduce fuel and energy consumption by encouraging multimodal trips and decreasing single-occupancy motorized trips

WHAT CAN CITIES DO TO SUPPORT MICROMOBILITY INTEGRATION?

3

Integration can take many forms, and the benefits and challenges of each differ depending on local contexts and capacities. Regardless, it is up to cities to catalyze momentum toward integration as opposed to waiting for the private sector to initiate it. In other words, cities must proactively seek integrative measures and work with operators toward that goal. Cases like the Muevete Chilo bikeshare system in Mazatlán, Mexico, where strategic government investment in communications and infrastructure bolsters operations capacity provided by private operator VBike, demonstrate the critical role of public-private partnership for any form of integration.

This section evaluates different approaches to physical, payment, informational, and institutional integration to understand what is working and what challenges remain. Outstanding questions for each type of integration are listed in Appendix B.

3.1 PHYSICAL INTEGRATION

Viewed as the foundation for other types of integration, physical integration refers to siting infrastructure for different modes in close proximity so that transferring between modes is physically convenient. This helps to reduce major barriers to multimodal trips, including added time, which can help to make multimodal trips more competitive with the ease of driving.¹¹ The scale of physical integration can range from small (bicycle parking at transit stations) to large (multimodal mobility hubs). With increasing scale comes increasing benefits; however, more complex mobility hubs also present higher costs and capacity requirements.

Common examples of physical integration include:

MICROMOBILITY PARKING near public transport stations.



ABOVE: A public bikeshare station located near a metro station entrance in Pune, India. **SOURCE:** ITDP India

Installing or adding docked bikeshare stations, especially near transit stations, can increase the “network effect,” where shorter distances between stations lessens anxiety and improves reliability for users.¹² This can help to increase trips made by micromobility while reducing personal vehicle and taxi use.¹³ For dockless mobility, designated parking areas near bus and metro stops can achieve similar outcomes and also help to avoid clutter. Operators can incentivize dockless device parking in designated areas by offering users credits for future rides or by charging a fee. Mobike offers these incentives in Guangzhou, Singapore, and other cities.¹⁴ Micromobility parking areas that include racks can also serve personal micromobility users transferring to transit.

11 Jakarta Intermodal Integration Guideline.
 12 Shared Micromobility Policy Toolkit: Docked and Dockless Bike and Scooter Sharing.
 13 Shared Micromobility Policy Toolkit: Docked and Dockless Bike and Scooter Sharing.
 14 Regulating Dockless Bikeshare: Lessons from Tianjin, China.

PROTECTED MICROMOBILITY LANES (commonly referred to as protected bicycle lanes or cycle tracks) that complement major public transit corridors and connect to transit stations.

Micromobility lanes that run along transit corridors can alleviate system strain in cities where public transport is overcrowded or concerns about maintaining physical distance due to COVID-19 are strong. Lanes that connect to transit stations enable more people to use micromobility to access transit from a farther distance than they could on foot (see figure 3). High-quality, well-connected micromobility lanes can reduce travel times and improve comfort for users, and they expand the range of destinations and opportunities accessible by public transport. In many cities, a lack of protected cycling infrastructure is cited as a top barrier to micromobility use, especially for underrepresented groups.¹⁵



Physically-separated cycle lanes connect travelers to the Metro system in Washington, D.C., United States. **SOURCE:** Joe Flood, Flickr

In Stuttgart, Germany, bicycles permitted on-board public transport vehicles enables users to connect to transit and cover their last-mile needs. **SOURCE:** Carlos Felipe Pardo, Flickr



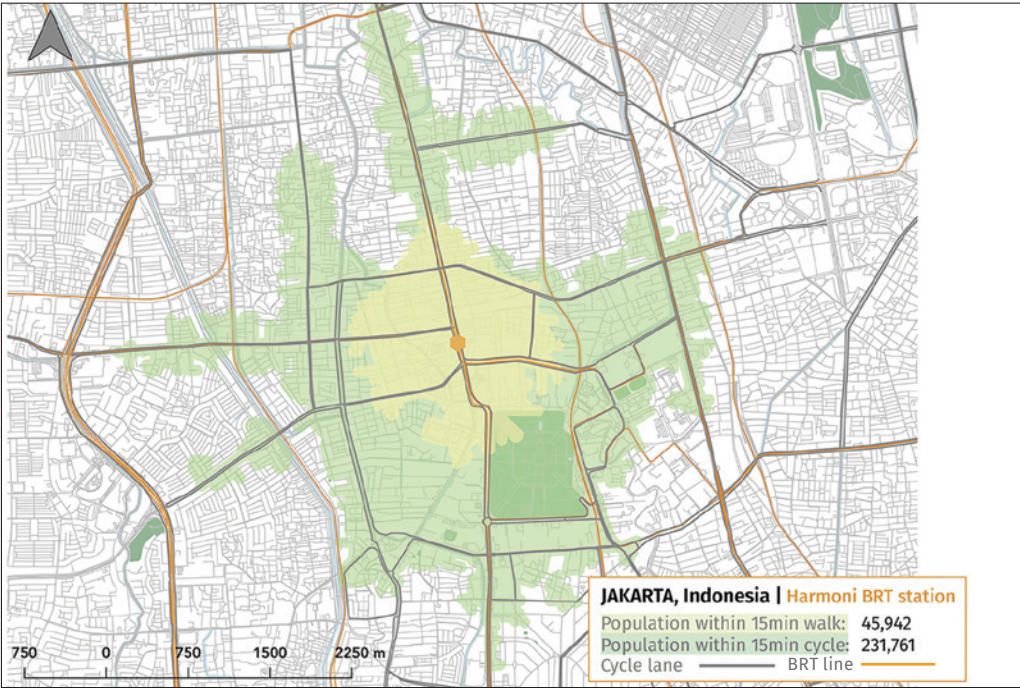
Other forms of physical integration between micromobility and public transport include:

- bicycle repair kiosks placed at stations
- bicycle lockers or covered micromobility parking at transit stations
- charging stations for e-micromobility devices at transit stations
- micromobility devices permitted on board transit vehicles and/or bicycle racks on buses.

