

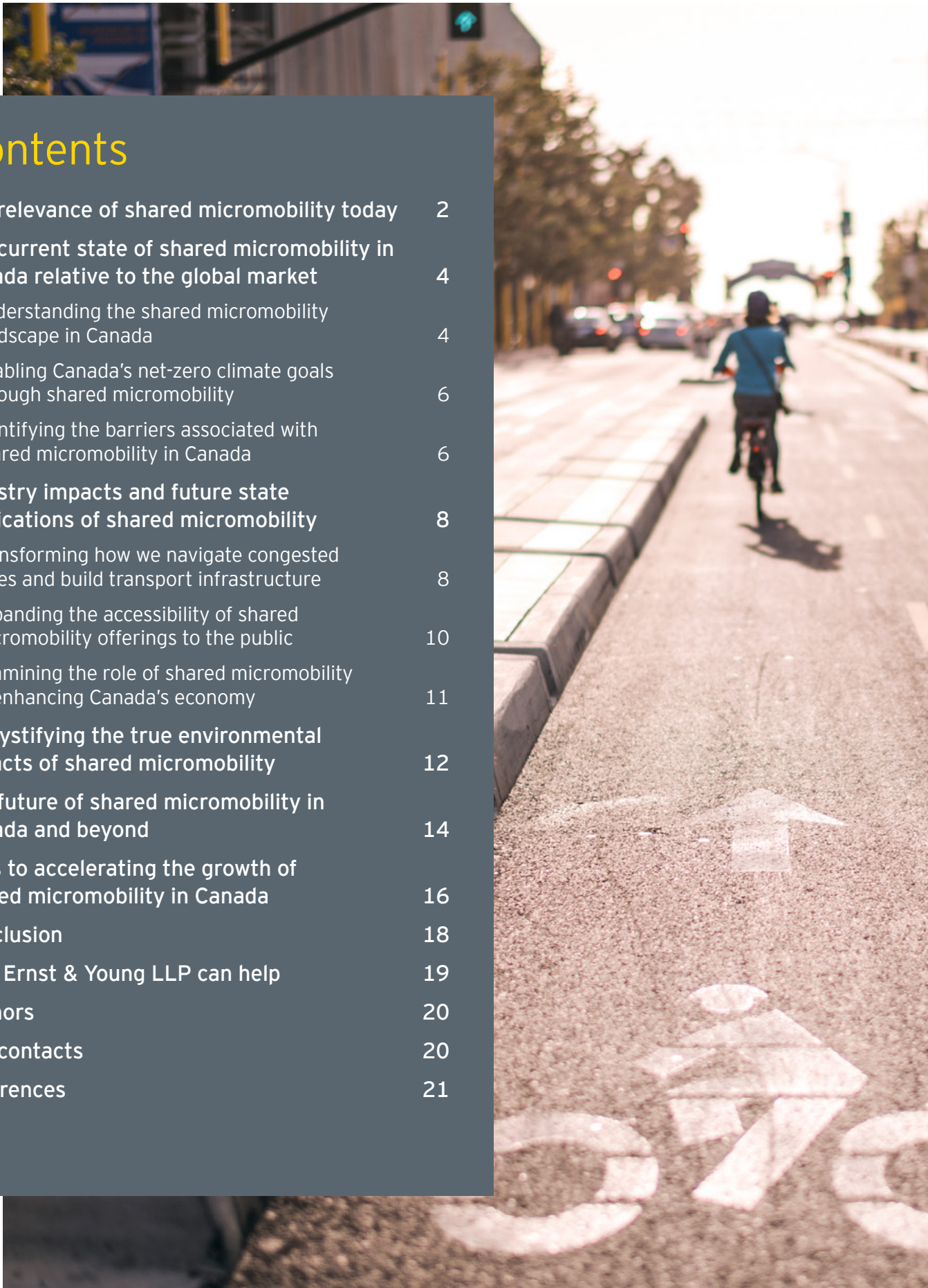
The evolving landscape of eMobility:

Understanding the
current state and future
aspirations of shared
micromobility in Canada



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Foreword - the relevance of shared micromobility today

We define 'shared micromobility' primarily as the collection of publicly available electric-powered vehicles primarily used for last-mile transportation. These are often in the form of scooters (e-scooters) and bicycles (e-bikes), and in some instances e-mopeds. Shared e-scooters or e-bikes are usually owned and administered by private operators, regulated by individual cities and made accessible to the residents and visitors of a city on the public right of way via mobile applications.

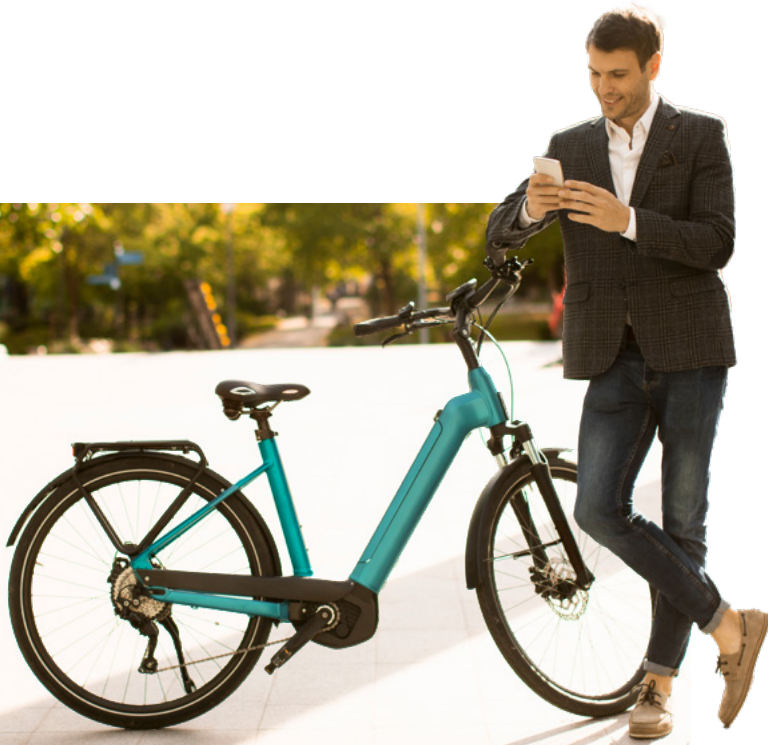
Shared micromobility operators focus on servicing short distance transportation needs in highly dense geographical areas— to and from their homes, public transit stations, offices, grocery stores and entertainment venues, for example – via a more affordable, flexible and sustainable alternative to personal vehicles, ride-sharing services, taxis or public buses.

Although most consumers in Canada and abroad view shared micromobility as a novel solution addressing a small subsection of the transportation sector, widespread integration of e-scooters and e-bikes into a city's transport infrastructure could have tremendous upside in terms of reducing overall traffic congestion, addressing social inequities related to transportation and assisting the over 192 countries committed to reaching net-zero emissions by 2050.¹

However, for cities to unlock the many social, economic and environmental benefits associated with shared micromobility, they must engage and collaborate with operators, users, and key system stakeholders (such as transit authorities, business improvement associations, and economic development agencies) to understand the intricacies of their local market. Every city has a unique set of constraints and capabilities that will enable or inhibit its ability to integrate shared micromobility into its transportation ecosystem.

41% Passenger vehicles contribute to roughly 41% of global carbon dioxide CO² emissions.²

33% Work journeys taken by micromobility have decreased by 33% in comparison to pre-pandemic.³



By taking the time to work with operators, city governments will be able to develop fit-for-purpose service models and regulatory frameworks that consider the unique infrastructure limitations, economic growth targets and environmental impacts a shared e-scooter or e-bike program will have on their city.



Accompanying these challenges are several opportunities that have the potential to accelerate the integration of shared micromobility into global transportation networks. The advancement of technologies such as geolocation, the internet of things (IoT), swappable batteries and lidar have played a significant role in enhancing the performance of shared e-scooters and e-bikes, improving their ability to service a wider range of trips. With these trends in mind, Ernst & Young LLP analyst research suggests the global shared micromobility market is still expected to reach:

 <p>An e-scooter market size of \$1.07b in 2022 and \$2.53b in 2027.⁴</p>	 <p>A bike-sharing market size of \$3.46b in 2022 and \$4.49b in 2027.⁵</p>	 <p>Roughly 149 shared micromobility operators around the world.⁶</p>
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These insights indicate that the global shared micromobility market is promising, offering a multitude of benefits related to more efficient transportation, economic growth and environmental sustainability for cities across the globe. However, unlike other global markets, Canada possesses several unique barriers to entry and adoption that could stifle widespread integration of shared e-scooters and e-bikes into its transportation ecosystem.

