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Micromobility Speedbumps: Navigating Regulations, Equity, and Profitability in the Metropolis

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Micromobility Speedbumps: Navigating Regulations, Equity, and Profitability in the Metropolis

I. Introduction

Cities offer diverse and vibrant communities, job opportunities, night-life, and a wealth of cultural activities, but are increasingly plagued with failing and outmoded transportation infrastructures. The integration of micromobility into urban transportation systems promises to reduce the stress on transportation infrastructures, to address transportation inequities, and to improve the environmental quality of urban areas by reducing carbon emissions.

The primary focus of this paper is on comparing the different approaches that two urban areas, New York City and the Boston metropolitan area (Boston Metro), have taken towards integrating micromobility into their transportation systems. In making this comparison, consideration is given to the interplay among state and local regulatory structures, business interests, and urban planning authorities on the development of micromobility within urban environments. Issues considered include how businesses have adapted to achieve profitability, the key role of public-private partnerships, the need for more flexible regulatory schemes to adapt to rapid technological advances, and how to equitably integrate micromobility into urban transportation systems in a manner that addresses the needs of underserved communities.

Both Boston and New York have stumbled in their efforts to integrate micromobility into their transportation systems, and these stumbles provide lessons for moving forward. But despite the growing pains, for these cities as for cities around the world, micromobility promises to help us attain more pleasant and liveable cities, with more efficient and equitable transportation infrastructures.

II. Background

A. *The last mile problem*

Large numbers of people in urban areas depend on mass transportation to travel to and from work. But in underserved areas, much time can be spent just getting to and from subway and bus stations. Increasingly, public mass transportation systems are perceived as crowded, unreliable, and in need of repair.¹ Micromobility promises to improve access to distant public transportation, as well as to provide a convenient and rapid means to travel short distances.²

B. *History of Micromobility*

Micromobility programs have evolved from early bike sharing programs through the inclusion of e-bikes to encompassing not only bikes and e-bikes, but also scooters. Along the way, from Amsterdam anarchists to the flocking of Bird Scooters to Santa Monica, provocative actions have acted as agents of change.

1. Early pioneers – municipal bike sharing

a. *1960's Amsterdam anarchists*

Bicycles provide a rapid means for traveling short distances in crowded urban environments, and urban bike sharing programs provide an equitable means for allowing people to move conveniently from point A to point B. In 1965, the Provo collective of anarchists in Amsterdam initiated the Wittefietsen (White Bikes) program, which left unlocked bikes, painted white, scattered around the city, for any and all to use.³ The brainchild of industrial engineer Luud Schimmelpennink, the bikes were accompanied by a manifesto stating that “the white bike

¹ Rounaq Basu & Joseph Ferreira, *Sustainable mobility in auto-dominated Metro Boston: Challenges and opportunities post-COVID-19*, 103 TRANSPORT POLICY 197–210 (2021).

² Private Transit Key To Solving First-Mile, Last-Mile Problem, <https://marketurbanismreport.com/blog/private-transit-key-to-solving-first-mile-last-mile-problem> (last visited Feb 25, 2022).

³ Renate van der Zee, *Story of cities #30: how this Amsterdam inventor gave bike-sharing to the world*, THE GUARDIAN, April 26, 2016, <https://www.theguardian.com/cities/2016/apr/26/story-cities-amsterdam-bike-share-scheme> (last visited Apr 2, 2022).

symbolizes simplicity and hygiene as opposed to the gaudiness and filth of the authoritarian car.”⁴ The plan was short-lived, as the bikes were quickly removed by the police.⁵ But the problem of the growing number of cars was real, in Amsterdam and in cities around the world. And Schimmelpennink persisted. He became a member of the Amsterdam city council and presented the council with an elaborate plan to distribute 10,000 free bikes across the city.⁶ The city council unanimously rejected the plan. Not discouraged, Schimmelpennink eventually obtained the political support for a shared system of small electric cars, known as *Witkarren*, which was operated by a primitive computer system. This plan, though small (four cars and one station) and underfunded, nonetheless lasted for ten years and demonstrated the feasibility of a computer-operated shared microbility system for improving urban transportation.⁷

b. 1990's: Coin-op in Copenhagen

In 1995, Schimmelpennink helped the city of Copenhagen set up the first large scale bike share program, a free, coin-operated system where you dropped a coin into the bike at the beginning and got it back when you parked the bike.⁸ The program was funded in part by advertising, lasted until 2012, and at its peak offered more than 2,000 bikes.⁹ In 2014 Copenhagen introduced a new, modernized app-based system with GPS navigation.¹⁰

⁴ *Id.*

⁵ *Id.*

⁶ *Id.*

⁷ *Id.*

⁸ *Id.*

⁹ Susan A. Shaheen, Stacey Guzman & Hua Zhang, *Bikesharing in Europe, the Americas, and Asia: Past, Present, and Future*, 2143 TRANSPORTATION RESEARCH RECORD 159, 161 (2010).

¹⁰ Sigal Kaplan et al., *Intentions to use bike-sharing for holiday cycling: An application of the Theory of Planned Behavior*, 47 TOURISM MANAGEMENT 34, 36 (2015); Bycyklen | Activities, VISITCOPENHAGEN, <https://www.visitcopenhagen.com/copenhagen/planning/bycyklen-gdk495345> (last visited Apr 2, 2022).

c. *Bike sharing today*

The incorporation of coin-deposit locks and docking stations in the Copenhagen system improved reliability and theft resistance.¹¹ However, the coin deposit fee was low and theft was a common problem.¹² Modern bike sharing programs incorporate computer technology for making reservations, pickup, drop-off and information tracking, making them more convenient, and also better adapted to make money.¹³ Early programs in Vienna, Lyon, and then in Paris in 2007 heralded the dawn of modern docked bike sharing plans. By 2014 there were almost one million shared bikes in the world, with China dominating with more than 750,000 bikes.¹⁴ As of 2017, there were 119 US cities with municipal bikeshare systems, with the top five systems being in New York City, Chicago, Washington, Minneapolis, and Boston.¹⁵

Luud Schimmelpennink had left a legacy.