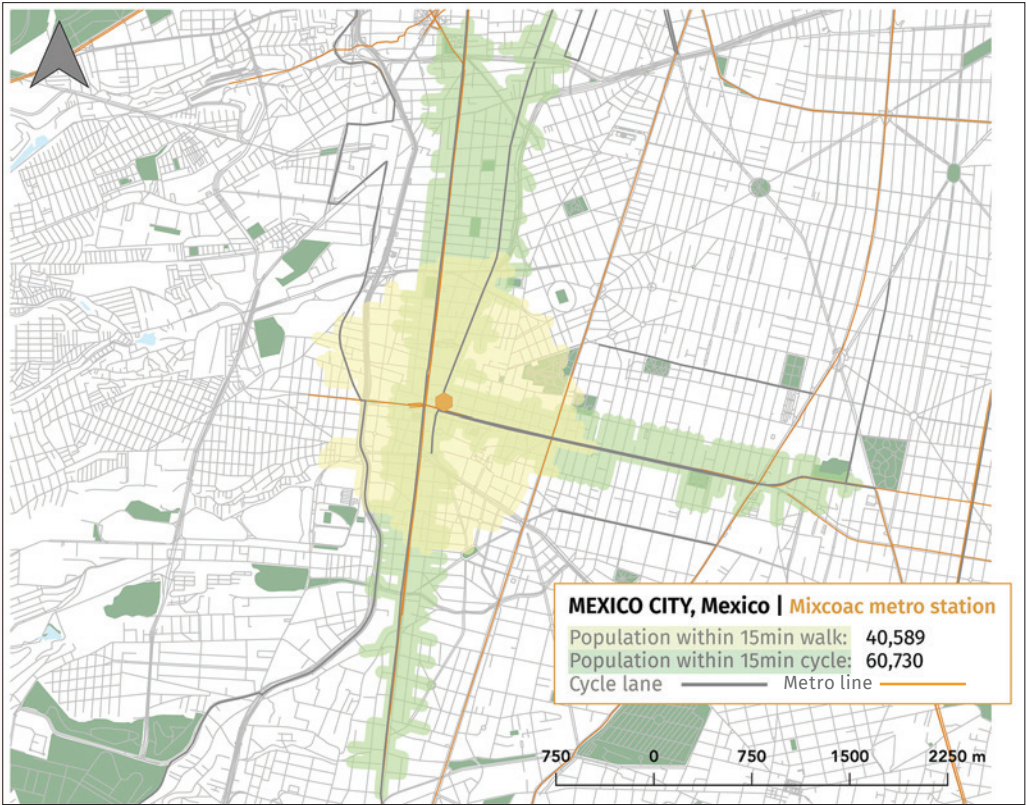
The type and scale of infrastructure installed as a response to travel changes brought about by the COVID-19 pandemic may be different than pre-COVID due to increased numbers of cyclists and, in the near term, fewer public transit riders. Demand for reliable, affordable transport during the pandemic has highlighted an infrastructure gap in many cities. Safe spaces to ride and store micromobility are critical first steps toward curbing demand for private vehicles.

Physical integration between micromobility lanes and transit stations expands access. This is demonstrated in the maps below, which show a significantly higher percentage of the population within a 15-minute cycle (or other micromobility) trip using a cycle lane compared to a 15-minute walk of a public transit station in Jakarta, Mexico City, and Fortaleza.¹⁶

Cycle lanes around the Harmoni BRT station in Jakarta, Indonesia expand the population that can reach the system within 15 minutes from about 46,000 (by foot) to 231,000 with cycling, approximately a 400% increase.

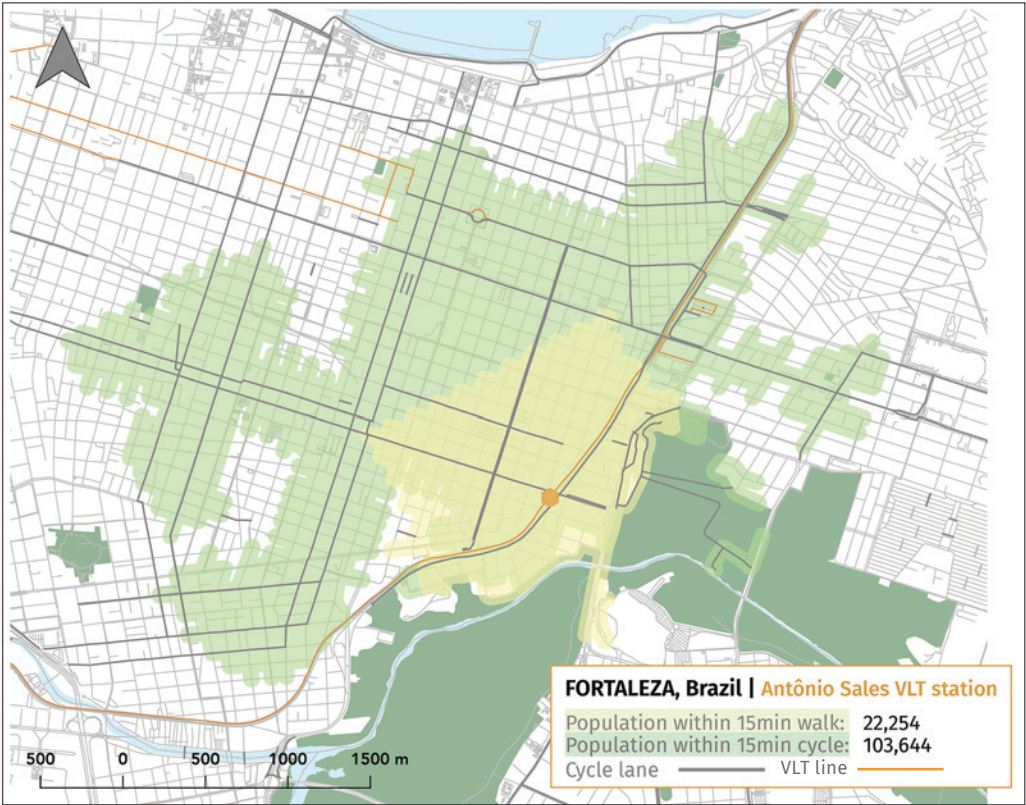


Cycle lanes around the Mixcoac metro station in Mexico City, Mexico expand the population that can reach the system within 15 minutes from about 41,000 (by foot) to 61,000 with cycling, approximately a 50% increase.