Throughout this point of view, Ernst & Young LLP will assess the current state of shared micromobility across Canada, identify and rank specific barriers present in the market and introduce the critical impacts and future implications shared micromobility could have on the country.



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The current state of shared micromobility in Canada relative to the global market

Understanding the shared micromobility landscape in Canada

The prevalence of shared micromobility has grown significantly in cities across the globe, most notably in Western Europe, Southeast Asia and the United States. However, Canada is a commonly overlooked market in the early stages of integrating shared micromobility into its national transportation ecosystem.

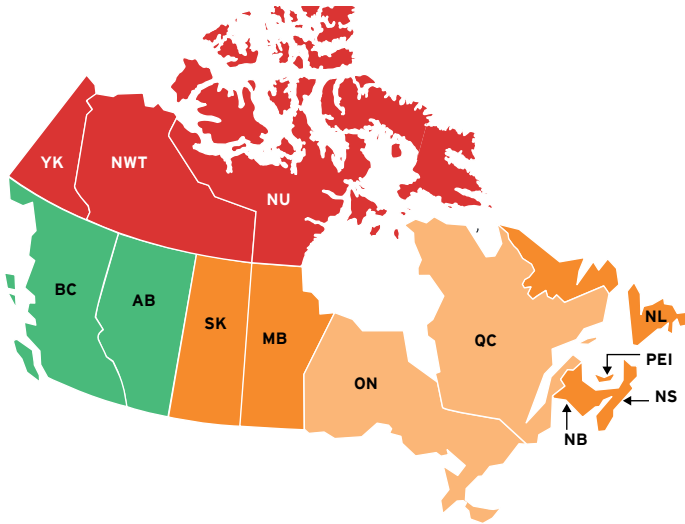
Despite the \$1b+ market potential for shared e-scooters and e-bikes, in 2022, several major Canadian cities have yet to implement a successful pilot program. High-traffic metropolitan areas like Vancouver, Toronto and Montréal have struggled to launch effective shared micromobility pilot programs, and in some instances have banned the use of specific modes like shared e-scooters primarily because:

- ▶ E-scooter regulations were underdeveloped during the launch of the pilot program, making it difficult for city governments to manage how and where the vehicles were being used.
- ▶ E-scooters posed a threat to public safety, as they were being operated and parked predominantly on pedestrian walkways.

Although some of Canada's largest cities have struggled to seize the full benefits of shared micromobility, several others have progressed beyond the pilot phase with favorable results. For example, Kelowna has established what could be considered Canada's most advanced shared micromobility system as it is the first city in Canada to require on-vehicle helmets, sidewalk detection technology, multi-modal (e-scooters and e-bikes) service, and a hybrid lock and free-floating parking model. Various cities across Alberta have continued to introduce or expand their shared e-scooter programs, with Calgary and Edmonton expanding their fleet size to 1,500 vehicles each. Furthermore, mid-sized cities across British Columbia – including Richmond and Vernon – have plans to expand their shared e-scooter and e-bike programs annually to maximize the economic, social and environmental benefits generated by shared micromobility. A detailed illustration of current market size of major Canadian cities can be found on the following page.



Current state assessment of Canada's shared micromobility market



Vancouver, BC
E-Bikes: 500
E-Scooters: NA

Kelowna, BC
E-Bikes: 300
E-Scooters: 700

Vernon, BC
E-Bikes: 20
E-Scooters: 250

Lethbridge, AB
E-Bikes: 50
E-Scooters: 250

Calgary, AB
E-Bikes: 200
E-Scooters: 1,500

Red Deer, AB
E-Bikes: NA
E-Scooters: 1,000

Edmonton, AB
E-Bikes: 400
E-Scooters: 1,500

Regina, SK
E-Bikes: NA
E-Scooters: NA

Saskatoon, SK
E-Bikes: NA
E-Scooters: NA

Winnipeg, MB
E-Bikes: NA
E-Scooters: NA

Windsor, ON
E-Bikes: 100
E-Scooters: 500

Toronto, ON
E-Bikes: 525
E-Scooters: NA

Ottawa, ON
E-Bikes: NA
E-Scooters: 900

Montreal, QC
E-Bikes: 1,905
E-Scooters: NA

Fredericton, NB
E-Bikes: NA
E-Scooters: 80

Charlottetown, PEI
E-Bikes: NA
E-Scooters: NA

Halifax, NS
E-Bikes: NA
E-Scooters: 32

St. John's, NFLD
E-Bikes: NA
E-Scooters: NA

0 - Limited	YK NWT NU
Facing significant external barriers that limit the viability of a shared micromobility program	Canadian Territories: Harsh weather conditions, low population density and a lack of overall infrastructure make it difficult for cities and towns within Yukon, The Northwest Territories, and Nunavut to justify investing in the necessary upgrades to support the creation of a shared micromobility program.
1 - Developing	SK MB NB NS PEI NL
Researching and developing a regulatory framework to govern the usage of shared micromobility programs (i.e., shared e-scooters or e-bikes).	Saskatchewan: The city of Saskatoon is developing a regulatory framework to support the implementation of a shared e-scooter pilot program in 2023 and is currently soliciting feedback from city residents. ⁷ Manitoba: The City of Winnipeg began researching the potential of shared e-scooters and e-bikes in 2019, ⁸ and passed the Vehicle Technology Testing Act providing a regulatory framework to support a possible pilot program in the future. ⁹ The Atlantic Provinces: New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland & Labrador are currently navigating how to regulate the usage of e-scooters and e-bikes. ¹⁰ Larger cities in this region are slightly ahead of the curve with local vendors in Fredericton ¹¹ and Halifax ¹² providing shared e-scooters using an hourly pricing strategy however, the usage of these vehicles is technically illegal per current bylaws. ¹³
2 - Basic	ON QC
Implemented at least one mode of shared micromobility into cities or towns throughout the province and/or have struggled to integrate multiple modes of shared micromobility (i.e., banning e-scooters or e-bikes).	Ontario: Toronto has a large bikesharing and e-bike program featuring 6,850 docked vehicles ¹⁴ and 525 dockless vehicles ¹⁵ respectively, but banned the use of shared e-scooters in 2021. ¹⁶ However, Smaller cities like Ottawa ¹⁷ and Windsor ¹⁸ both have recently introduced well-developed shared e-scooter programs that are operating smoothly and expected to grow within the year. Quebec: Montreal has a fairly sophisticated bike-sharing/shared e-bike system with over 7,270 regular bikes and 1,905 e-bikes available in 2021. ¹⁹ However, the city did not renew its shared e-scooter program in 2020 citing numerous riders were not following regulations governing e-scooter usage which created a threat to public safety. ²⁰
3 - Evolving	BC AB
Implemented multiple modes of shared micromobility in cities which have expanded to subsidiary towns that are in the process of launching or expanding at least one mode of shared micromobility (i.e., shared e-scooters or e-bikes).	British Columbia: Cities in British Columbia including Richmond ²¹ Vernon ²² and Kelowna ²³ have all implemented shared e-scooter and e-bike programs that have proven to be wildly successful and are expected to grow significantly moving into 2023. Alberta: Calgary and Edmonton both have massive shared e-scooter and shared e-bike programs with an estimated combined fleet size of 3,500 e-scooters ^{26,27} and 600 e-bikes. ^{27,28} Additionally, cities and towns across the province including Red Deer, ²⁹ Lethbridge, ³⁰ St. Albert, ³¹ Okotoks, ³² and Cochrane ³³ have launched shared micromobility programs (predominantly focused around shared e-scooters) which have been well received.
4 - Advanced	No Canadian Provinces
Implemented multiple modes of shared micromobility in several major cities that that have progressed past the pilot stage and become a critical component of the province/regions transport infrastructure.	Canada's shared micromobility market is still in its infancy with several cities launching their first pilot programs over the last few years while major European markets including Paris, Madrid, and Berlin have significantly integrated shared e-scooters and e-bikes into their respective transportation ecosystems. For Canadian cities to move into the "Advanced" category they must: 1. Embrace pedestrianization and invest in critical infrastructure. 2. Create flexible regulatory frameworks and a data driven approach to incentivize and penalize operators based on their overall performance. 3. Establish innovative supplementary services to support the growth of shared micromobility such as an integrated mobility-as-a-service (MaaS) platform.

*All e-bike and e-scooter totals are estimates based on data available at the time of writing.

Enabling Canada's net-zero climate goals through shared micromobility

Canada could benefit significantly from larger investments in shared micromobility, specifically when it comes to tackling climate change and decreasing traffic congestion. Moreover, shared micromobility could serve as part of the roadmap to help Canada achieve its net-zero goals.