2. Electrification

Although the first e-bike was patented in 1895,¹⁶ interest waned and it was not until nearly a century later that interest again began to grow.¹⁷ In recent years, with advances in lithium-ion battery technology, and the development of pedal-assist technologies, e-bike sales have grown rapidly.¹⁸ With the global pandemic, bike sales overall boomed, and included a 145 percent increase in e-bike sales from 2019 to 2020.¹⁹ E-bike sales are predicted to grow from 3.7

¹¹ Shaheen, Guzman, and Zhang, *supra* note 9.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.*

¹⁵ Dan Malouff, *All 119 US bikeshare systems, ranked by size*, GREATER, GREATER WASHINGTON (2017), <https://ggwash.org/view/62137/all-119-us-bikeshare-systems-ranked-by-size> (last visited Feb 25, 2022). *See also* The Meddin Bike-sharing World Map, <https://bikesharingworldmap.com/> (last visited Apr 18, 2022).

¹⁶ O. Bolton, *Electrical bicycle*, (1895) U.S. patent 5,552,271.

¹⁷ Facts & Statistics of Electric Bicycles, EBICYCLES, <https://www.ebicycles.com/ebike-facts-statistics/> (last visited Mar 31, 2022).

¹⁸ Elaine Glusac, *Farther, Faster and No Sweat: Bike-Sharing and the E-Bike Boom*, THE NEW YORK TIMES, March 2, 2021.

¹⁹ *Id.*

million bikes in 2019 to 17 million in 2030.²⁰ By 2019, 28% of bike-sharing programs had integrated e-bikes into their systems, including the largest US bikesharing program, Citi Bikes, in New York City.²¹

3. Dockless disruption

The age of the e-scooter arrived abruptly in September of 2017, when 250 e-scooters descended on the beach front community of Santa Monica, California, dropped there by the startup Bird Rides, along with instructions on how to rent them using an app.²² City officials, who had no advance warning, were taken by surprise. In the wake of the mayhem that followed, Bird paid \$300,000 to settle a nine-count misdemeanor criminal complaint from the city attorney's office.²³

Other startups, including Lime, Scoot, Skip, Spin, Jump, and Lyft, quickly followed suit, and in the coming months, often with minimal consultation with city authorities, dockless shared e-scooters began appearing in other US cities.²⁴ According to the National Association of City Transportation Officials (NACTO), total e-scooter rides increased 130% from 38.5 million in 2018 to 88.5 million in 2019.²⁵ As of 2021, there were 92 dockless e-scooter systems in US cities.²⁶

²⁰ *Id.*

²¹ *Id.*

²² Will Yakowicz, *14 Months, 120 Cities, \$2 Billion: There's Never Been a Company Like Bird. Is the World Ready?*, INC.COM (2018), <https://www.inc.com/magazine/201902/will-yakowicz/bird-electric-scooter-travis-vanderzanden-2018-company-of-the-year.html> (last visited Apr 2, 2022).

²³ *Id.*

²⁴ *Localities Pose Stricter Rules on E-Scooter Use, But Challenges Remain*, ROUTE FIFTY, <https://www.route-fifty.com/smart-cities/2021/11/scooters/186730/> (last visited Feb 25, 2022).

²⁵ *Shared Micromobility in the U.S.: 2019*, NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS, <https://nacto.org/shared-micromobility-2018> (last visited Feb 2, 2022).

²⁶ *Localities Pose Stricter Rules on E-Scooter Use, But Challenges Remain*, *supra* note 24.

4. Schimmelpennink's capitalist heir?

One wonders what the anarchist Luud Schimmelpennink would have thought of the ultracapitalist Bird CEO Travis Vander Zanden. The motivations for their provocative actions may have differed, but both thumbed their nose at the law, and in so doing instituted processes that eventually led to widespread changes in transportation systems.

III. Commercial landscape for e-bikes and e-scooters: an industry in flux

A. Micromobility has a market opportunity

According to the New York City Mobility Report of the New York Department of Transportation (DOT), Citi Bikes in midtown on average travel faster than taxis.²⁷ Bikes, e-bikes and e-scooters relieve congestion, decrease pollution, and make navigating short distances faster and less stressful.²⁸ But in order for Luud Schimmelpennink's vision of more liveable, environmentally responsible cities to be realized, there needs to be a commitment to sensible regulation and wide-ranging changes in infrastructure, winning space from cars, and giving it back to alternative transportation modalities.²⁹ State and local authorities, micromobility providers, and the public need to work together to enable authorities to develop rational transportation systems, micromobility companies to make a profit, and the public to reap the benefits of more rapid commutes and more liveable environments.

²⁷ NYC DOT - New York City Mobility Report, August, 2019.
<https://www1.nyc.gov/html/dot/html/about/mobilityreport.shtml> (last visited Apr 2, 2022).

²⁸ Micro Mobility Revolution: Startups, Companies & Market Solutions | CB Insights, (2021),
<https://www.cbinsights.com/research/report/micromobility-revolution/> (last visited Feb 4, 2022).

²⁹ Small is beautiful, DELOITTE INSIGHTS, <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/micromobility-is-the-future-of-urban-transportation.html> (last visited Feb 25, 2022).

B. State of the industry

As with other sectors of the transportation economy, shared micromobility suffered during the early days of the Covid-19 epidemic.³⁰ However, compared to traditional public transit systems, shared micromobility rebounded faster. According to a survey of the North American Bikeshare and Scootershare Association (NABSA), between February and April of 2020 North American ridership decreased by about 70% compared to 2019 levels.³¹ However, by the end of the year, ridership had increased to within 20% of 2019 levels.³² In contrast, over the same time periods, public transit ridership fell by about 80% and only recovered to about 70% of 2019 levels.³³

Against this backdrop, in 2020, at least 224 North American cities had at least one bikeshare or e-scooter system, and 72 had both.³⁴ Of the 129 e-scooter systems, all were dockless and electric.³⁵ As of 2020, 55% of shared micromobility systems were for profit, 30% were run by public authorities, and 15% were run by non-profit organizations.³⁶

A. Public-Private Bikeshare Partnerships

The five largest bikeshare systems in the U.S. are, in decreasing order of size, Citi Bike in New York, Divvy in Chicago, Capital Bikeshare in D.C., Nice Ride in Minneapolis, and Bluebikes in Boston.³⁷ All five are dock-based systems, and all five were originally operated by Motivate, which by 2018 was responsible for 80% of all bikeshare rides in the US.³⁸ E-bikes are

³⁰ 2020 Shared Micromobility State of the Industry Report, <https://nabsa.net/about/industry/> (last visited Apr 4, 2022).

³¹ *Id.*

³² *Id.*

³³ *Id.*

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ Malouff, *supra* note 15.