Challenges with physical integration can include high upfront costs, such as docked bikeshare stations or bicycle lockers. However, other measures, such as painted designated parking areas, are relatively inexpensive. Other challenges stemming from community resistance can arise, namely concerns about removing car parking and otherwise diverting funding away from vehicles. In addition, there may be equity concerns if physical infrastructure, like stations or parking areas, is installed in higher-income neighborhoods, primarily serving groups that are already well-connected within the larger transport network.¹⁷ In turn, this can lead to overlooked groups' feeling that micromobility is not for them because the infrastructure that supports it is not available in their neighborhoods.

Cycle lanes around the Antonio Sales VLT station in Fortaleza, Brazil expand the population that can reach the station within 15 minutes from about 22,000 (by foot) to 103,000 by bicycle or micromobility, approximately a 370% increase.



Grin e-scooters are available at a BRT station in Bogotá, Colombia. E-scooters fulfill short trips, and can act as a first-last mile option to connect to and from public transport. **SOURCE:** Carlos Felipe Pardo, Flickr



3.1.1 ON-THE-GROUND PRACTICES

GEOFENCED PARKING IN TIANJIN, CHINA:

Dockless bikeshare in Tianjin exploded in 2017: One in every four bicycle trips was made using a dockless bicycle.¹⁸ The rapid uptake led to piles of dockless cycles, particularly near transit stations and hubs. As a result, Tianjin's Transport Commission developed regulations to improve use and management, including requiring geofencing for micromobility parking.¹⁹ All shared bicycles must be GPS-enabled, and all operators are required to display geofenced parking areas in their apps. While not a complete fix, the regulations substantially improved parking, particularly near transport stations and other key destinations, and have made Tianjin a popular best practice example.²⁰

PUBLIC BIKESHARE PARKING AT TRANSIT STATIONS IN CHENNAI AND PUNE, INDIA:

In Chennai, surveys indicate that people frequently cycle as a form of recreation and exercise, so the city is installing more public bikeshare stations in neighborhoods and near apartment buildings to support that demand. To complement that, Chennai bikeshare operator SmartBike has installed stations near metro stations to support last-mile connectivity. Similarly, in Pune, the city has installed bikeshare docks around bus stops to serve last-mile needs.

E-SCOOTER AND BICYCLE PARKING AT BRT STATIONS IN BOGOTÁ, COLOMBIA:

Grin (Grow) Mobility partnered with the Transmilenio BRT (bus rapid transit) operator to provide integrated e-scooter parking at eight stations along the Calle 26 (or Avenida El Dorado) corridor.²¹ As feeder buses have not been able to cover demand for the system, local experts were keen to test how e-scooters could connect people to the BRT corridor.²² However, concerns have been raised about access for certain groups (e.g., parents with children, elderly people, etc.) and that e-scooters are not regulated in the National Traffic Code. Integrating e-scooter parking at BRT stations complements the city's ongoing efforts to implement thousands of bicycle parking spaces near rapid transit over the next seven years.²³

BICYCLE REPAIR KIOSKS AT PUBLIC TRANSPORT STATIONS IN TORONTO, CANADA:

After trialing bicycle repair stations at 10 transit stations in 2015, positive responses from users led to a master plan to install repair stations at 50 stations throughout the city, covering 70% of the public transit network.²⁴

BICYCLE LANES ALONG BRT LINES AND EXTENDING THE NETWORK IN MEXICO CITY, MEXICO:

In response to the COVID-19 pandemic, Mexico City has prioritized cycle lane expansion, with plans to implement 55.7 km of temporary lanes, extending the existing network into more peripheral neighborhoods (particularly in the north, south, and eastern areas of the Federal District). The city has installed “emergent” cycle lanes along BRT lines 1 and 2, which have eased crowding on buses and provided an alternative to public transport during the pandemic.²⁵ As of October 2020, the micromobility operator, Dezba, was working with the government to place shared bicycles along the Insurgentes emergent cycle lane and to install parking stations at high-volume transit stations.

18 [Regulating Dockless Bikes: Lessons from Tianjin, China.](#)
19 [Beyond Avoiding the Micromobility Tragedy](#)
20 [Regulating Dockless Bikes: Lessons from Tianjin, China.](#)
21 [Transmilenio, Grow Mobility Launch Bogotá Micro-mobility Solution](#)
22 [Cómo Usar Patinetas Eléctricas para Llegar y Salir de Transmilenio por la 26.](#)
23 [Copenhagenize Index 2019: Bogotá.](#)
24 [Bicycle and Transit Integration.](#)
25 [Local Actions to Support Walking and Cycling During Social Distancing Dataset.](#)

3.2
PAYMENT AND FARE INTEGRATION

Payment integration enables users to reserve, transfer between, and pay for multiple transport modes using one consolidated method or form of payment. Payment integration allows for more seamless multimodal travel (enabling users to pay for travel using a common method) and lays the foundation for fare integration (where users are not penalized by paying two fares for needing to make a multimodal trip). Together, payment and fare integration makes multimodal trips more affordable and attractive. Payment integration between micromobility and other transport modes is growing. Common examples of payment integration include:

SMART/RFID CARDS for integrated payment between transport modes, such as city-managed bikeshare and public transit.