Moreover, shared micromobility could serve as part of the roadmap to help Canada achieve its emissions targets by providing cities with an innovative and effective solution to reduce transportation-related emissions. This is particularly critical given that transportation sector is responsible for 27 percent of greenhouse gas (GHG) emissions in Canada, where light-duty vehicles - the cars, vans and light-duty trucks we drive - are responsible for almost half of that total.³⁴

As the industry evolves, shared e-scooters and e-bikes will become more widely recognized as a viable transportation alternative for all Canadians as opposed to just appealing to an environmentally conscious demographic.

As competition in Canada progresses, the municipal, provincial, and federal governments will need to upgrade their transportation investment strategy to incorporate various forms of shared micromobility. For instance, Canada's National Transportation Strategy is focused on empowering a modal shift away from carbon-intensive vehicles and towards active transportation, such as biking and walking.³⁵ Shared e-scooters and e-bikes could serve as a bridging technology to help Canadians transition towards more active forms of transportation.

Despite this, shared micromobility and other forms of non-fixed infrastructure, including dockless e-bikes and e-scooters, are currently ineligible for Canada's Active Transportation Fund.³⁵ Shared micromobility enthusiasts, alongside the North American Bikeshare and Scootershare Association, are lobbying to increase investment in shared micromobility across Canada. However, the Canadian market for shared e-bikes and e-scooters presents a variety of unique barriers that make it difficult for any substantial changes to take shape.

Identifying the barriers associated with shared micromobility in Canada

Canadian cities have been slow in adopting and expanding the use of e-scooters and bikes since their inception primarily because of:



Inadequate infrastructure to support alternative decentralized modes of transportation



Lack of shared micromobility regulations / frameworks implemented by cities



Limited industry collaboration between shared micromobility operators and cities



Neutral, and sometimes negative, public perceptions of shared micromobility



Harsh weather conditions that limit the demand for shared micromobility solutions during the winter



Safety concerns related to shared micromobility users and pedestrians



* Key players in Canadian shared micromobility:

Bird

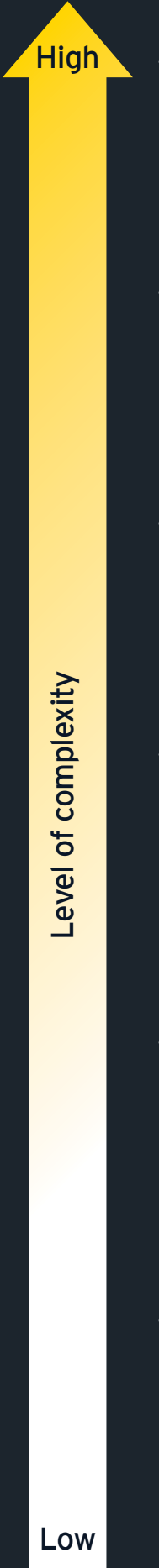






Lime

Neuron

** These are not the only players in the industry nor are they ranked in sequence.*

To aid in the decarbonization of Canada's national transportation network, federal, provincial and city governments across the country must take action to address these barriers to entry and adoption. The table on the next page provides additional insight into these obstacles and some of the specific strategies Canadian cities and shared micromobility operators have deployed to overcome them and successfully implement effective shared e-scooter or e-bike programs.

Ranking barriers to shared micromobility in Canada

	Complexity ranking*	Barrier	Description	Ease of resolution	Case study
	1 	Inadequate infrastructure	<p>Inadequate infrastructure refers to underdeveloped/non-existent bike lanes or shared pathways that limit shared micromobility enthusiasts from safely travelling in a designated location away from pedestrians on sidewalks or larger vehicles on roadways.</p> <p>Charging hubs or designated parking zones for shared micromobility vehicles are limited in most Canadian cities, increasing the likelihood that vehicles clutter sidewalks or obstruct roadways.</p>	Can be resolved in the long-term (5-10 years)	Micromobility hubs Swiftmile and Stantec GenerationAV Parking and e-charging hubs are expected to become increasingly common thanks to Stantec GenerationAV and Swiftmile's collaboration. ³⁶ The "micromobility hub" service aims to clean up sidewalks by offering micromobility parking and charging hubs and allows riders to reliably access charged e-bikes and e-scooters. These charging devices are flexible and compatible with all micromobility solutions.
	2 	Varying regulations	<p>Canada has elected to provide individual cities with the authority to institute their own bylaws to police shared micromobility in their immediate jurisdiction. These bylaws tend to be more restrictive for operators entering the market.</p> <p>Additionally, in almost all Canadian cities, shared micromobility operators need to obtain a permit and engage city governments in legislative proceedings before a single vehicle in their fleet can be launched in a given city.</p>	Can be resolved in the medium-term (2-5 years)	Regulatory inconsistencies various cities The rules pertaining to age requirements, helmet use, approved pathways, speed limits and accessory requirements such as lights and bells vary between cities. This is exemplified through varying age requirements in Alberta. In Calgary, the minimum age to ride an e-scooter is 18 years old, whereas Red Deer recently lowered the minimum age requirement to 16 years old. ^{37, 38}
	3 	Limited industry collaboration	<p>As the shared micromobility industry matures, operators will begin to transition from standalone service providers to a fully integrated component of a city's shared public mobility network.</p> <p>For this transition to be effective, shared micromobility operators, city governments and private vehicle-sharing companies need to collaborate and begin aligning their long-term goals to drive sustainable change in Canada's transportation ecosystem.</p>	Can be resolved in the medium-term (2-5 years)	Building a better share economy Spin To promote greater accessibility of mobility services, Spin has partnered with the City of Pittsburgh, local nonprofits and researchers on a universal basic mobility pilot that offers easy access to transportation services for low-income residents. ³⁹ The initiative is designed to connect mobility services such as e-scooters, trip planning, carshare, electric mopeds, carpool matching, charging stations and real-time transit information into one transit application.
	4 	Consumer perceptions	<p>Shared micromobility operators target all genders and most ages, branding their services as flexible transportation options that allow users to avoid heavy traffic, avoid high parking fees or tour a city from a unique vantage point.</p> <p>However, despite the numerous benefits, the perception of shared micromobility vehicles in Canada is quite muted, with several demographics indicating that shared micromobility is a "menace" that disturbs, rather than enhances, a city. Most residents who complain about shared micromobility do so because they feel these decentralized vehicles clutter sidewalks.</p>	Can be resolved in the medium-term (2-5 years)	Parking zones Calgary, Alberta To mitigate challenges associated with shared e-scooters or e-bikes being driven and parked on pedestrian pathways, the City of Calgary instituted shared micromobility parking zones in the furniture area of the sidewalk adjacent to bike lanes. This allows users to start and end their trips close to a designated travel lane away from other vehicles and pedestrians, reducing the likelihood of a collision and overall clutter on the sidewalk. ⁴⁰
	5 	Harsh weather conditions	<p>The majority of shared micromobility vehicles haven't been properly designed to combat the well-below freezing temperatures most Canadian cities face in the winter months.</p> <p>Harsh winter conditions pose a variety of problems for operators, since demand for unenclosed vehicles is lower, the battery life of their vehicles is reduced, brakes become compromised, steering becomes less reliable and vehicles begin to depreciate at an accelerated rate.</p>	Easily resolved in the short term (within a year)	Bracing for the winter Kelowna Despite weather challenges, the City of Kelowna has made significant commitments to maintaining safe riding conditions all year round for micromobility users. The program allows bikeshare devices to operate year round, only allowing service interruptions with approval from the City's Strategic Transportation Planning Manager. Bikeshare service interruptions are expected in the winter for devices that are not designed to meet safe winter requirements. When severe weather conditions occur, such as snowstorms, freezing rain and hail, services can be reduced for up to 72 hours at the permit-holder's discretion. ⁴¹
	6 	Safety concerns and risks	<p>Due to the varying regulations regarding the use of shared e-scooters and e-bikes across Canada, in many instances users are tasked with educating themselves on guidelines that tend to be quite ambiguous.</p> <p>Ambiguity in shared micromobility guidelines has led to numerous incidents of riders colliding with oncoming traffic or unsuspecting pedestrians, not wearing helmets, riding under the influence and distracted riding.</p>	Easily resolved in the short term (within a year)	Addressing safety Kelowna To alleviate growing safety concerns related to the use of micromobility vehicles, all shared e-scooter and e-bike service providers in Kelowna provide options to support compliance with the helmet law. Examples include providing or sending helmets to users free of charge. This program assists in reducing the cost barrier of helmets for riders and promotes safety. Riders are expected to comply with bylaws and road rules to keep themselves and others safe on the road. Although requiring shared helmets was initially considered, this option was not pursued due to safety and hygiene reasons. ²³

*The complexity ranking was assigned based on the effort, capital and change required to overcome the listed shared micromobility barriers.