³⁸ Lyft Becomes America's Largest Bikeshare Service, <https://www.lyft.com/blog/posts/lyft-becomes-americas-largest-bikeshare-service> (last visited Apr 3, 2022).

now included in four of these five systems; only Boston has restricted its inventory to conventional bikes.³⁹ In November of 2018, Lyft acquired Motivate, making Lyft America's largest bikeshare service.⁴⁰

Dock-based systems such as these are by now well established, and are expected to show continued growth and integration into municipal transportation systems. In addition to ridership fees, and in some cases public monies, these systems are funded in part by corporate sponsors (CitiBank in New York, Blue Cross Blue Shield in Boston), leading to more favorable unit economics. The bikes are also very durable, again contributing to per unit profitability.

1. Reality Bites: Unicorns, Profitability, and Consolidation

Less than nine months after its founding in 2017, Bird achieved unicorn status, making it the fastest company at that time to reach a valuation of \$1B. Four months later, Bird doubled in valuation to \$2B.⁴¹ By October of 2021, Bird was operating in 300 cities worldwide. Bird's largest competitor Lime also rose quickly to unicorn status, and was valued at \$2.4B before Covid.⁴²

Bird went public in November of 2021, merging with a special purpose acquisition company.⁴³ But a review of the S1 filing shows a company that lost startling sums of money year after year, \$387.5 million in 2019 and \$208.2 million in 2020, despite laying off 400 people.⁴⁴

³⁹ Bicycle-sharing Systems across the United States of America - PAHO/WHO | Pan American Health Organization, <https://www.paho.org/en/documents/bicycle-sharing-systems-across-united-states-america> (last visited Apr 18, 2022).

⁴⁰ Lyft Becomes America's Largest Bikeshare Service, *supra* note 38.

⁴¹ Micro Mobility Revolution, *supra* note 28.

⁴² *Id.*

⁴³ Bird's SPAC Deal is Done: First Day on the NYSE Ends Virtually Flat, DOT.LA (2021), <https://dot.la/bird-stock-nyse-first-day-2655507173.html> (last visited Apr 2, 2022).

⁴⁴ A. Wilhelm & K. Korosec, *Bird's SPAC filing shows scooter-nomics just don't fly*, TECHCRUNCH, <https://social.techcrunch.com/2021/05/12/bird-rides-spac-filing-shows-scooter-nomics-just-doesnt-fly/> (last visited Apr 3, 2022).

These figures reflect in part an industry wide retraction in the wake of Covid, but also that running a micromobility system with dedicated fleets is very labor intensive, lacking the benefits of scaling associated with ride-share operations such as Uber. According to the NABSA report, private micromobility system operators identify their top three program costs as 1) recharging and rebalancing (i.e. moving bikes around to equalize distribution; 2) vehicle maintenance and repair; and 3) overhead costs (e.g. insurance, fees, etc.).⁴⁵ The upshot is that unit costs are high for shared micromobility, leading to small (or negative) per ride profit margins. Compounding this problem, the early Bird scooters were poorly made. As part of its open data policy, the city of Louisville, Kentucky, provided sharing data for Bird scooters in that city. According to an analysis of data between August to December of 2018, the average lifespan of a Bird scooter in Louisville was determined to be just 28.8 days—not long enough to pay for itself.⁴⁶ Recently, Bird has shifted to more of a franchise model, where it provides fleets of scooters to small operators to handle deployment and charging, thereby shifting the cost burden to those smaller operators.⁴⁷

Lime recently announced that it had raised \$523 million in debt financing, and intends to go public sometime in 2022.⁴⁸ In pursuing profitability, Lime has diversified its product offerings to include e-bikes, e-scooters, and now e-mopeds.⁴⁹ It has also focused on unit economics by developing more durable scooters in order to increase their average lifespan.⁵⁰

⁴⁵ 2020 Shared Micromobility State of the Industry Report, *supra* note 30.

⁴⁶ Alison Griswold, *Shared scooters don't last long*, QUARTZ (2019), <https://qz.com/1561654/how-long-does-a-scooter-last-less-than-a-month-louisville-data-suggests/> (last visited Apr 4, 2022).

⁴⁷ Wilhelm and Korosec, *supra* note 44.

⁴⁸ Andrew J. Hawkins, *Lime raises over \$500 million, confirms plans to take its electric scooter company public*, THE VERGE (2021), <https://www.theverge.com/2021/11/5/22764064/lime-electric-scooter-investment-public> (last visited Feb 25, 2022).

⁴⁹ *Id.*

⁵⁰ *Id.*

Lime has also introduced swappable batteries to reduce recharging costs.⁵¹ In contrast to Bird, Lime has actually had two quarters with positive EBITDA.⁵²

In the years since 2017, when the Birds first flocked to Santa Monica another significant trend has been consolidation within the shared mobility ecosystem. Uber led a \$170M investment round for Lime, and as part of the deal, Lime took over Uber's scooter business Jump.⁵³ As mentioned, Lyft took over Motivate to become the world's largest bikeshare provider; Bird acquired two competitors, Scoot and Circ, providing the company with new markets; and the scooter company Superpedestrian acquired the Zagster shared micromobility platform.⁵⁴

IV. Regulatory landscape

A. Overview

E-bikes and e-scooters in urban environments are governed by a patchwork of state and local regulations.⁵⁵ For shared micromobility companies, decisions about whether and how to enter a given market depend significantly on both understanding local regulations, and on working with local regulators to ensure a successful market entry. For municipalities, decisions about regulatory frameworks, enforcement strategies, and public-private partnerships reflect planning priorities that take into account existing transportation infrastructure, geographical and

⁵¹ R. Bellan, *For second time, Lime announces adjusted EBITDA-profitable quarter*, TECHCRUNCH (2021), <https://social.techcrunch.com/2021/10/18/lime-announces-second-ebitda-profitable-quarter-in-company-history/> (last visited Apr 4, 2022).

⁵² *Id.*

⁵³ Hawkins, *supra* note 48.

⁵⁴ Micro Mobility Revolution, *supra* note 28.

⁵⁵ State Electric Bicycle Laws | A Legislative Primer, (2021), Publication of the National Conference of State Legislatures. <https://www.ncsl.org/research/transportation/state-electric-bicycle-laws-a-legislative-primer.aspx> (last visited Feb 25, 2022).

sociological factors.⁵⁶ The rational development of such planning priorities ideally will involve community input, pilot programs, data collection (with associated privacy concerns), and equity considerations.⁵⁷

B. Classification

1. e-bikes

Low-speed e-bikes fit into one of three categories, the defining characteristics of which are provided in Table 1.⁵⁸ These categories also define how e-bikes are regulated in an ever increasing majority of states.⁵⁹ Class 1 e-bikes have been integrated into a number of bike share programs, including the Citi Bikes program in New York City (NYC).⁶⁰ Class 2 e-bikes are the preferred transportation mode for food delivery in New York City.⁶¹ Class 3 e-bikes are higher end products that appeal to a narrower audience of more affluent buyers.