The integrated RFID card in Mexico City allows riders to access and pay for multiple public transport modes and bikeshare.
SOURCE: ProtoplasmaKid, Wikicommons

In general, RFID cards are well-favored, and they are currently used by cities such as Los Angeles, Mexico City, and Montreal. Similarly, in Tokyo, IC cards (a type of reloadable prepaid card) can be used to pay for public transportation, Docomo bikeshare, and other non-mobility services.26 RFID cards are beneficial from an equity standpoint, as they do not require smartphone use.

MOBILE PAYMENT APPS for common digital payment across multiple modes.



In addition to paying with a credit card, this metro ticket machine supports Alipay payment, represented by the blue code.
SOURCE: MNXANL, Wikicommons

Payment apps such as Alipay and WeChat pay are increasingly integrated not only across transport modes in Chinese cities but also with food-delivery services.27 Berlin and several other cities have built their own apps that enable common payment across multiple modes.28 Mobility companies such as Grin and Yellow in Latin America allow users to use cash to purchase ride credits, which are tracked in a digital wallet and can also be used for non-mobility-related purchases at shops and restaurants.29

While payment integration is becoming more common, fare integration—and reduced-fare transfers, more specifically—is still rare. In most cases, fare integration for micromobility has been facilitated between public transport and city-owned bikeshare, where bikeshare trips are offered for free. This avoids the need to integrate two separate payment systems, which can present significant logistical challenges.

INTEGRATED PAYMENT BETWEEN BIKESHARE AND PUBLIC TRANSPORT

CITY	SYSTEM NAME	PAYMENT INTEGRATION
Berlin GERMANY	Nextbike	Users can pay for public transport, Nextbike bikeshare, and other shared mobility options like e-scooters and mopeds through the Jelbi app.
Cologne GERMANY	KVB rad	Users who pay VRS (regional train) fare receive free (30-minute) transfer to bikeshare.
Dublin IRELAND	Dublin Bikes	Leap card holds registration details for transit and bikeshare (payment accounts are separate, both accounts accessible with common card).
Helsinki FINLAND	City Bike	Users can pay for public transit and bikeshare through the Helsinki Travel Card.
Kansas City MO, USA	BCycle	Integrated card includes magnetic strip for bus fare, RFID for bikeshare access.
Los Angeles CA, USA	Metro Bike Share	Users can pay for public transit, bikeshare using the TAP card or app.
Mexico City MEXICO	Ecobici	Integrated card includes access to bus, metro, bikeshare, and parking.
Milwaukee WI, USA	Bublr	Integrated card includes transit access and RFID sticker for bikeshare.
Montreal CANADA	BIXI	Integrated OPUS card includes access to public transit and bikeshare; CA\$100 nonmember deposit for bikeshare rental is waived if using OPUS.
Pittsburgh PA, USA	Healthy Ride	Users who pay bus fare receive free (15-minute) transfer to bikeshare.

Updated from ITDP's Bikeshare Planning Guide, 2018.

FREE BIKESHARE SYSTEMS

CITY	SYSTEM NAME	PAYMENT INTEGRATION
Buenos Aires ARGENTINA	Ecobici	All Ecobici trips are free, MiBA card offers more streamlined access.
Fortaleza BRAZIL	Bicicletar	All trips Monday–Saturday under 60 minutes and Sunday under 90 minutes are free to users.
Hangzhou CHINA	Hangzhou Public Bicycle	All trips under 60 minutes are free to users.
Quito ECUADOR	BiciQuito	All trips are free to users.

Adapted from ITDP's Bikeshare Planning Guide, 2018. In addition, many cities and operators offered free or reduced-cost bikeshare in response to COVID-19.30

26 Frequently Asked Questions | Docomo Bike Share Service.
27 Micromobility: Leading Players Leverage Scale to Offer Additional Service.
28 Jelbi – Berlin's Public Transport and Sharing Services in One App.
29 Electric Scooters And Micro-Mobility: Here's Everything You Need To Know.

LEFT: A public bikeshare station is located just outside of the Pentagon City Metro in the Washington, D.C. metropolitan area.
SOURCE: Mariordo (Mario R. Duran Ortiz), Wikicommons



RIGHT: Fortaleza's Bicicleta Integrada, a long-term bikeshare system, is available at outer transit stations and enables users to keep a bicycle overnight so that they can return to the station by bicycle in the morning.
SOURCE: Dante Rosado



Fare integration, and simplified fare structures in particular, can benefit companies and agencies that manage transport services by increasing ridership and decreasing spending on advertising and management of complex fare structures.³¹ Simple, integrated fares are also beneficial for users because they reduce confusion. In addition, when fare structures are streamlined across different modes, the ability to use multiple modes within a given time period (when previously individual fares for each would be necessary) saves users transfer and time costs. Simplified fare structures can also ease the addition of more modes to the system, enabling cities to plan for future integration. Fare simplification may look like:

- A single flat-fee for multiple modes,
- Reduced multimodal pricing, with one mode (such as bikeshare) included for free,
- A variable fare based on distance or time instead of multiple fares based on mode,³² or
- A variable “smart fare” made up of discounted rates unlocked when modes are used together.

In London, an integrated payment system calculates the best price for users at the end of the day.³³ This ensures that users receive the best-value fare and enables those who otherwise could not afford the upfront cost of an unlimited or monthly pass to access the same per-ride discounts.

