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NC FIRST COMMISSION
FUTURE INVESTMENT RESOURCES FOR SUSTAINABLE TRANSPORTATION

The NC FIRST Commission was created in March 2019 to evaluate North Carolina's transportation investment needs. Their job is to advise the Secretary of Transportation of new or better ways to ensure that critical financial resources are available in the future. As part of this process, we're looking for input from you, the people of North Carolina! This brief is part of a "Disruptor Series" that examines technological and societal trends impacting our transportation system. This brief considers the rise of micromobility and how it may affect the state's overall transportation network.

DISRUPTOR SERIES: PART 3

The Rise of Micromobility and its Potential Impacts for North Carolina

Overview

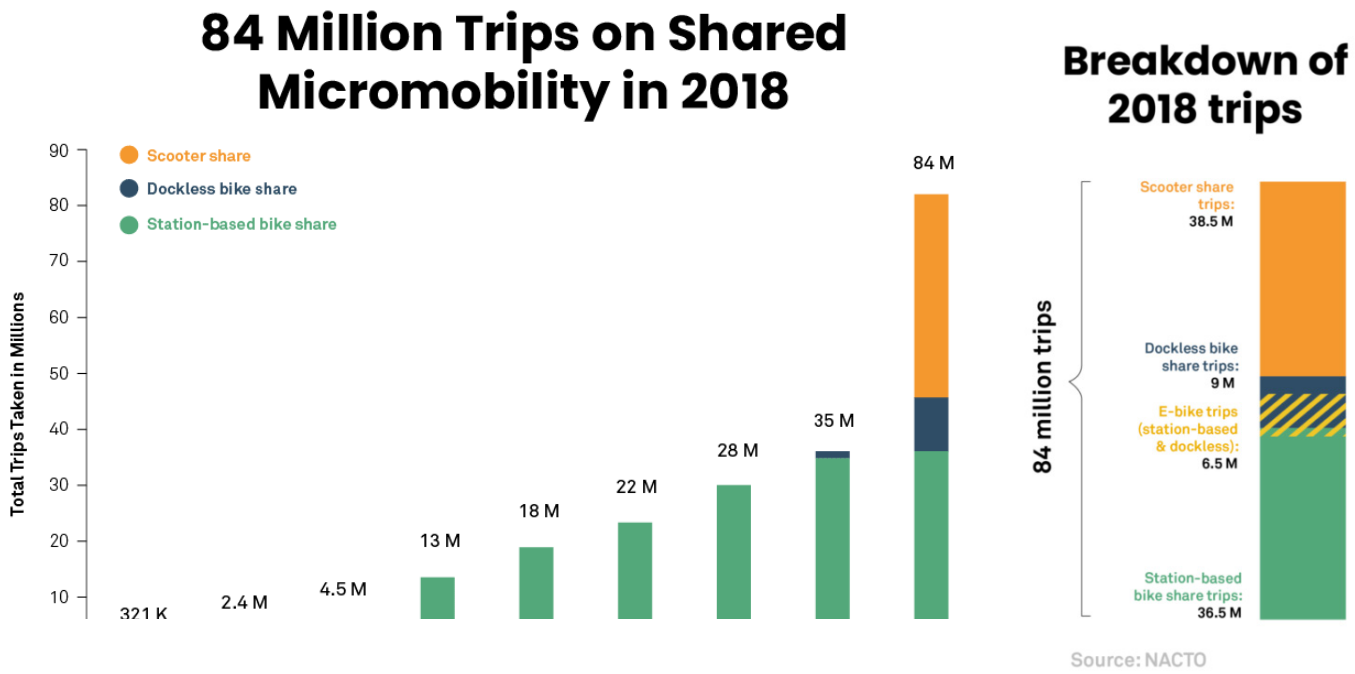
In North Carolina and nationwide, options for how we get from Point A to Point B are evolving rapidly. The recent explosion of technology-enabled, shared-use micromobility services—such as shared bicycles and electric scooters—is one hot trend that is already transforming how people move around their communities. For decision makers, these small vehicles are raising big questions for how we think about, design, and pay for our transportation system as a whole.

What is "micromobility"?

The term "micromobility" refers to small transportation solutions that are used for shorter trips. These include shared-use bicycles, electric-assist bicycles (e-bikes), and electric scooters (e-scooters) that potential riders can unlock and pay for through mobile apps or other connected devices. The bikes or scooters can be checked out from stations or kiosks ("docked"/"station-based") or set up to be parked and retrieved from anywhere ("dockless"). These self-serve systems are designed to offer flexible, easy, and affordable travel options that allow users to ride where they want, when they want, for as long as they want.