Table 1. Classification scheme for low speed electric bikes.

<i>category</i>	<i>defining characteristics</i>
class 1	motor assists only when rider pedals; assistance provided up to 20 mph
class 2	motor may propel bicycle when rider is not pedaling; assistance up to 20 mph
class 3	motor assists only when rider pedals; assistance provided up to 28 mph

2. E-scooters

The term scooter can include everything from a child’s kick-scooter to a moped capable of highway speeds. With e-scooters, a primary distinction can be drawn between e-scooters that travel at less than 20 mph and (typically) have no seat, and electric mopeds, which have a seat and may travel at speeds in excess of 20 mph. However, there are no hard and fast classification

⁵⁶ NACTO Guidelines for Regulating Shared Micromobility, NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS, <https://nacto.org/sharedmicromobilityguidelines/> (last visited Feb 2, 2022).

⁵⁷ *Id.*

⁵⁸ State Electric Bicycle Laws | A Legislative Primer, *supra* note 55.

⁵⁹ *Id.*

⁶⁰ Meet the Citi Bike Bicycles: Built for Everyone | Citi Bike NYC, <https://citibikenyc.com/how-it-works/meet-the-bikes> (last visited Mar 30, 2022).

⁶¹ Jessica Coulon, *It’s Now Legal to Ride E-Bikes With Top Speeds of Under 25MPH in NYC*, BICYCLING, 2020, <https://www.bicycling.com/news/a32984364/nyc-legalizes-e-bikes/> (last visited Mar 30, 2022).

schemes, and as an extreme example, the Rion R90 is a standing scooter that reportedly has a top speed of 100 mph, which has been electronically limited to a mere 80 mph.⁶² For the purposes of this paper, e-scooters are considered as vehicles with handlebars but without pedals and a seat that travel at less than 20 mph.

C. Rules of the road

1. State and local regulations

The role of state and local regulations is aptly summarized in a white paper recently published by the National Conference of State Legislatures:

State traffic laws and vehicle codes remain the sole domain of states and state legislatures. In other words, the manufacturing and first sale of an e-bike or e-scooter is regulated by the federal government, but its operation on streets and bikeways lies within a state's control.⁶³

a. E-bikes

State laws for e-bikes vary significantly. Some states categorize e-bikes with mopeds and other motorized vehicles, require licensure and registration, and do not permit e-bikes to be used on facilities such as bike lanes or multi-purpose trails. Some states do not define e-bikes at all. Some states simply classify e-bikes as bicycles, governed by the same regulations as non-powered bicycles.⁶⁴

The three-tier classification scheme summarized in Table I has been adopted by a growing majority of states as a basis for regulating the operation of e-bikes. States that have adopted this scheme typically do not require e-bike registration, licensure, and insurance, thereby

⁶² Fastest electric scooter | Rion Motors | United States | Hyper scooter, RION MOTORS, <https://www.rionmotors.com> (last visited Mar 21, 2022).

⁶³ State Electric Bicycle Laws | A Legislative Primer, *supra* note 55.

⁶⁴ *Id.*

distinguishing e-bikes from other motorized vehicles such as mopeds. However, at least six states—including Massachusetts—require a driver’s license to operate an e-bike.⁶⁵

b. E-scooters

E-scooter laws are very much in flux, and vary from state to state. In some states, e-scooters are classified as mopeds, in others they are governed by the same regulations as e-bikes, and in more than a few e-scooters exist in a legal gray zone. E-scooters are also subject to a variety of municipal regulations. Regulations relate to maximum speeds, whether or not a driver’s license is required to operate, minimum age requirements, the need to wear a helmet, and whether e-scooters can be ridden on bike paths and highways.⁶⁶

2. Comparison of regulations and their effects in Boston Metro and New York City.

a. E-bikes

i. Boston Metro

In contrast to a growing majority of states, Massachusetts law does not discriminate between e-bikes and gas-powered motorized bikes, and makes no distinction among Class I, Class II and Class III e-bikes.⁶⁷ Rather, E-bikes are considered under the category of “motorized bicycle,” defined as:

... a pedal bicycle which has a helper motor, or a non-pedal bicycle which has a motor, with a cylinder capacity not exceeding fifty cubic centimeters, an automatic transmission, and which is capable of a maximum speed of no more than thirty miles per hour.⁶⁸

According to statute in Massachusetts, motorized bikes can only be operated by persons 16 years or older possessing a valid driver’s license or learner’s permit, and may not be operated

⁶⁵ *Id.*

⁶⁶ The Comprehensive Guide to Electric Scooter Laws, <http://www.unagiscooters.com/articles/the-comprehensive-guide-to-electric-scooter-laws> (last visited Mar 20, 2022).

⁶⁷ State Electric Bicycle Laws | A Legislative Primer, *supra* note 55.

⁶⁸ Mass. Gen. Laws. Part I, Title XIV, Chapter 90, Section 1, Definitions.

at speeds exceeding 25 mph. Protective headgear is required. Motorized bikes are allowed on public ways except where signs specifically prohibit bicycles. Motorized bikes are further allowed in bike lanes adjacent to public ways, but are specifically prohibited from off-street bike paths.⁶⁹

By constraining their useage, these restrictions inhibit e-bike integration into urban transportation systems. Specifically, because municipalities are bound by Massachusetts Commonwealth statutes, they are not in a position to regulate e-bikes in a less restrictive manner. According to a press release from the Metropolitan Area Planning Council (MAPC), the regional planning agency for Boston Metro:

While electric bikes are typically used similar to nonmotorized pedal bikes, statute current(ly) subjects electric bikes to more restrictive operating requirements. **This discrepancy causes regulatory challenges for municipalities looking to procure, permit, and actively promote use of electric bicycles on local roadways.**⁷⁰

By failing to update overly restrictive statutes Massachusetts has failed to adopt e-bike legislation appropriate to the increasing useage of e-bikes as a mode of transportation in Boston and surrounding areas. This situation has led to a disconnect between the law as written, and people's actual usage of e-bikes.⁷¹ Personally owned cargo e-bikes are used to ferry kids to school and extracurricular activities.⁷² Increasingly, class I and class III e-bikes are favored as commuting options.⁷³ Yet under existing state law, electric bikes are not allowed on Boston's network of cycling paths, including the Boston Esplanade cycling path that provides a key

⁶⁹ Mass. Gen. Laws. Title XIV, Chapter 90, Section 1B. Motorized bicycles; operations regulations.