Despite the growing popularity and benefits of payment integration in transport, governments and companies alike are hesitant to move toward multimodal fare integration. This is due in large part to the question of which party “owns” customers’ data and money in virtual wallets. Fare integration is likely to require a closer relationship between operators and the city than currently exists for most privately owned shared micromobility programs. In addition, both the private and public sectors may be limited by the initial costs associated with transitioning to an integrated platform, which can require updating physical payment infrastructure like kiosks, turnstiles, etc. Further, some cities have legacy contracts with payment vendors that do not offer integrative payment options. In the larger San Francisco Bay area, for example, the contract between the transit agency and fare payment provider discouraged changes and updates to the pricing system, citing fees, delays, and complications with existing business rules.³⁴ The technology also did not allow for institutional integration (i.e., discounts for university students) or new platforms.³⁵

Other challenges with payment integration, particularly smartphone-based solutions, include limited capacity or desire to digitally integrate payments. While mobile payments are popular in Chinese cities because smartphone uptake is high and QR codes are well integrated in daily life, this method may prove more challenging in areas where digital access or the use of smartphones for payment is low.³⁶

3.2.1 ON-THE-GROUND PRACTICES

INTEGRATED TRANSPORT PAYMENTS IN HANGZHOU, CHINA:

As the headquarters of Alibaba, Hangzhou has integrated payment for public transportation, private bikeshare, and taxis through Alipay. This integrated platform is also used elsewhere in China, with more than 260 Chinese cities accepting Alipay for public transportation payment.³⁷ This means that users who want to use public transport in other Chinese cities do not have to worry about getting a different transit card, loading money, or not understanding the fare structure.

TICKET INTEGRATION IN FORTALEZA, BRAZIL:

Bicicleta Integrada, a first- and last-mile program implemented by the city of Fortaleza, seeks to promote integration between public transport and bikeshare. The bikeshare stations are located very close to public transport station entrances, and users can rent a bicycle using the ticket from their public transport trip, at no extra cost. Users can keep bicycles for up to 14 hours, which is an additional element of reliability.³⁸

RFID CARD INTEGRATION IN MEXICO CITY, MEXICO:

Mexico City uses RFID cards to integrate payment for public transit (including buses, metro, and LRT) and bikeshare.³⁹ Payment integration has been cited as critical in cultivating growth in bikeshare use.⁴⁰ Integration of modes has been a phased effort; at present, the city is in phase three of four, with the final stage planned for June 2021.⁴¹ The first three phases have successfully integrated Metro, Metrobús (BRT), Trolebús (trolleybus), and Ecobici (public bikeshare), and the final phase will incorporate Cablebús (cable car) service.



In Los Angeles county, the regional TAP card can be used to access public transport and Metro bikeshare, but users must register separately and have separate accounts for each mode.
SOURCE: Metro Bike Share, Flickr

³¹ [Mobility Payment Integration: State-of-the-Practice Scan.](#)
³² [Integrated Public Transport Systems Make Travel Easier and More Affordable.](#)
³³ [Unlocking the Promise of Integrated Mobility in the Capital Region.](#)
³⁴ [Seamless Transit: How to Make Bay Area Public Transit Function Like One Rational, Easy-to-Use System.](#)
³⁵ [Seamless Transit: How to Make Bay Area Public Transit Function Like One Rational, Easy-to-Use System.](#)
³⁶ [QR Codes in International Payment Services.](#)

³⁷ [Mobile Payments in China: No Wallet, Bring Your Smartphone.](#)
³⁸ [Bicicletas Integradas de Fortaleza.](#)
³⁹ [Single Card Service for Transportation in Mexico City.](#)
⁴⁰ [Cities100: Mexico City - Public Transit Integration Catapults Bike-share.](#)
⁴¹ [Single Card Service for Transportation in Mexico City.](#)

3.3
INFORMATIONAL INTEGRATION

Informational integration focuses on providing users with clear, easily accessible information necessary for making multimodal trips. It helps users feel more comfortable relying on multiple transport modes because the information they need to make decisions about their trip is reliable, easy to understand, and, potentially, housed in one place.

Common examples of informational integration include:

WAYFINDING SIGNAGE, a relatively low-technology, customer-facing form of integration that directs users to nearby transport landmarks like bus, metro, or bikeshare stations.

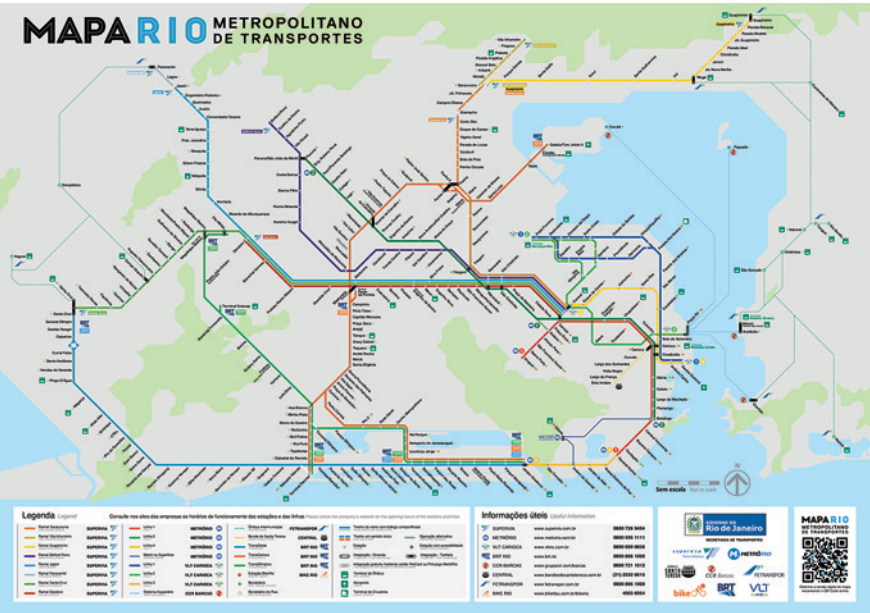
Wayfinding signage, like this totem at the entrance to a station in Jakarta, Indonesia, helps riders understand what modes are available.
SOURCE: ITDP Indonesia

BELOW: In Rio de Janeiro, Brazil, public transport maps displayed in stations and on-board vehicles have QR codes to allow riders to download and carry the map with them digitally, helping to facilitate transfers.
SOURCE: Governo do Rio de Janeiro



Knowledge of available modes can encourage connections between them. In some cities, like Milwaukee, connections to bikeshare stations are announced on board public buses.42 This can increase user comfort in unfamiliar locations, and it notifies bus riders about available transportation options they may not have considered. Jakarta has prioritized and standardized wayfinding signage at BRT and other transit hubs, directing travelers to commuter rail and angkot (shared van) connections as well as nearby points of interest. The city is working to integrat its new bikeshare program into the wayfinding network.