Industry impacts and future state implications of shared micromobility

Transforming how we navigate congested cities and build transport infrastructure

Historically, the development of transportation networks across Canada has been centered around accommodating passenger vehicles, optimizing public transit systems and reducing city traffic congestion. However, urban population growth continues to rise along with the use of passenger vehicles in cities, resulting in higher emissions and longer commutes across Canada. As more Canadians return to work in the post-pandemic world, these problems will only intensify unless cities evolve their transportation strategies.

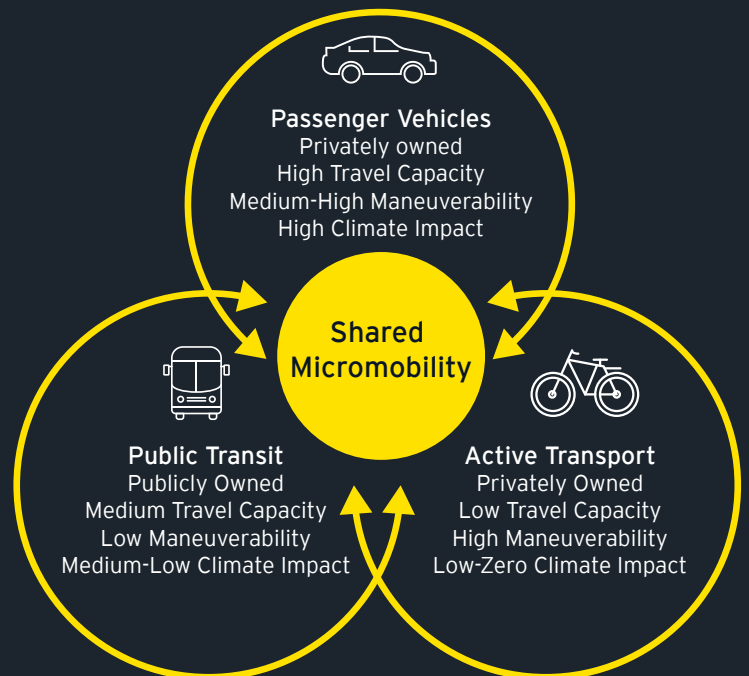
18 of the 25 largest municipalities in Canada are **growing more rapidly** than the national average of **5.2%** from 2016 to 2021.⁴³

Canadians spend **~65 minutes** on their daily commute to work,⁴³ with only **22%** opting to use public transit or active transport.⁴⁴

A critical component of this evolution will be the successful implementation of shared micromobility services in large (~population of 1m people) and medium-sized (~population of 100k people) cities across the country. This is because shared micromobility serves as a three-way bridge between passenger vehicles, public transit and active transport (i.e., walking or riding a bike), taking advantage of various aspects of traditional modes of transportation and packaging them into a flexible and climate-conscious alternative for large and medium-sized cities.

Micromobility serves as a bridge between traditional modes of transportation because:

1. Privately owned but operated by the public
2. Low-medium travel capacity for inner-city trips
3. High maneuverability like active transport
4. Presents a low-medium climate impact



As a unique blend of various forms of traditional modes of transportation, shared micromobility can revolutionize how Canadians navigate and experience their cities in two primary ways:

1

Alleviating traffic congestion

Current challenges: A major pain point driving traffic congestion in Canadian cities is the “first and last mile problem,” which refers to the notion that it is impossible for the entire city to live or work within walking distance of public transit.⁴⁵ The lack of effective first and last mile transportation means many Canadians forgo public transit altogether in favor of driving.

Implications of shared micromobility: If Canadian cities were to build the necessary infrastructure – such as bike lanes and shared paths – and implement regulatory frameworks to support the use of shared micromobility, it could serve as a realistic option to meet the first and last mile needs of Canadian commuters by increasing accessibility to public transit and reducing traffic.

Real-world impact: Implementing a strong regulatory framework and necessary infrastructure to encourage the use of shared micromobility – as opposed to driving to bridge first and last mile transportation gaps (~5km⁴⁶) – would alleviate traffic congestion around transit hubs in dense neighborhoods, which tend to elongate commutes for Canadians living outside the downtown core.

2

Incentivizing new transportation infrastructure

Current challenges: A significant challenge facing shared micromobility in Canada is the lack of regulation and investment in infrastructure associated with decentralized modes of transportation (i.e., e-scooters and e-bikes) across the country, as current shared micromobility offerings operate haphazardly on sidewalks, posing a threat to pedestrians.⁴⁷

Implications of shared micromobility: 52% of pedestrian injuries are related to being struck by a shared micromobility vehicle.⁴⁸ To improve public safety, cities will need to sequester the use of e-bikes and e-scooters to bike lanes and expand shared pathways with pedestrians to effectively reduce collisions.

Real-world impact: Cities such as Paris and Barcelona have repositioned their transportation strategy to support “pedestrianization” by repurposing street parking to build expanded pathways for pedestrians and shared micromobility motorists.⁴⁹ As a result, the use of micromobility has positively impacted air quality and public health, while also reducing pollution and traffic in both cities.⁴⁹



Expanding the accessibility of shared micromobility offerings to the public

As Canadian cities look to establish or expand a shared micromobility pilot program, it's important they consider how to make this new form of transportation accessible to all citizens. Historically, several forms of public transportation have embedded inequalities that significantly reduce their accessibility. By addressing these systemic barriers, shared micromobility providers and cities will be able to deliver an alternative for short-range transportation that satisfies a wider range of use cases.

Key accessibility considerations include:

	Problem	Response	Limitations
1. Accommodating underserved locations	<ul style="list-style-type: none"> ▶ Due to reduced ridership during the COVID-19 pandemic, city governments cut spending for public transit. This left many Canadians who are reliant on public transportation isolated from essential services. ▶ These reductions in service levels disproportionately impacted the poor, immigrants and those with mental and physical disabilities. ▶ 64% of these disadvantaged individuals were reliant on public transit to access essential goods like pharmaceuticals and groceries.⁵⁰ 	<ul style="list-style-type: none"> ▶ Deploying privately operated shared micromobility services in a city would provide residents who are currently reliant on public transit with an inexpensive alternative mode of transportation during times of economic hardship or cutbacks to public services. 	<ul style="list-style-type: none"> ▶ Shared micromobility operators have a limit on the number of vehicles they can have in circulation. As a result, most providers only place their vehicles in high-traffic locations. ▶ No incentives currently exist to stimulate operations in vulnerable areas. Incentives such as government subsidization can help promote the deployment of vehicles in underserved areas (e.g., offering a dollar value per vehicle per day to operators for deploying vehicles in equity zones).
2. Accounting for differently abled customers	<ul style="list-style-type: none"> ▶ Few forms of transportation have been re-engineered and made affordable to accommodate the roughly 17% of Canadians diagnosed with physical or mental conditions that limit what forms of transportation they can use.⁵¹ ▶ As cities begin to incorporate shared micromobility as a key component of their transportation ecosystems, they will need to ensure their partner operators provide accessible service options that cater to various differently abled populations. 	<ul style="list-style-type: none"> ▶ Municipalities need to enhance their operator selection criteria and allocate bonus fleet capacity to operators that offer accessible vehicle options such as wider, seated and 4-wheel alternatives.⁵² 	<ul style="list-style-type: none"> ▶ The main challenges operators face when it comes to increasing the accessibility of their vehicles are higher production costs and transferability between users. ▶ More accessible vehicle options would need to be reserved for differently abled users to a certain extent. ▶ Determining the optimal location to deploy specialty vehicles for differently abled users to maximize ridership is difficult.
3. Building an accessible customer experience	<ul style="list-style-type: none"> ▶ To ensure they are providing an exceptional, accessible and inclusive customer experience, operators should consider enhancing their offerings to alleviate potential barriers surrounding language, technology and payment accessibility. This is because: <ul style="list-style-type: none"> - 22% of Canadians' first language is neither English nor French.⁵³ - 16% of Canadians don't own smartphones.⁵⁴ - 11% of Canadians don't have credit cards.⁵⁵ 	<ul style="list-style-type: none"> ▶ Cities should develop evaluation frameworks to determine if operators are offering shared micromobility solutions that appeal to the widest range of residents. ▶ By making their applications and vehicles more accessible to everyone, operators will differentiate themselves significantly in the Canadian market. 	<ul style="list-style-type: none"> ▶ Operators have a target market that they are focused on serving; in many cases, uprooting parts of their digital ecosystem to serve a subset of Canadians isn't financially tenable.