⁷⁰ Elise Harmon, *Local leaders call for e-bike legislation*, MAPC (2022), <https://www.mapc.org/news/local-leaders-call-for-e-bike-legislation/> (last visited Apr 1, 2022).

⁷¹ Electric bikes taking hold without regulatory framework, <https://www.wbur.org/news/2022/03/31/electric-bikes-boston> (last visited Apr 25, 2022).

⁷² Taylor Dolven, *Increasingly popular e-bikes are everywhere — and live in a legal gray zone in Massachusetts*, BOSTONGLOBE.COM, October 21, 2021, <https://www.bostonglobe.com/2021/10/21/metro/increasingly-popular-e-bikes-are-everywhere-live-legal-gray-zone-massachusetts/> (last visited Apr 26, 2022).

⁷³ Electric bikes taking hold without regulatory framework, *supra* note 71.

commuting route towards downtown Boston.⁷⁴ Young people or others without driver's licenses are not allowed to legally use e-bikes at all.⁷⁵

As reported by WBUR, a local NPR station in Boston, one group pushing for reform of Massachusetts's law is the Boston Cyclist Union.⁷⁶ The group's executive director, Becca Wolfson, points out that cars can go 100 or 120 miles per hour, and yet we don't "ban them because that would be unsafe." Rather, "we post speed limits, we design infrastructure that manages people's individual speeds. We have social norms."⁷⁷

Wolfson goes on to point out that "we at minimum need to have this legal framework that is in line with the e-bikes that people are actually using . . . This legislation would allow municipalities to start feeling comfortable starting up e-bike sharing programs."⁷⁸

According to Boston Chief of Streets Jascha Franklin-Hodge, delivery services are another area where e-bikes could ease urban transportation woes. According to Franklin-Hodge, it is "fundamentally . . . ridiculous that we're using 4,000-pound fossil fuel vehicles to move a chicken sandwich . . . one or two miles through our very congested city."⁷⁹

Beyond encouraging ordinary citizens to be scofflaws, the legal gray area of electric bikes has hampered the efforts of regional officials to integrate e-bikes into urban transportation schemes, in particular the popular Bluebikes bikeshare system serving Boston Metro.⁸⁰ The Bluebike system, while run by Lyft, is jointly owned by the cities of Boston, Cambridge, Somerville, Everett, and Brookline. While Lyft "handles the system's day to day operation, the

⁷⁴ Mass. Gen. Laws. Title XIV, Chapter 90, Section 1B, *supra* note 65.

⁷⁵ *Id.*

⁷⁶ Electric bikes taking hold without regulatory framework, *supra* note 71.

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ *Id.*

⁸⁰ Dolven, *supra* note 72.

municipalities own the bikes and the station.” As a consequence, it is the municipalities that have control over the purchase of e-bikes.⁸¹

As reported in Streetsblog,⁸² according to a Boston Transportation Department spokesperson, among the reasons why the Bluebike municipalities have failed to integrate e-bikes into the Bluebike system are the following:

- (1) E-bikes are illegal on bike paths.
- (2) Municipalities are hesitant to spend the extra money on e-bikes, which are significantly more expensive than conventional bikes.
- (3) Equity issues arise since Lyft typically adds a surcharge for e-bike usage, making e-bikes less affordable for lower income individuals.

In the face of increasing pressure from local mayors and other municipal officials, legislation may finally be passed to update Massachusetts’s laws governing e-bikes (and e-scooters).⁸³ House Bill H.3457/Senate Bill S.2309 proposes to adopt the three-tiered classification scheme that is now operative in 42 other states, and—according to a letter in support of the bill by twenty mayors, managers, and local officials from sixteen Massachusetts municipalities—would allow cities and towns to effectively regulate electric bicycles and integrate them into regional and local transportation systems.⁸⁴ The bill would allow e-bikes to be ridden wherever non-motorized bikes are ridden, including on bike paths, but would empower municipal officials with authority to impose additional restrictions based on classification within the three-tiered system.⁸⁵ From the perspective of city planning, this approach would provide municipal officials with the flexibility to regulate the different categories of e-bikes in a manner

⁸¹ On Bluebikes, Batteries Won’t Be Included Anytime Soon, STREETSBLGMASS (2020), <https://mass.streetsblog.org/2020/09/08/on-bluebikes-batteries-wont-be-included-anytime-soon/> (last visited Apr 18, 2022).

⁸² *Id.*

⁸³ Harmon, *supra* note 70.

⁸⁴ *Id.*

⁸⁵ Bill S.2309, <https://malegislature.gov/Bills/192/S2309> (last visited Apr 1, 2022).

most appropriate to their needs, and in tune with the will of their constituencies.⁸⁶ With public input, both Boston and Cambridge continue with plans to build off-street bike paths, and more bike-friendly streets.⁸⁷ These plans promise a future for which parallel transportation infrastructure, combined with sensible municipal ordinances, places the needs of cyclists of all varieties on a more equal footing with those of “4000 pound fossil fuel vehicles.” But the inclusion of e-bikes and e-scooters in that future will be compromised until the Commonwealth adopts sensible legislation that provides municipalities the flexibility they need to regulate these electrified vehicles.

The Boston city council adopted a resolution supporting H.3457/S.2309.⁸⁸ According to an official communication from the city government reporting the resolution, the use of e-bikes “expands accessibility of biking to new audiences—particularly seniors, people with disabilities, and people traveling with children or transporting large loads.”⁸⁹ The communication goes on to note that “E-bikes . . . reduce dependence on single occupancy vehicles, reduce overall vehicle miles traveled, and lower aggregate carbon emissions in the transportation sector.”⁹⁰

While the integration of e-bikes into the Bluebike system will likely await changes in state-level legislation, Boston has already undertaken a pilot program in its Allston neighborhood

⁸⁶ Harmon, *supra* note 70.

⁸⁷ Go Boston 2030, BOSTON.GOV (2017), <https://www.boston.gov/departments/transportation/go-boston-2030> (last visited Apr 17, 2022); Cambridge Bicycle Plan 2020, <https://www.cambridgema.gov/en/Departments/communitydevelopment/2020bikeplanupdate> (last visited Apr 26, 2022).

⁸⁸ City Council Supports E-Bikes, BOSTON.GOV (2022), <https://www.boston.gov/news/city-council-supports-e-bikes> (last visited Apr 25, 2022).