MOBILE APPLICATIONS AND QR CODES show users different transportation options, routes, connections, and costs for a specific trip. These can be city-generated or provided by third parties like Transit or Alipay.



In Delhi, Uber's BikeShare app offers users information about the city's motoshare, metro, and bus systems.43 In Helsinki, the city-facilitated HSL app allows users to purchase tickets and plan trips using multiple modes. Apps like these can promote more efficient trip planning that minimizes travel time and creates more seamless connections between modes. In Rio de Janeiro, transit route and connection maps can be accessed and carried by users throughout their trip using a QR code.

Critical to informational integration is open data. This is especially important when private operators are responsible for providing services such as bikeshare or scooter share. Publicly available real-time data that is standardized—as part of the General Bikeshare Feed Specification (GBFS), for example—enables mobile application developers to populate map apps with and generate routes using multiple modes or services. This makes it easier for users to locate different modes on a common map and make more informed decisions about their optimal route.

Informational integration, particularly when there are multiple operators providing similar services, can combat the “walled gardens” effect: This occurs when a given operator’s services are only accessible through their own applications (i.e., no inter-operator integration). This encourages use of one operator’s offerings despite, in the case of shared micromobility, another operator’s service being more convenient or cheaper at a given location or time. Walled gardens also present barriers for users if they must navigate between multiple operator platforms to receive a complete understanding of the system as a whole. As such, informational integration can move the entire system toward being mode- or provider-agnostic; that is, providing users with the fastest, cheapest travel options for each trip.

3.3.1
ON-THE-GROUND PRACTICES

INTEGRATED WAYFINDING AND PAYMENT IN JAKARTA, INDONESIA:

In Jakarta, the Jak Lingko program integrates payment and signage across multiple public transport modes including TransJakarta (BRT), KRL Commuterline, MRT, LRT and shared vans known as angkots. The wayfinding program is being expanded to include Jakarta’s bikeshare program, integrating directional signage from public transport station exits to the closest bikeshare parking area. Point of interest maps on wayfinding totems at bikeshare stations guide users to local destinations.

INTEGRATED WAYFINDING SIGNAGE IN LONDON, ENGLAND:

“Legible London” is a comprehensive wayfinding system in London piloted in 2009 to make it easier for travelers to complete trips by walking, cycling, and using public transport.44 The system now has over 500 signs indicating walking distances to different destinations and transportation connections, such as metro, bus, and bikeshare. Additional signage highlights cycling infrastructure (including London’s Cycle Superhighways) and the travel time to nearby transport stations by bicycle to encourage people to cycle.45

INTEGRATED TRANSPORT MAPS IN RIO DE JANEIRO, BRAZIL:

The metropolitan area of Rio de Janeiro has integrated maps in rapid transit stations that show users transfer options to other lines and other modes, including bikeshare (Bike Rio stations) and secure bicycle parking for personal micromobility.46 These maps also feature a QR code that can be used to check the integrated information at any time, allowing users to reference it throughout their trip.

INTEGRATED TRAVEL-PLANNING APP IN BUENOS AIRES, ARGENTINA:

In Buenos Aires, the city government–run BA Como Llego app enables users to see travel time, routes, and service information for multiple modes, including train, metro, bus, bicycle, and walking.47 The app allows customization, letting users set a maximum walking distance to reach their mode, set preferred trip characteristics, and save preferred routes.

3.4
INSTITUTIONAL INTEGRATION

Institutional integration refers to improved cooperation between different agencies, levels of government, or external partners to increase efficiency and institutional capacity to support multimodal transport. Coordination between different government bodies allows for improved implementation of sustainable urban transport and can encourage its use by the public. Improved cross-jurisdictional cooperation, such as between municipalities or counties, can reduce barriers presented by arbitrary boundaries and foster a more cohesive, integrated service for users.

Common examples of institutional integration include:

Multimunicipal service areas, in which several municipalities coordinate to provide a common service across the entire area.

The expanded service area decreases barriers created by arbitrary geographic boundaries between municipalities, counties, etc. This enables users to seamlessly access destinations and services across a larger area and increases user comfort with widespread station availability. In Boston, multiple municipalities came together to implement a dockless bikeshare network that spans the larger metropolitan area. A similar approach was used for station-based bikeshare in the Washington, DC, metropolitan area, where six cities and counties in Virginia, Washington, DC, and Maryland provide a common bikeshare service.

Multimodal management by a single government entity, where one agency is responsible for management across multiple transportation modes.

Having one municipal entity responsible for operations, management, and customer interfacing can improve efficiency and help to facilitate more complicated integration types like payment and fare integration. Operators may prefer this approach because it creates a central point of communication for the entire service area, with unified regulations and requirements.

Multicity micromobility pilots, in which multiple cities partner to develop a model for service provision that can be replicated by peer cities.

While not very common, multicity pilots enable peer cities to share information and resources to maximize their capacity and improve piloted services. Instead of each city creating systems and processes to manage micromobility from scratch, multicity pilots foster open communication and sharing of both successes (to replicate) and challenges (to avoid).