Micromobility has been steadily on the rise since 2008, when station-based bikeshares were first launched in the U.S. Recent years, however, have seen dramatic shifts in the market as emerging vehicle technologies, improved GPS, and the spread of smartphones have opened up new possibilities for on-demand, park-anywhere options. Starting in 2017, dockless non-electric bikes quickly proliferated (and then mostly vanished), while e-bikes grew in popularity and e-scooter companies like Bird, Lime, and Spin took communities by storm. In 2018, overall micromobility use skyrocketed to 84 million trips nationwide—more than double the previous year (**Figure 1**).[1] By 2030, forecasts estimate a U.S. micromobility market potential of $200 to $300 billion.[2]

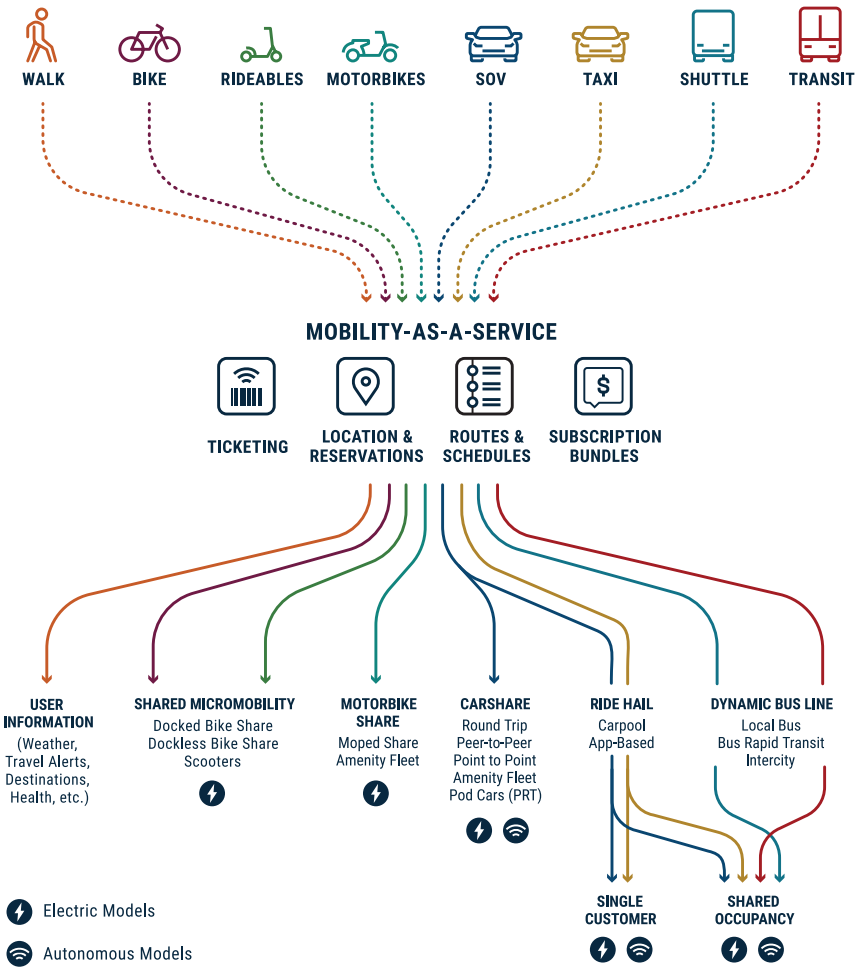
Figure 1: Shared Micromobility Trips from 2010 to 2018



[1] National Association of City Transportation Officials (NACTO)
[2] McKinsey Institute

Micromobility is part of a larger trend toward "Mobility-as-a-Service" (MaaS). Now, instead of needing to drive their own car everywhere, many travelers can use different, on-demand transportation services for each trip based on how much it costs, how long it takes, and personal preference. Besides micromobility, other technology-enabled options that are facilitating this shift include carsharing (e.g., Zipcar, Car2Go), ride-hailing (e.g., Uber, Lyft), integrated travel apps (e.g., Citymapper), and flexible "microtransit" such as on-demand vanpools and shuttles (**Figure 2**). Reflecting this trend, a host of companies that previously focused on car travel are repositioning themselves as personal mobility providers. In 2018, Ford, Uber, and Lyft all acquired micromobility companies, while both Ford and General Motors started developing and marketing their own e-bikes and several traditional auto-makers launched car subscription plans.[3]

Figure 2: Mobility-as-a-Service[4]



Source: Alta. "The Rise of Micromobility." By Jean Crowther. Alta Innovation Lab: 20 September 2018.