⁸⁹ *Id.*

⁹⁰ *Id.*

to provide merchants with free food delivery by e-bike.⁹¹ According to Harper Mills, the pilot's program manager:

Our streets are not really set up to accommodate the frequency and amount of delivery vehicles that we see trying to stop at the curb, sometimes double-parked, stopped in bus lanes, bike lanes. . . . We need a better way to accommodate this demand.⁹²

With input from the public, both Boston and Cambridge have comprehensive plans to improve transportation systems, including more bike lanes, and better integration of micromobility with mass transit.⁹³ However, Boston, Cambridge, and other municipalities in Boston Metro await sensible legislation from the Commonwealth before they can reasonably develop municipal regulations appropriate for their longer term plans.⁹⁴

ii. New York City

Starting in 2017, the DiBlasio administration waged a war against food delivery workers, using a broad set of state and city laws, promulgated in response to Segway's influence, that banned not only the Segway, but also e-bikes, and e-scooters, from city streets.⁹⁵ According to the journalist John Seabrook, writing in the *New Yorker*, low income food delivery workers, mainly immigrants, were targeted with hundreds of five hundred dollar citations, and in some cases had their e-bikes confiscated.⁹⁶ The Deliver Justice Coalition, supported by local politicians, fought back, but lacked funding to effectively lobby Albany.⁹⁷ In the meantime, the

⁹¹ DoorDash? No, it's the City of Boston: A new e-bike pilot will seek to provide free delivery for Allston businesses, BOSTON.COM (2022), <https://www.boston.com/news/local-news/2022/03/11/door-dash-no-its-the-city-of-boston-a-new-e-bike-pilot-will-seek-to-provide-free-delivery-for-allston-businesses/> (last visited Apr 26, 2022).

⁹² *Id.*

⁹³ Go Boston 2030, *supra* note 87; Cambridge Bicycle Plan 2020, *supra* note 87.

⁹⁴ Harmon, *supra* note 70.

⁹⁵ John Seabrook, *The E-Scooters Loved by Silicon Valley Roll Into New York*, THE NEW YORKER, 2021, <https://www.newyorker.com/magazine/2021/04/26/the-e-scooters-loved-by-silicon-valley-roll-into-new-york> (last visited Mar 20, 2022).

⁹⁶ *Id.*

⁹⁷ *Id.*

status of pedal-assist e-bikes was clarified as exempt from the law, which allowed Citi Bikes, the city-approved bike sharing system to begin electrifying its fleet. But the full-throttle class 2 e-bikes favored by the delivery workers remained illegal.⁹⁸

It wasn't until the micromobility companies Bird and Lime, eyeing the lucrative New York market, but stymied by the same Segway-inspired legislation, began spending heavily on lobbying that Senate Bill 5294A was eventually passed that aimed to broadly legalize two-wheeled electric vehicles, including Class 1 and Class 2 e-bikes, as well as e-scooters. The bill passed the New York Assembly in 2019, but was vetoed by then-governor Andrew Cuomo, ostensibly due to the lack of a helmet mandate. But when, in the early days of the Covid lockdown, food delivery workers were hailed as heroes, Cuomo backed down on the helmet mandate for riders older than eighteen, and signed the bill in April of 2020.⁹⁹ In June of 2020, the New York City Council legalized all e-bikes with a top speed of up to 25 miles per hour.¹⁰⁰

In characteristic New York fashion, the new legislation's passage followed intensive political maneuvering, but the end result, for both e-bikes and e-scooters, at least provided a plan for regulating micromobility. The New York state law requires e-bikes to abide by all laws governing manual bicycles, and provides additional provisions specific to e-bikes.¹⁰¹ Key provisions include:

- 1) riders of e-bikes must be older than sixteen years of age;
- 2) e-bikes may not be operated on sidewalks, except as authorized by local ordinance;
- 3) no person may operate a class one or two e-bike in excess of twenty miles per hour;
- 4) no person may operate a class three e-bike in excess of twenty-five miles per hour;

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ Coulon, Jessica. 2020. "It's Now Legal to Ride E-Bikes With Top Speeds of Under 25MPH in NYC." *Bicycling*. <https://www.bicycling.com/news/a32984364/nyc-legalizes-e-bikes/> (March 30, 2022).

¹⁰¹ N.Y. Veh. & Traf. Law § 1242 (McKinney) Additional provisions applicable to bicycles with electric assist.

- 5) operating a class three e-bike outside of a city with a population of one million or more is prohibited (effectively limiting class 3 e-bikes to New York City);
- 6) bicycles shall have a permanently affixed manufacturer's label specifying e-bike class, maximum motor-assisted speed, and motor wattage.

The New York Department of Transportation provides handy summary of rules governing e-bikes and mopeds on its website.¹⁰²

While the path towards e-bike regulation in New York state may have been circuitous, the end result was at least uniform state legislation that allowed municipalities the freedom to locally regulate e-bikes within urban transportation systems. In New York City this means that, for the most part, e-bikes are treated like conventional bicycles, with additional restrictions depending on e-bike class. Delivery people can earn a better living by making more deliveries per hour, and commuters can more rapidly navigate city streets.

b. E-scooters

i. Boston Metro

In the summer of 2018, a flock of Bird scooters appeared in Boston Metro on the streets of Cambridge and Somerville, where they were promptly removed by city workers.¹⁰³ For awhile the scooters kept reappearing after being removed, but after both Cambridge and Somerville charged the company with blocking public sidewalks, and conducting business in public without a permit, the scooters just as rapidly disappeared.¹⁰⁴ Now, in 2022, compared to some other cities around the country, scooters are relatively scarce in the Boston area, being confined to private devices operating within the shadow of the law.

¹⁰² "NYC DOT - Electric Bicycles & More." <https://www1.nyc.gov/html/dot/html/bicyclists/ebikes.shtml> (February 25, 2022).

¹⁰³ Adam Vaccaro, *Rogue scooter company Bird flees Cambridge and Somerville — for now*, BOSTONGLOBE.COM, August 15, 2018.