Examining the role of shared micromobility in enhancing Canada's economy

A major impact the implementation of shared micromobility services will have on Canadian cities depends on how they will generate ancillary economic benefits related to increasing investment in the electrification of various transportation networks, spur new innovations that support the growth of the electric-mobility (eMobility) sector in Canada or connect consumers to local businesses that fuel economic growth in individual cities.

1. Emphasizing the importance of a diverse transportation ecosystem: Global transport systems are historically plagued by the “path dependency” phenomenon, which essentially means that the more steps a city takes in a specific transportation direction, the more dependent it becomes on that mode of transportation and, therefore, the more likely it is to continue investing in it.⁵⁶

Canadian transport systems have progressed predominantly around internal combustion engine (ICE) vehicles, as the technology surrounding these vehicles has been dominant for the last century. Cities have become so dependent on ICE vehicles and carbon-intensive methods of transportation that making an immediate shift towards widespread eMobility is challenging. However, the increasing uptake of shared micromobility services across Canada has inspired numerous initiatives that will further decarbonize Canada's transportation infrastructure, reducing the country's reliance on ICE vehicles in favor of more sustainable eMobility alternatives.

2. Spurring innovation and sector growth: Shared micromobility operators are motivated to address the needs and operational challenges of their customers, spurring them to continuously enhance their offerings. This is evident in the development of:

- ▶ **Swappable battery technology**, which has improved the overall operational efficiency of shared micromobility vehicles by eliminating the need to transport an entire e-bike or e-scooter to a charging station, maximizing the availability of these vehicles in key locations around a city.
- ▶ **Technologies applying telematics and the internet of things (IoT)** to collect valuable vehicle data, including user habits, commuter trends and vehicle maintenance requirements to control costs, improve safety, optimize routes and expand fleet operations.⁵⁷
- ▶ **Additional eMobility alternatives** like “microcars” (700cc 2-passengers) that operate as a compact, maneuverable, low-pollution, inexpensive substitute for traditional ICE vehicles and a safer, more comfortable and longer-range alternative to shared micromobility.⁵⁸

3. Kickstarting the economy and connecting consumers to local businesses: Throughout the COVID-19 pandemic, shared micromobility services played a critical role in connecting citizens to local goods and services and employment opportunities. A few examples include:

During the COVID-19 pandemic, **60% of Bird users were using micromobility** to access local businesses, so it piloted a new feature that allowed users to identify restaurant delivery options directly in the app.⁵⁹

As economies rebounded from the COVID-19 pandemic, shared micromobility in conjunction with public transit was estimated to **increase access to employment opportunities by 40%**.⁶⁰

A study conducted by Lime concluded that **roughly 57% of its customers were using shared micromobility** vehicles to travel from their current job or school.⁶¹

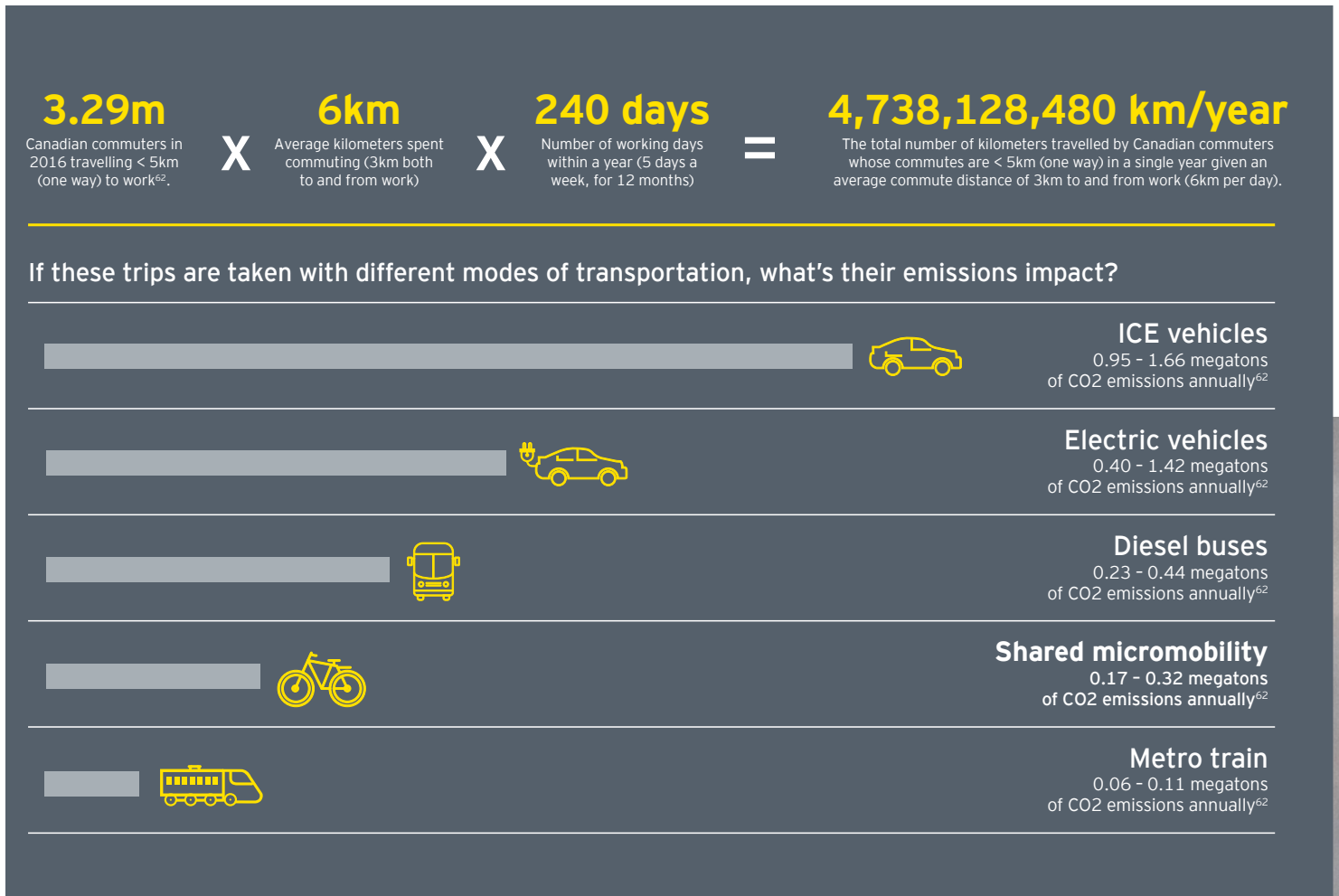
Research conducted by the Goizueta Business School concluded that shared micromobility services **increased food and beverage sales** in its local community by roughly **\$13.8m**.⁶¹

Demystifying the true environmental impacts of shared micromobility

1. Understanding the potential benefits of shared micromobility: If the current transportation infrastructure in Canadian cities were adjusted to accommodate more emission-friendly modes of transportation, negative climate outcomes could be reduced significantly across the country. Comparing the transportation options Canadians use to travel 5 km or less (illustrated in the graphic to the right), it's clear that ICE-powered passenger vehicles generate the most emissions.⁶²

However, available electric modes of transportation such as passenger electric vehicles (EVs) and even electric buses generate more emissions than short-range single-rider shared micromobility alternatives.

Moreover, if an individual took a 5 km trip to a transit station via a shared micromobility alternative and then a 5 km train ride to their destination, it would emit identical emissions to a single 5 km diesel bus ride. As a result, cities should focus part of their transportation strategy on encouraging the use of shared micromobility and transit systems in tandem, as doing so will allow citizens to travel greater distances while emitting fewer emissions than other public (e.g., diesel buses) and private (e.g., personal passenger ICE and EVs) modes of transportation.



2. Shared micromobility vs. active transportation: When examining the climate impacts of shared micromobility services, it's critical that cities determine the extent to which shared e-scooters and e-bikes will replace active modes of transportation. An amalgamation of 19 studies related to transportation substitution patterns concluded:

43%

of trips taken on shared micromobility vehicles replaced walking.

22%

replaced taxis/ridesharing.

13%

replaced trips taken in passenger vehicles.^{63, 64}

While replacing trips in passenger vehicles and taxis will have a positive climate impact, walking generates zero GHG emissions. Therefore, every trip taken via shared micromobility at the expense of walking will increase GHG emissions by approximately 35-67 grams of CO₂ per km travelled.⁶⁵

Cities and operators need to develop tracking mechanisms that record how citizens are using shared micromobility services to navigate cities; otherwise, they could introduce a new technology that eliminates active as opposed to carbon-intensive transportation, which would have a net negative impact on overall emissions. Moreover, a reduction in active transportation could impact the health of residents whose primary form of exercise was walking to and from local amenities.