RIGHT: The Capital Bikeshare system spans six cities and counties across Virginia, Washington, D.C., and Maryland. SOURCE: Elvert Barnes, Flickr

NEXT PAGE: Legible London is a wayfinding system that directs pedestrians and cyclists to nearby transit stations and other points of interest. SOURCE: Dennis Wegner, Flickr



3.4.1
ON-THE-GROUND PRACTICES

Data sharing between transport operators and cities is a key aspect of institutional integration. When mobility data is shared between institutions working within the same service area, better mobility solutions can be found and implemented. For example, cities such as Nashville and Boston in the United States have used shared micromobility trip data, provided by operators, to determine locations for new infrastructure. Cities have built requirements for standardized data formats in operating contracts, requests for proposals, and permit applications to ensure interoperability.

Challenges to institutional integration may include resistance or inability to dedicate time and resources to coordinate with other municipalities around micromobility planning. Cities that do not have such capacity or resources could rely on a third party, such as Populus or Ride Report, for data management and analysis, however this will pose financial costs. Cities may also hesitate to give up control or allow modification of their assets (such as bikeshare infrastructure) by other agencies. In addition, existing policies that may not support micromobility integration—such as classification of certain micromobility modes like e-scooters or e-bikes as motor vehicles—will need to be adjusted prior to institutional integration. Furthermore, data privacy concerns from users, disagreement over who “owns” the data, and competing data sharing interests between operators and agencies may pose barriers to interagency or multimunicipal data management.

JOINT COUNTY MICROMOBILITY PARTNERSHIP IN GREATER BOSTON, UNITED STATES:

The Boston Municipal Planning Organization (MPO) supports a joint county partnership for shared mobility services. Successful cooperation from multiple municipalities in the greater Boston area has yielded a regional bikeshare network. For users, this means municipal boundaries do not pose barriers to the network; shared bicycles can be used across counties without restriction.

SINGLE ENTITY TRANSPORT MANAGEMENT IN LONDON, ENGLAND:

Transport for London (TfL) in the UK is responsible for managing multiple modes across the metropolitan area, including metro, bus, tram, bikeshare, and water taxis. Integrated operations, management, and payment has yielded an increase in public transport overall and increased bus ridership, despite falling usage rates across the country. The integrated system has also improved data collection efforts, and the results have been used for modeling congestion as well as informing future investments and infrastructure.

MULTICITY MICROMOBILITY MANAGEMENT PILOT IN OMAHA, DETROIT, AND CHARLOTTE, UNITED STATES:

In the United States, three cities—Omaha, NE, Detroit, MI, and Charlotte, NC—entered into a multicity pilot aimed at testing innovative management approaches and sharing best practices. The three cities are using a common software platform and are in close communication—comparing data, challenges, and what is working—with the goal of developing a regulatory model that can be scaled and replicated in peer cities.

50 Bike Data: Measuring How Many People Ride Bikes in the City.
51 Perfecting Policy with Pilots: New Mobility and AV Urban Delivery.
52 USDOT Intelligent Transportation Systems Joint Program Office: Institutional Issues.
53 Practical Guide to Mobility Data Sharing & Personal Privacy under GDPR ruling.
54 Cities Collect Scooter Data Using MDS, Developed in Los Angeles. They Want Uber and Lyft Data Next
55 How to Make Public Transport an Attractive Option in Your City.
56 TfL is a Model for Transport Investment and Management in Other UK Cities.
57 TfL is a Model for Transport Investment and Management in Other UK Cities.
58 Three Major Cities Partner with Passport and Shared Scooter Company on First-of-its-Kind Micro-mobility Management Solution.



OPPOSITE PAGE:
Integration between public transport and micromobility makes these modes more direct, affordable, and convenient, which yields better health outcomes, fewer emissions, and more resilient transportation systems.
SOURCE:
Trimet, Flickr

KEY TAKEAWAYS

4

Micromobility integration with public transport can help people access destinations in less time and at a lower cost than when these modes are not well connected. By ensuring that micromobility and public transportation become the fastest, cost-effective option for most trips, integration can yield benefits such as urban resilience, improved air quality, increased physical activity and better health outcomes, and fewer greenhouse gas emissions.

Given the urgency that cities have felt to install micromobility-supportive infrastructure and programs in response to the COVID-19 pandemic, now is a unique chance for cities to more explicitly integrate micromobility with other transport modes.

Key
Takeaway
1

Ignite momentum for integration and developing strong working relationships with private operator(s)

Successful integration has been achieved in cities where a single entity is responsible for managing multiple transport modes and where the city is working closely with operators, requiring them to comply with measures like data sharing that enable integration. The private sector is often not motivated to integrate information, payments, or infrastructure across modes in the same way that the city is because private micromobility companies are narrowly focused on their own users and not on the transportation system as a whole. Cities must take the first step in planning for integration and ensuring that operators—both public and private—work with the public sector to provide reliable, convenient, affordable transportation services for all.

Key
Takeaway
2

Move beyond operational regulation and toward intermodal integration

Integration between transportation modes enables cities to develop strong networks that prioritize pedestrians and public transportation, enable multimodal trips, and encourage mode shift away from private vehicles. The COVID-19 pandemic has highlighted gaps in existing transportation networks in many cities, as well as opportunities for micromobility to fill those gaps by offering competitive travel times, flexibility, and physically distanced transportation. To capitalize on this potential, cities will need to broaden their focus from operational regulation of micromobility to integration with public transportation. Regulation alone has not been enough to foster widespread adoption of micromobility modes, nor has it enabled operating structures that work particularly well for cities, operators, and users. A conscious step toward integration can help to scale micromobility use, foster more sustainable partnerships with micromobility operators, and expand access to public transportation and, ultimately, more destinations and services.