¹⁰⁴ *Id.*

As of this date, e-scooters are not specifically regulated under Massachusetts law. Rather, they are lumped together with motorized scooters, with the following definition:

"Motorized scooter", any 2 wheeled tandem or 3 wheeled device, that has handlebars, designed to be stood or sat upon by the operator, powered by an electric or gas powered motor that is capable of propelling the device with or without human propulsion. The definition of "motorized scooter" shall not include a motorcycle or motorized bicycle or a 3 wheeled motorized wheelchair.¹⁰⁵

Among the operating regulations are that:

- (1) the rider must possess a valid driver's license or learner's permit;
- (2) the scooter not operate at a speed greater than twenty miles per hour;
- (3) the scooter be equipped with operational stop and turn signals;
- (4) the rider wear a helmet; and
- (5) riding is not permitted on separated bike paths.¹⁰⁶

Because most e-scooters are not outfitted with stop and turn signals, this law in effect makes most e-scooters illegal in Massachusetts.¹⁰⁷ Lime has indicated that once scooters are allowed, it hopes to bring them back to the Boston area.¹⁰⁸

ii. New York City

As discussed above, the shared micromobility companies Bird and Lime were heavily involved in drafting and lobbying for legislation legalizing electric micromobility devices, including e-scooters. The resulting legislation provided a legal framework for operating e-scooters, subject to modification by local municipalities according to their unique needs.¹⁰⁹ In New York City, e-scooters are now allowed on bike paths and on streets with speed limits of less than thirty miles per hour.¹¹⁰

¹⁰⁵ Mass. Gen. Laws. Part I, Title XIV, Chapter 90, Section 1. Definitions.

¹⁰⁶ Mass. Gen. Laws. Part I, Title XIV, Chapter 90, Section 1E. Motorized scooters; operation regulations.

¹⁰⁷ Adam Vaccaro, *Boston still waiting on scooter legalization*, BOSTONGLOBE.COM, January 25, 2020.

¹⁰⁸ *Id.*

¹⁰⁹ N.Y. Veh. & Traf. Law § 1281 (McKinney) Traffic laws apply to persons operating electric scooters; local laws. N.Y. Veh. & Traf. Law § 1282 (McKinney) Operating electric scooters. N.Y. Veh. & Traf. Law § 1284 (McKinney) Riding on roadways, shoulders, and lanes reserved for non-motorized vehicles and devices

¹¹⁰ "NYC DOT - Electric Bicycles & More." <https://www1.nyc.gov/html/dot/html/bicyclists/ebikes.shtml> (February 25, 2022).

V. Controlled Chaos: The Impact of Regulatory Restraints.

The private usage of e-bikes by food delivery workers was a staple of New York City life well before such usage was legal.¹¹¹ And it was chaos. Lacking proper infrastructure and operating in the shadow of the law, e-bikes jammed the sidewalks, rode against traffic in bike lanes and roadways, and generally added to the already not inconsiderable mayhem of city life. Despite the initial heavy handed approach of the DiBlasio administration, for low-wage delivery workers, the economics were clear—workers on e-bikes could earn thousands more per year using e-bikes compared to conventional bikes.¹¹² Food-delivery e-bikes were not going away. And yet strikingly, it took the confluence of a global pandemic and intense political pressure from an unlikely coalition of dockless scooter operators greedily eyeing the largest potential market in the country and political operatives representing the immigrant communities of the food delivery workers to finally get the New York legislature to pass comprehensive regulations governing e-bike and e-scooter usage, and then-Governor Cuomo to sign it into law.¹¹³

As a consequence, statewide laws in New York now provide a basic set of definitions and regulations that allow municipalities throughout the state to develop municipal ordinances based on their particular geographic, demographic, and equity needs. With clear guidance for the food delivery workers, the chaos calmed.

Aided by these regulatory guidelines, New York City has successfully integrated e-bikes into its bikeshare program, and is poised to introduce at least some e-scooters in pilot programs. In contrast, because Boston has not developed laws appropriate to regulate these relatively new

¹¹¹ Seabrook, *supra* note 95.

¹¹² *Id.*

¹¹³ *Id.*

technologies, Boston remains behind New York and most of the rest of the country, in terms of providing electrically enabled micromobility options.

A. Regulation of privately owned bikes, e-bikes, and e-scooters.

Privately owned e-bikes, and to a lesser extent e-scooters are regularly seen on separated bike paths in both New York City and Boston. Despite such usage being illegal in Boston, e-bikes in particular are increasingly popular.¹¹⁴ Compared to e-bikes, e-scooters have met with a more mixed reaction, with public sentiment ranging from enthusiasm to anger.¹¹⁵ Nonetheless, in Boston Metro, fines for violating e-bike and e-scooter regulations are low, enforcement is lax, and there is a growing consensus that current laws are outmoded.¹¹⁶

From the practical perspective of a private owner, the different regulatory restraints in Boston and in New York are of little consequence. In the former, usage is ahead of regulation, whereas in the latter, regulation conforms reasonably well to considerate usage.

B. Regulation of Shared Mobility Systems in Boston Metro and New York City

New York's Citi Bike system is the largest bikeshare system in the US, with a total of 20.6 million trips taken over the course of 2019¹¹⁷, and an annual membership of 144,981 as of

¹¹⁴ Dolven, *supra* note 72.

¹¹⁵ Let Boston try e-bikes and scooters, BOSTONGLOBE.COM, March 22, 2019, <https://www.bostonglobe.com/opinion/editorials/2018/10/20/let-boston-try-bikes-and-scooters/IkuVAQlXsgYxwDKpwIRJUO/story.html> (last visited Mar 20, 2022); Stefan Gössling, *Integrating e-scooters in urban transportation: Problems, policies, and the prospect of system change*, 79 TRANSPORTATION RESEARCH PART D: TRANSPORT AND ENVIRONMENT 102230 (2020).

¹¹⁶ Dolven, *supra* note 72; Vaccaro, *supra* note 107.

¹¹⁷ "NYC DOT - Bicyclists - Cycling in the City." July, 2020. <https://www1.nyc.gov/html/dot/html/bicyclists/cyclinginthecity.shtml> (April 4, 2022).

February, 2022.¹¹⁸ Boston’s Bluebikes is the fifth largest bike share program in the US.¹¹⁹ Since its inception in 2011, more than fifteen million trips have been taken by Bluebikes riders, with nearly three million trips taken in 2021 alone.¹²⁰

In contrast to the laissez-faire regulation of personal e-bikes and e-scooters, shared mobility systems in Boston Metro and in New York City are tightly constrained in their operation first by state law and then by the municipal governments of their operating cities. In exchange for these constraints, Lyft operates as an effective monopoly in both Boston Metro and New York City. Historically, in both metropolitan areas, other microbility systems, be they docked or dockless, have been excluded. A distinction between the two systems is that whereas in New York, Lyft owns and operates the system, with no city funding, and no direct control of day-to-day activities,¹²¹ in Boston Metro, the system is owned by the municipalities of Boston, Cambridge, Somerville, Everett, Salem, and Brookline.¹²² But that distinction aside, both systems are tightly regulated by municipal authorities.