Where are micromobility services currently in use?

As of July 2019, just over 350 bikeshare and e-scooter systems were serving more than 200 communities nationwide.[5] Although micromobility is more often associated with urban centers, some rural towns have started their own small bikeshare programs to encourage residents and visitors to explore nearby bike trails or shop local businesses.[6] In North Carolina, micromobility options are available in at least Cary, Charlotte, Durham, Greensboro, Raleigh, and Winston-Salem, as well as on some college campuses, with more services currently under development.[7] In Charlotte alone, since the city launched its shared mobility program in May 2018, riders have logged more than 2,068,209 trips and more than 2,173,666 miles on e-scooters.[8]

[3] National League of Cities (NLC); CB Insights; Edmunds; Forbes; The Motley Fool

[4] Crowther (2018), *The Rise of Micromobility*, Alta Innovation Lab, as cited in NCDOT's *NC Moves 2050 Drivers and Opportunities Fact Sheet: Technology*

[5] U.S. Department of Transportation, Bureau of Transportation Statistics (BTS)

[6] NACTO; Shared-Use Mobility Center; Fast Company; Koloni

[7] BTS; Smart Cities Dive

[8] Charlotte Department of Transportation

How are micromobility services owned and operated?

Micromobility services are provided under several different business models. Many systems are owned and run by private companies—although, due to some controversies in which scores of dockless bikes or e-scooters have been deployed on city sidewalks without warning, local governments have increasingly required vendors to apply for permits first. Most bikeshare systems are publicly owned and privately operated, like Capital Bikeshare in Washington, D.C.; conversely, a handful, including some Koloni bikeshares in rural towns, are privately owned and publicly operated. Several bikeshare systems are owned and operated by local nonprofits that either manage them directly or contract out to a third party; under this model, funding typically comes from a blend of private and public sources. One of the nation's oldest nonprofit-owned-and-operated bikeshares is Charlotte's B-cycle, right here in North Carolina.[9]

Regardless of who owns or operates these services, local governments are typically responsible for oversight, coordination, regulation, and enforcement. Further, localities may also have to pay for new parking areas and signage, expanded bike lanes, additional pavement upkeep, or other adjustments to accommodate these new modes. To help cover these costs, many jurisdictions now collect annual permit fees, per vehicle fees, or per trip fees from micromobility providers.[10]

What are the potential benefits of micromobility?

The micromobility phenomenon offers a great deal of promise, both for individual travelers and for their broader communities. For travelers, these services can offer easy, fun, and affordable alternatives for covering shorter distances. For communities, the hope is that replacing some car trips with bikes or e-scooters will mean less traffic and cleaner air. Although micromobility impact studies are still limited, the data so far suggests that this trend is already contributing to social, behavioral, and environmental benefits.[11]

First- and last-mile travel. Shared bikes and e-scooters offer the potential to help people get to public transit stops that are too far away to reach by walking, thereby extending transit access into underserved areas and increasing overall ridership. In 2018, user surveys indicated that more than half of station-based bikeshare trips and more than a quarter of e-scooter trips were used to connect to transit.[12] At the same time, micromobility has been shown to replace some transit trips and even, in some cases, reduce overall ridership, especially in high-density urban cores.[13]

Better mobility for people with travel challenges. By providing more low-cost travel options and easing connections to transit, micromobility could especially benefit people in traditionally underserved and disconnected communities. To encourage this, some cities—including Durham, here in North Carolina—call for a share of vehicles to be placed in higher-need areas where residents have limited access to cars and public transit. In addition, many jurisdictions require micromobility operators to provide income-based discounts, payment options for customers without credit cards, and access for users without smart phones. Some systems are also starting to offer adaptive bikes or e-scooters that are designed for people with physical limitations.[14]

Fewer cars on the road. Nationwide, traffic congestion is a persistent problem in towns and cities of every size—and is likely to worsen as people continue to move to urban centers.[15] Micromobility could help; today, more than half of all car trips in the U.S. are shorter than five miles[16] and estimates suggest that up to 15 percent of those trips could eventually be replaced by micromobility solutions.[17] Studies so far have shown that bikesharing and e-scooters reduce the use of personal vehicles and for-hire services such as taxis, Uber, or Lyft. By reducing car trips, these alternative modes also have been shown to lower greenhouse gas emissions.[18]