3. Emissions value chain of shared micromobility vehicles: By recycling their vehicles, shared micromobility operators will be able to significantly reduce their overall climate impact by roughly 30%.⁶⁵ Moreover, recycling will limit the number of new vehicles that will need to be produced, curtailing emissions in the most carbon-intensive component of the shared micromobility value chain.

Production makes up 49% of the total emissions generated throughout the shared micromobility value chain.⁶⁵



The future of shared micromobility in Canada and beyond

Twenty-five years ago, the Canadian architect Moshe Safdie theorized in his book, *The City After the Automobile*, that said the future city would be characterized by open spaces, effortless mobility and shared automobiles.⁶⁶ He predicted that fewer cars on the roads would radically transform urban design. Today, many of Safdie's ideas are deeply embedded in the planning principles of numerous cities across Canada.

However, not all Canadian cities are convinced the future of shared micromobility is as optimistic as that depicted in Safdie's vision. On one hand, the industry is recovering from the pandemic and showing promise in terms of providing societal value and economic return to cities. Some argue that COVID-19 has accelerated the potential consolidation of the space and opened many commuters to the idea of using single-rider, open-air transportation solutions as opposed to

crowded, mass transit options. On the other hand, some Canadians feel that the impacts of COVID-19 have stagnated the acceptance of shared micromobility in Canada, with a subset of the population still concerned about hygiene and the risk of infection associated with shared transportation.

Notably, much of the market's success is dependent on geography, and whether cities and communities can successfully accommodate these methods of transportation. Most Canadian cities that have adopted shared micromobility programs are still in their pilot phases. The ability to grow ridership, demonstrate the benefits and secure widespread stakeholder support for these programs will be critical for ensuring the long-term success of shared micromobility in Canada.



Below, we highlight some of our high-level predictions regarding the future of shared micromobility in Canada.

SHORT-TERM: 0-3 years

1. Fleet services



- ▶ Short-term success in the shared micromobility platform industry will be defined by market share, cash flow, and growth in consumer adoption. This requires market consolidation, geographic expansion, increases in offerings (e.g., vehicle types), options (e.g., alternative business models, add-on services), and increased profitability to generate improved cash flow.
- ▶ Products/services that complement shared micromobility platforms to achieve operational efficiency and growing profitability through fleet services present an opportunity to generate near-term returns with the potential for sustainable long-term success.

2. Market consolidation



- ▶ In the next 5-10 years, independent shared micromobility players may be outcompeted or acquired by larger, shared mobility players. For example, in 2019 Uber and Lyft segued into shared micromobility, specifically into scooters and bikeshares, by adding these modes to their service options.
- ▶ Shared micromobility market consolidation is possible if big players continue to acquire smaller shared micromobility operators.
- ▶ Regional providers may still exist, but they will all be integrated into the offerings of some larger provider.

MID-TERM: within 5 years

1. Alternative vehicles, autonomy and robotics



- ▶ Autonomy, robotics, and alternative vehicle start-ups in the shared micromobility industry are likely to first improve on existing transport methods prior to developing ground-breaking innovations.
- ▶ Start-ups that have developed solutions or products that can generate consumer interest and revenue to test and sustain their development of futuristic technologies will be able to leverage existing consumer bases and adjust their designs to ensure product-market-fit.

2. Mobility-As-A Service



- ▶ Building more efficient, sustainable, and interconnected cities has led to the emergence of "Mobility-As-A-Service" (MaaS) market, wherein new platforms and services are integrating various modes of mobility and bringing streamlined options to the consumer.
- ▶ MaaS is the integration of a wide range of transport services into one easily accessible menu; covering everything from public transport to car rental, from buying tickets to finishing the ride.
- ▶ The function of MaaS is to streamline complex processes, providing the user with the best value, better accessibility to public transportation, a reduction in road congestion, a lower environmental footprint, and provide a convenient method for a short trip.

LONG-TERM: within 10 years

1. Smart cities and infrastructure



- ▶ Global trends toward urbanization and population growth will exacerbate the city congestion, noise, and pollution. Mitigating these issues will require the complete redefinition of transportation to create a seamless, sustainable mobility system.
- ▶ Impediments facing both shared micromobility firms and governments will require a joint effort with facilitation by advancements in shared micromobility and smart city technology.
- ▶ Government officials will need to be heavily involved with the creation of new shared micromobility regulations and optimization.
- ▶ Start-ups that provide cities with smart infrastructure solutions – especially solutions that will mitigate current clashes between governments and shared micromobility platforms will be instrumental in the shared micromobility sector's long-term success.

Keys to accelerating the growth of shared micromobility in Canada

For Canadian cities to effectively reach their net-zero climate commitments, shared micromobility must become a strong enabler of their transportation networks. To properly incorporate shared micromobility into their transportation sectors, Canadian cities should consider the following critical success factors:

- 1. Public-private partnerships are essential:** The shared micromobility market involves several unique stakeholders, but the most important dynamic exists between municipal governments and shared micromobility operators. Municipal governments will need to work with operators to ensure the vehicles being introduced into their cities are accessible to the greatest number of citizens. Municipal governments should work closely with shared micromobility operators as they develop policies to regulate the use of shared micromobility services to ensure both groups are aligned on what is expected of riders to ensure their safety.
- 2. Solutions need to be easily accessible:** The introduction of shared micromobility solutions in underserved locations throughout a city can drastically reduce its population's reliance on public transit and significantly benefit residents living in underserved transit locations. Municipal governments need to develop strategies to help subsidize the cost of shared micromobility services for lower-income users and work with operators to develop payment and pricing options that match the realities of these communities. Municipal governments need to develop a framework to evaluate operators on how accessible their services are to citizens.

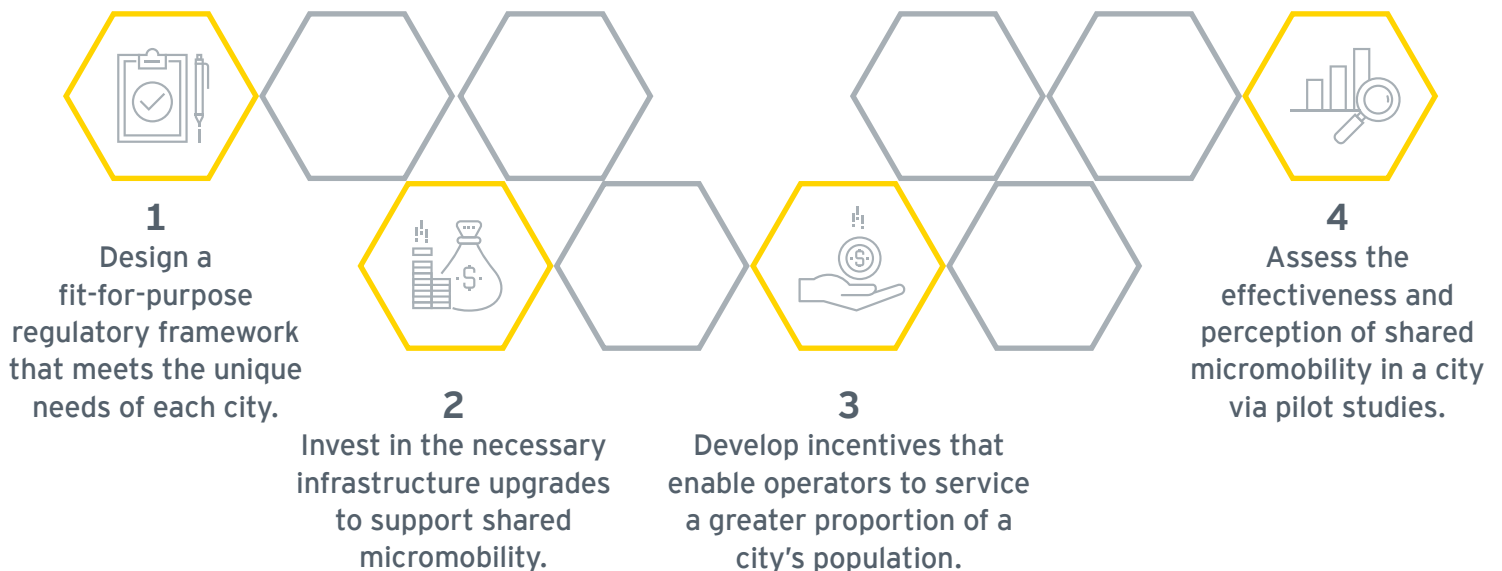
3. The customer experience needs to be a priority for operators and cities: Shared micromobility solutions need to be accessible and easy to use for a wide variety of unique users. Currently, most cities are flooded with multiple operators, with separate applications and platforms. Municipalities and operators need to collaborate and build the infrastructure necessary to offer mobility-as-a-service (MaaS) and synergize publicly accessible transportation options throughout their respective cities. The future of mobility is an interconnected network that allows all citizens to take an e-scooter, local transit station, a public bus and a private ride-share service via a single application that's accessible in terms of language, technology and payment flexibility.