Key
Takeaway
3

Explicitly link integration to a goal of expanded access, especially by sustainable transport modes

Integration reduces barriers—such as long travel times or a lack of information—to sustainable and multimodal trips. However, integration itself is not the end goal. Instead, integration is a means of expanding access to destinations and services without having to rely on a private vehicle. When micromobility and public transport work better together, users experience faster and less expensive trips. Thus, integration should be user-focused: A major measure of successful integration should be whether making a multimodal trip is more accessible, reliable, and cost- and time-effective, and if it is more likely to replace a private vehicle trip than it had been before.

Key
Takeaway
4

Consider integration in steps, starting with physical integration

Some forms of integration may be easier or quicker to implement than others, depending on existing infrastructure, capacity, and resources. This may be especially true in small and mid-size cities. Many cities have started with low-cost physical integration—siting micromobility parking areas near transit stations. Physical integration lays the foundation for more complex efforts, such as informational and payment integration. These require cities to take even more of an active role in encouraging operators to meet certain standards necessary for successful integration. Opportunities for institutional integration should be considered throughout this progression, as more collaborative institutions are critical for designing and implementing a long-term integration strategy.

Key
Takeaway
5

Identify shifts in travel demand (due to COVID-19 or other major events), internal factors such as contracts up for renewal, or similar opportunities that could help facilitate integration

The COVID-19 pandemic has undoubtedly shifted travel patterns in many cities, eliminating commute trips for people able to work remotely and causing others to reconsider transport options that do not allow for physical distancing or fresh air circulation. Many cities have recognized increased demand for walking and cycling and responded by implementing temporary cycle lanes and slow-speed streets that limit through-traffic. As cities consider making these measures permanent, there is an opportunity to bolster physical infrastructure build-outs with informational or payment integration. This can help curb demand for private vehicles as people return to pre-pandemic travel patterns. Similar opportunities to pursue integration may arise in response to other, more limited changes, such as the end of a contract period with an existing service or payment provider.



RIGHT: In Beijing, China, wheel ramps allow bicycle riders to more easily access the elevated cycle highway.
SOURCE: ITDP China

NEXT PAGE:
WRI Ross Center for Sustainable Cities
SOURCE: Talia Rubnitz/WRI, Flickr



APPENDIX A: ADDITIONAL RESOURCES

ITDP Guidance on Micromobility and Integration

- ITDP. [Grow Cycling: A Toolkit to Rapidly Grow Cycling in Your City](#). 2020.
- ITDP India. [Post-Lockdown Guidelines to Create Cycle-Friendly Cities](#). 2020.
- ITDP. [The Electric Assist: Leveraging E-bikes and E-scooters for More Livable Cities](#). 2019.
- ITDP Indonesia. [Jakarta Intermodal Integration Guideline](#). 2019.
- ITDP. [Optimizing Dockless Bikeshare for Cities](#). 2018.
- ITDP. [The Bikeshare Planning Guide](#). 2018.
- ITDP Africa. [Streets for Walking and Cycling](#). 2018.

Planning Guides

- Mobycon. [Making Safe Space for Cycling in 10 Days](#). 2020.
- NACTO. [Streets for Pandemic Response & Recovery](#). 2020.

Other Resources

- [Multiple author organizations]. [COVID Mobility Works](#). 2020.
- International Transport Forum (ITF). [Good to Go? Assessing the Environmental Performance of New Mobility](#). 2020.
- International Transport Forum (ITF). [Re-Spacing Our Cities for Resilience](#). 2020.
- International Transport Forum (ITF). [Safe Micromobility](#). 2020.
- International Transport Forum (ITF). [Transport Policy Responses to the Coronavirus Crisis](#). 2020.
- NACTO. [Rapid Response: Emerging Practices for Cities](#). 2020.
- Shared-Use Mobility Center. [Case Study: Pop-Up Mobility Paths & Open Streets Due to COVID-19 Crisis](#). 2020.
- Transportation for America. [Shared Micromobility Playbook](#). 2018.
- Urbanism Next Center. [Perfecting Policy with Pilots: New Mobility and AV Urban Delivery Pilot Project Assessment](#). 2020.

APPENDIX B: OUTSTANDING QUESTIONS

The following questions were used in a workshop hosted in December 2020 to guide discussion around the gaps and challenges that city decision-makers and practitioners face when integrating micromobility with public transportation. The questions are based on existing literature, ITDP experience on-the-ground, as well as partner organizations experience in implementing micromobility integration projects in cities globally. While the scope of this publication does not address these questions, future research should consider exploring these knowledge and implementation gaps.

PHYSICAL INTEGRATION

- What opportunities exist to extend micromobility-supportive infrastructure, improving connections both within the network and to public transit?
- What physical infrastructure is most critical to enabling multimodal trips?
- How can cities best incentivize operators to distribute shared micromobility devices in underserved/poorly connected areas? What incentives or support can/should cities give to operators to ensure service is available in underserved areas?
- How have physical infrastructure needs changed as a result of COVID-19-related travel changes?
- There is a lack of data for understanding how physical integration methods (such as geofenced parking) impact micromobility and/or public transport ridership. Why is this, and how can cities move toward collecting this kind of data?

PAYMENT AND FARE INTEGRATION

- In what contexts are mobile payment apps, RFID cards, and other methods of payment more likely to be adopted at a large scale?
- What barriers to payment integration can be reasonably mitigated?
- How can cities best foster payment integration if multiple operators are providing service?
- What impacts does payment integration have on micromobility use and substitution of vehicle trips with multimodal trips?

INFORMATIONAL INTEGRATION

- How can cities ensure successful informational integration even when multiple operators are providing service?
- What are the impacts of informational integration on the propensity to make multimodal trips?
- What steps can cities take to avoid the “walled gardens” effect?

INSTITUTIONAL INTEGRATION

- Where might multi-jurisdictional cooperation around micromobility integration be advantageous, and what are the benefits and challenges?
- What role, if any, can national governments play in setting priorities and providing guidance or funding for micromobility integration?
- What technological, privacy, or capacity barriers may prevent accurate data sharing between operators and city governments? What concerns does each party have?



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