[9] NLC; Shared-Use Mobility Center; Transit Cooperative Research Program (TCRP), National Academies of Sciences, Engineering, and Medicine

[10] NLC; Pedestrian and Bicycle Information Center (PBIC), UNC Highway Safety Research Center; Remix

[11] Shaheen and Cohen (2019), *Shared Micromoblity Policy Toolkit: Docked and Dockless Bike and Scooter Sharing*, UC Berkeley Transportation Sustainability Research Center

[12] NACTO

[13] Shaheen and Cohen; TCRP

[14] Government Technology; NACTO; PBIC; Remix; Shaheen and Cohen; Shared-Use Mobility Center; TCRP

[15] Texas A&M Transportation Institute. For more details about ongoing urbanization and other demographic trends that could affect North Carolina's transportation network, see the NC FIRST Commission's Issue Brief: Edition 2: *Changing Demographics and the Future of Transportation in North Carolina* at www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Pages/resources.aspx.

[16] Federal Highway Administration

[17] McKinsey Institute

[18] Shaheen and Cohen

What are the challenges of micromobility?

While micromobility innovations offer several benefits, they also have raised unique concerns and challenges. In response, state and local entities have been working to address these services' possible drawbacks and effectively integrate them with the existing transportation network.

Safety. "One of the main concerns surrounding the uptick in scooter and bike use," says the National League of Cities, "is safety." Some users (including minors) have been involved in crashes with pedestrians on sidewalks or with cars on roads that aren't designed for them, and injuries have been linked to faulty equipment, riding impaired, or not wearing a helmet. Other safety issues have included dockless vehicles being left in streets and sidewalks, which poses hazards for all users of the public right-of-way and blocks access for people with disabilities. To address these issues, many jurisdictions now regulate who is allowed to use these devices, where, and how fast, as well as what safety equipment is required; some have also adapted their existing infrastructure to accommodate these new modes. Safety, however, remains a concern.[19]

Other regulatory issues. Local and state entities are also working to address a number of other concerns related to the burgeoning new micromobility industry through regulatory activity, pilot programs, and permitting processes. These concerns include data sharing, customer privacy, vehicle maintenance, fleet size, parking options, cost structure, insurance, liability, enforcement, and more. But because the regulatory environment for these new modes is still being settled, questions persist about the extent of local and state authority over their operation.[20] North Carolina was one of more than 30 states that considered e-scooter legislation in 2019;[21] among other provisions, one of the pending bills would require the Legislative Research Commission to study state and local regulation of e-scooters and scooter share businesses in the state.[22]

How else might micromobility affect the future of our transportation system?

The micromobility phenomenon is still in its early days, but there are already indications that it may shape the future of our transportation system in two significant respects. First, by adding new modes to our streets and sidewalks and extending the reach of public transit, micromobility could place new demands on existing infrastructure and services. Already, government agencies and transit operators are considering how—and how much—to take micromobility into account as they plan, design, and pay for the transportation system as a whole.

At the same time, micromobility could also affect how much funding is available for transportation investments. Today, most of North Carolina's transportation funding comes from fuel taxes, and micromobility is just one of several disruptive trends that are reducing how much people drive and therefore how much gasoline they consume.[23] Further, studies to date suggest that micromobility could help decrease personal car ownership[24] which, in turn, would erode other key revenue sources such as driver and vehicle fees and the state tax on vehicle sales. As travel patterns continue to shift, funding approaches must also evolve to ensure that North Carolina can meet its transportation infrastructure needs into the future.

[19] American Association of Motor Vehicle Administrators; Kobayashi et al. (2019), The e-merging e-pidemic of e-scooters, *Trauma Surgery and Acute Care Open*; National Conference of State Legislatures (NCSL); NLC; PBIC

[20] NACTO; NLC; Remix; Shaheen and Cohen

[21] NCSL

[22] 2019 N.C. Senate Bill 620. Other relevant bills include 2019 N.C. Senate Bill 373 and 2019 N.C. House Bill 77.

[23] For other trends that are affecting transportation revenues, see the NC FIRST Commission's issue brief series at www.ncdot.gov/about-us/how-we-operate/finance-budget/nc-first/Pages/resources.aspx.

[24] Shaheen and Cohen; TCRP