4. Shared micromobility needs to be implemented with the future in mind: City governments introducing this new method of transportation need to do so with the future of an electrified transportation network in mind. Currently, some Canadian cities lack the pathways necessary to support the safe use of shared micromobility solutions. Therefore, city planners and government officials need to take into consideration how shared micromobility could transform their transportation networks and make investments that reflect that. City governments and operators must lobby federal officials to ensure that shared micromobility is included in the National Active Transportation Fund, which will help to fuel additional investment in the sector.



Conclusion

Although this point of view has characterized the various benefits and requirements associated with shared micromobility, it's important to note that this industry is not fully formed in the Canadian market. The growth of this sector stagnated heavily during the COVID-19 pandemic, and many believed it spelled the end for the industry. Recent market data indicates the industry is on the rebound. However, for shared micromobility to become a key component of Canada's transportation ecosystem, operators and city governments will have to work collaboratively to execute the following next steps:



How Ernst & Young LLP can help

Ernst & Young LLP eMobility Canada

Ernst & Young LLP's eMobility practice in Canada is a rapidly growing, cross-sector solution that applies our global capabilities in Advanced Manufacturing & Mobility, Government & Public Services, and Power & Utilities to support clients across industries in their electrification and mobility journeys.

We believe organizations must define their role in the emerging eMobility ecosystem, maintain a total focus on the customer experience and partner intelligently across the value chain to access greater opportunities for growth.

Relevant links

[eMobility | Ernst & Young LLP Canada](#)

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[Supply chain | Ernst & Young LLP Canada](#)

[Automotive - Our latest thinking | Ernst & Young LLP Canada](#)

Service offerings

[Supply chain reinvention](#)

[Workforce analytics](#)

[Audit technology](#)

[Digital Transformation services](#)

Ernst & Young LLP teams can help you see the potential in eMobility and reframe your future in the new ecosystem by:



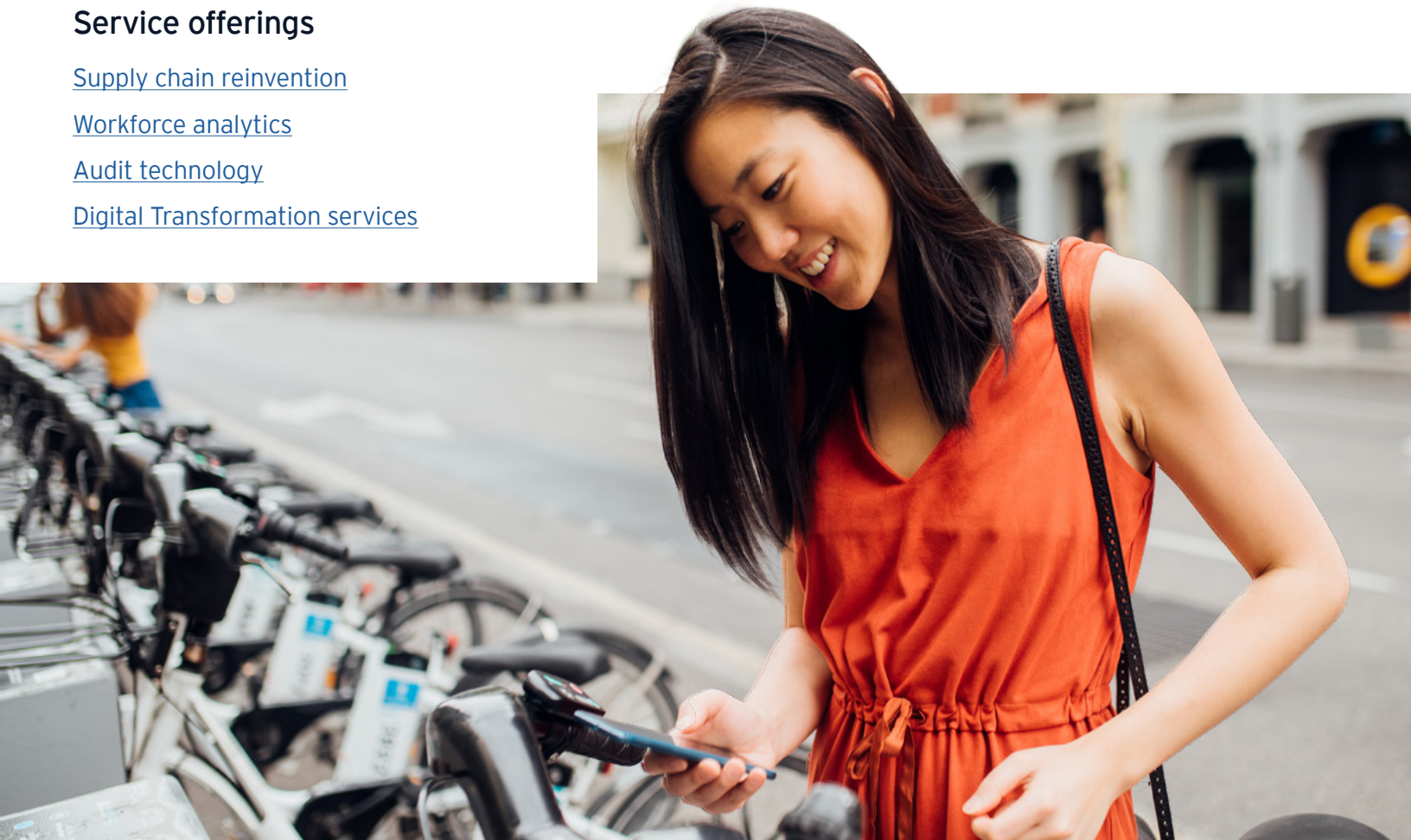
Defining your role, identifying the most attractive value pools and developing the right business models to boost return on investment.



Identifying and developing strategically effective cross-sector collaborations to help deliver additional growth while managing risk.



Using our bespoke suite of technology services to drive digital transformation, help implement operational efficiencies and provide improved profitability.



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References

- The Paris Agreement (2021). <https://www.un.org/en/climatechange/paris-agreement>
- How to accelerate the net-zero transition in transport (2022). <https://www.weforum.org/agenda/2022/01/how-to-accelerate-the-net-zero-transition-in-transport/>
- Confidential Ernst & Young LLP Consumer Market Index Study: Automotive (2022).
- E-Scooter Sharing Market Size & Trends Report, 2028 (2021). <https://www.grandviewresearch.com/industry-analysis/e-scooter-sharing-market-report>
- Global Bike Sharing Market (2022 to 2027) - Industry Trends, Share, Size, Growth, Opportunity, and Forecasts (2022). <https://www.globenewswire.com/en/news-release/2022/05/18/2445879/28124/en/Global-Bike-Sharing-Market-2022-to-2027-Industry-Trends-Share-Size-Growth-Opportunity-and-Forecasts.html>
- Micromobility Landscape: Shared Micromobility (2022). <https://micromobility.io/industries/shared-mobility>
- City of Saskatoon Shared E-Scooter Program (2022). <https://www.saskatoon.ca/engage/shared-e-scooter-program>
- Winnipeg to study electric bike and scooter regulation (2019). <https://www.cbc.ca/news/canada/manitoba/escooters-ebikes-winnipeg-1.5006370>
- City testing of e-scooters up to province (2020). <https://www.winnipegfreepress.com/breakingnews/2020/07/01/city-testing-of-e-scooters-up-to-province>
- Canadian Electric Bike Rules and Regulations (2022). <https://ebikebc.com/?s=regulations>
- E-scooters hit city trails and streets in growing numbers with no clear rules (2022). <https://www.cbc.ca/news/canada/new-brunswick/electric-scooter-fredericton-trails-new-brunswick-1.6478967>
- Halifax's e-scooter rental boss hopes to spawn micromobility revolution (2019). <https://www.saltwire.com/atlantic-canada/business/halifaxs-e-scooter-rental-boss-hopes-to-spawn-micro-mobility-revolution-345390/>
- Third Party Docked and Dockless Bike and Scooter Share (2021). <https://www.halifax.ca/sites/default/files/documents/city-hall/standing-committees/210121tscinfo2.pdf>
- Toronto Bike Share Program (2020). <https://www.pbsc.com/cities/toronto-bike-share>
- Discover Bike Share Toronto's pedal assist e-bike program (2022). <https://bikesharetoronto.com/e-bikes/>
- Toronto city council votes to uphold e-scooter ban (2021). <https://globalnews.ca/video/7840961/toronto-city-council-votes-to-uphold-e-scooter-ban/>
- Electric scooters roll out in Ottawa (2022). <https://ottawa.ctvnews.ca/electric-scooters-roll-out-in-ottawa-1.5975370>
- Bird e-scooters and e-bikes return to Windsor streets (2022). <https://windsor.ctvnews.ca/bird-e-scooters-and-e-bikes-return-to-windsor-streets-1.5796696>
- Bixi Unveils its New and Improved Pricing Structure for an Electrifying New Season (2021). <https://www.newswire.ca/news-releases/bixi-unveils-its-new-and-improved-pricing-structure-for-an-electrifying-new-season--878389172.html>
- Shared e-scooters to be banned in Montreal in 2020 (2020). <https://www.cbc.ca/news/canada/montreal/scooters-banned-1.5468206>
- Lime selected by City of Richmond to operate e-scooter and e-bike share (2021). <https://dailyhive.com/vancouver/lime-richmond-e-scooter-ebike>
- Neuron rolls out its safety-first e-bikes in Vernon (2022). <https://www.rideneuron.com/neuron-rolls-out-its-safety-first-e-bikes-in-vernon/>
- City of Kelowna Shared bikes and e-scooters (2022). <https://www.kelowna.ca/roads-transportation/active-transportation/shared-bikes-and-e-scooters>
- Province of British Columbia Electric scooter pilot project (2022). <https://www2.gov.bc.ca/gov/content/transportation/transportation-environment/active-transportation/policy-legislation/motor-vehicle-act-pilot-projects/scooter>
- City of North Vancouver E-Bike Sharing (2022). <https://www.cnv.org/City-Services/Streets-and-Transportation/Sustainable-Transportation/Travel-Options/Cycling/eBike-Sharing>
- Calgary e-scooters return this spring as gas prices skyrocket (2022). <https://calgary.ctvnews.ca/calgary-e-scooters-return-this-spring-as-gas-prices-skyrocket-1.5818458>
- E-bikes and e-scooters are now ready to ride in Edmonton (2022). <https://edmonton.citynews.ca/2022/06/03/e-bikes-and-e-scooters-are-now-ready-to-ride-in-edmonton/>
- Neuron, Bird Launch New Mobility Option in Calgary (2022). <https://www.cbc.ca/news/canada/calgary/calgary-mobility-scooter-electric-assist-bike-option-returns-1.6471053>
- Red Deer E-scooter Launch (2022). <https://canadatoday.news/ab/red-deer-launches-lacombeonline-com-6960/>
- E-scooter and E-bike program officially launches in Lethbridge (2022). <https://lethbridgenewsnow.com/2022/04/08/e-scooter-and-e-bike-program-officially-launches-in-lethbridge/>
- City of St. Albert E-scooter Pilot Program (2022). <https://stalbert.ca/cosa/participation/opportunities-e-scooters/>
- Okotoks Shared e-Scooter (micro-mobility) program (2022). <https://www.okotoks.ca/your-community/living-okotoks/community-initiatives/shared-e-scooter-micromobility-pilot-program>
- Cochrane Shared Electric Scooter (E-scooter) Pilot Project (2022). <https://www.cochrane.ca/escooters>
- <https://www.nrcan.gc.ca/energy/efficiency/communities-infrastructure/transportation/idling/4419>
- State of the Industry: A Look at Shared Micromobility in Canada (2020). <https://nabsa.net/2022/03/15/canada/>
- Stantec to bring micro-mobility hubs to cities and campuses in new partnership with Swiftmile (2021). <https://electricautonomy.ca/2021/03/08/micro-mobility-hubs-stantec-swiftmile/>
- Shared Micromobility (e-Bikes and e-Scooters) program (2022). <https://www.calgary.ca/bike-walk-roll/electric-scooters.html>
- Red Deer e-scooter age lowered to 16 (2022). <https://www.reddeeradvocate.com/news/red-deer-e-scooter-age-lowered-to-16/>
- Bringing Mobility-as-a-service and Universal Basic Mobility to Pittsburgh (2021). <https://www.spin.app/blog-posts/bringing-mobility-as-a-service-and-universal-basic-mobility-to-pittsburgh>
- New in 2020 - Share & Go Parking Zones for e-scooter riders (2020). <https://newsroom.calgary.ca/new-in-2020--share-go-parking-zones-for-e-scooter-riders/>
- City of Kelowna Micromobility Permit Program (2022). https://www.kelowna.ca/sites/files/1/docs/micromobility_permit_program_-_version_1.4_.pdf
- Canada's fastest growing and decreasing municipalities from 2016 to 2021 (2022). <https://census.gc.ca/census-recensement/2021/as-sa/98-200-x/2021001/98-200-x2021001-eng.cfm>
- Results from the 2016 Census: Long commutes to work by car (2019). <https://www150.statcan.gc.ca/n1/pub/75-006-x/2019001/article/00002-eng.htm>
- More Canadians are buying cars and plan to drive to work: Survey (2021). <https://www.bnnbloomberg.ca/more-canadians-are-buying-cars-and-plan-to-drive-to-work-as-offices-open-up-survey-1.1644784>
- How Micromobility Solves Multiple Problems in Congested Cities (2018). <https://maas-alliance.eu/2018/07/17/how-micro-mobility-solves-multiple-problems-in-congested-cities/>
- To reduce Traffic Congestion, Increase Local Micromobility (2022). <https://www.governing.com/community/to-reduce-traffic-congestion-increase-local-micromobility>
- Micromobility Changing the way we navigate through our cities (2020). <https://hetaarchitects.com/insights/2020/04/Micromobility-changing-the-way-we-navigate-through>
- Understanding and Tackling Micromobility: Transportation's New Disruptor (2020). <https://www.ghsa.org/resources/understanding-and-tackling-micromobility-transportations-new-disruptor>
- How four European cities are embracing micromobility to drive out cars (2020). <https://techcrunch.com/2020/11/20/how-four-european-cities-are-embracing-micromobility-to-drive-out-cars/>
- Giving up public transit during the coronavirus is a luxury many Canadians can't afford (2020). <https://uttri.utoronto.ca/news/giving-up-public-transit-during-the-coronavirus-is-a-luxury-many-canadians-cant-afford/>
- Accessibility Findings from Canadian Survey on Disability (2017). <https://www150.statcan.gc.ca/n1/pub/89-654-x/89-654-x2021002-eng.htm>
- E-Scooters, Equity, and Accessibility (2019). <https://betterbikeshare.org/2019/03/21/e-scooters-equity-and-accessibility/>
- Statistics on official languages in Canada (2019). <https://www.canada.ca/en/canadian-heritage/services/official-languages-bilingualism/publications/statistics.html#a7>
- Telecommunications: Connecting Canadians (2022). https://www.statcan.gc.ca/en/subjects-start/digital_economy_and_society/telecommunications
- Statistics on Credit Card Trends in Canada (2021). <https://loanscanada.ca/stats/statistics-on-credit-card-trends-in-canada/>
- Exploring city propensity for the market success of micro-electric vehicles (2020). <https://etrr.springeropen.com/articles/10.1186/s12544-020-00416-8>
- IoT Solutions for Micromobility Market - A Global and Regional Analysis (2022). BIS - Global Industry Reports
- Micro shows off production line for its adorable electric microcars, first units in March (2022). <https://electrek.co/2022/01/07/micro-shows-off-production-line-for-its-adorable-electric-microcars-first-units-coming-in-march/>
- You can now see Local restaurants serving takeout and delivery in the Bird app (2020). <https://www.bird.co/blog/local-restaurants-serving-takeout-delivery-bird-app/>
- Micromobility will help cities recover and get moving again (2020). <https://www.bird.co/blog/micromobility-help-cities-recover-get-moving-again/>
- Benefits of Micromobility for Cities (2021). <https://www.eltis.org/in-brief/news/benefits-micro-mobility-cities>
- Results from the 2016 Census: Commuting within Canada's largest cities (2019). <https://www150.statcan.gc.ca/n1/pub/75-006-x/2019001/article/00008-eng.htm>
- What Mobility Modes Do Shared E-Scooters Displace? A Review of Recent Research Findings (2021) <https://trid.trb.org/view/1759120>
- Mode choice, substitution patterns and environmental impacts of shared and personal micro-mobility (2022). <https://www.sciencedirect.com/science/article/pii/S1361920921004296>
- Micromobility: moving cities into a sustainable future (2020). https://www.ey.com/en_gl/automotive-transportation/how-micromobility-is-moving-cities-into-a-sustainable-future
- The City After the Automobile (1997). <https://www.routledge.com/The-City-After-The-Automobile-An-Architects-Vision/Safdie-Kohn/p/book/9780813335452>

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