State legislation has played a profound role in the ability of Boston Metro and New York City to adopt e-bike and e-scooter technology. As discussed above, for New York City, e-bikes and e-scooters are regulated under state laws and municipal ordinances in a manner that allows them to be ridden wherever non-motorized bicycles are allowed. The clarity provided by New York laws and augmentation by ordinances allowed e-bikes to be integrated into the Citi Bike

¹¹⁸ “Citi Bike Monthly Operating Reports.” *Citi Bike NYC*. <http://ride.citibikenyc.com/system-data/operating-reports> (April 4, 2022).

¹¹⁹ Malouff, Dan. January 26, 2017. Greater Greater Washington. “All 119 US Bikeshare Systems, Ranked by Size.” <https://gwwash.org/view/62137/all-119-us-bikeshare-systems-ranked-by-size> (February 25, 2022).

¹²⁰ Bluebikes System Data, BLUE BIKES BOSTON, <http://www.bluebikes.com/system-data> (last visited Apr 30, 2022).

¹²¹ Andrew J. Hawkins, *Citi Bike to triple in size, thanks to \$100 million from new owner Lyft*, THE VERGE (2018), <https://www.theverge.com/2018/11/29/18118057/citi-bike-lyft-triple-size-100-million-investment-nyc> (last visited Apr 30, 2022).

¹²² About, BLUE BIKES BOSTON, <http://www.bluebikes.com/about> (last visited May 1, 2022).

system as early as 2018.¹²³ Moreover, with clear constraints placed by state law, the NY DOT is now moving ahead with a pilot program bringing dockless e-scooters by Lime, Bird, and Veo to “transit deserts” in the Bronx, the Rockaways in Queens, and the North Shore of Staten Island.¹²⁴ So far the city has purposely “controlled the chaos” by avoiding overlap with the Citi Bike system. The system uses dockless scooters, with geotagged corrals on busier thoroughfares.¹²⁵

In contrast, as discussed above, the regulation of e-bikes as motorized bikes, restricted from using bike paths, has been a key factor limiting the integration of e-bikes into the Bluebike system.¹²⁶ Despite support from the Boston City Council, and from officials in the towns of Arlington, Bedford, Boston, Cambridge, Chelsea, Everett, Lexington, Medford, Melrose, Natick, Newton, Salem, Somerville, Stoneham, Wakefield, and Winchester, the Commonwealth has so far failed to pass legislation (pending as H.3457/ S.2309) to update e-bike and e-scooter regulations.¹²⁷ According to the MAPC:

The bill’s passage would allow cities and towns to regulate the use of electric bicycles, proactively include them in local transportation plans, and integrate them into the region’s transportation network.¹²⁸

In the meantime Boston Metro lags behind New York and much of the rest of the country in integrating e-bikes into their shared mobility transportation systems.

Again in contrast to the permissive effect of state legislation in New York, e-scooters in Massachusetts are not allowed to operate on off-street bike paths, and as most are currently

¹²³ Seabrook, *supra* note 95.

¹²⁴ Hawkins, Andrew J. 2021. “New York City Selects Bird, Lime, and VeoRide for Its Coveted e-Scooter Pilot.” *The Verge*. <https://www.theverge.com/2021/4/14/22383976/nyc-scooter-permit-selection-lime-bird-veoride> (February 25, 2022).

¹²⁵ “Is There Room for E-Scooters in New York City?” 2021. *Bloomberg.com*. <https://www.bloomberg.com/news/features/2021-09-17/e-scooters-vie-for-space-on-nyc-s-crowded-streets> (February 25, 2022).

¹²⁶ On Bluebikes, Batteries Won’t Be Included Anytime Soon, *supra* note 81; Dolven, *supra* note 72; Harmon, *supra* note 70.

¹²⁷ Harmon, *supra* note 70; City Council Supports E-Bikes, *supra* note 88.

¹²⁸ Harmon, *supra* note 70.

configured (i.e. without operational stop and turn signals), are altogether banned under Massachusetts law.¹²⁹ Despite initial failed attempts to enter the market, including some pilot programs, there are currently no shared scooter systems operational in the Boston area.¹³⁰

VI. Equity in Micromobility Systems

High-income earners are over-represented among shared micromobility users compared to low income earners.¹³¹ Ridership tends to skew young, white, and male.¹³² In large part, this reflects the preference of micromobility companies to cluster in wealthier downtown neighborhoods.¹³³ Yet a recent study of Citi Bike ridership in New York found that among first year bikeshare members, those with lower incomes (with incomes less than \$25,000) were nearly four times more likely to become frequent users compared to people with incomes of greater than \$200,000, suggesting a significant unmet market.¹³⁴ However, for startups interested in attaining profitability, equity concerns may be secondary.¹³⁵ Nonetheless, according to NABSA a growing number of shared micromobility companies now have equity programs including discounts, education and outreach, equitable hiring, and adaptive vehicles.¹³⁶ In the spirit of the engineer Luud Schimmelpennink, at least two technologically oriented startup companies appear

¹²⁹ Vaccaro, *supra* note 107; Mass. Gen. Laws. Part I, Title XIV, Chapter 90, Section 1E. Motorized scooters; operation regulations.

¹³⁰ Vaccaro, *supra* note 107.

¹³¹ 2020 Shared Micromobility State of the Industry Report, *supra* note 30.

¹³² *Id.*

¹³³ Operationalizing Equity in Scooter and Bike Share, BETTER BIKE SHARE (2021), <https://betterbikeshare.org/2021/09/21/operationalizing-equity-in-scooter-and-bike-share/> (last visited Apr 4, 2022).

¹³⁴ Kathleen H. Reilly, Philip Noyes & Aldo Crossa, *From non-cyclists to frequent cyclists: Factors associated with frequent bike share use in New York City*, 16 JOURNAL OF TRANSPORT & HEALTH 100790 (2020).

¹³⁵ Operationalizing Equity in Scooter and Bike Share, *supra* note 133.

¹³⁶ 2020 Shared Micromobility State of the Industry Report, *supra* note 30.

to have made equity a part of their company culture, and have since inception offered discount programs, and developed micromobility technologies for people with disabilities.¹³⁷

Municipalities can play an encouraging role by including equity requirements in contracts with micromobility providers. In the recent NYC-DOT scooter pilot project in the Bronx, 80% of the population is Black or Latino. As dictated by their contract with the city, all three shared scooter providers (Bird, Lime, and Veo) are offering discounted rates for riders on public assistance, and accessible vehicle options including seated scooters and wheelchair attachments.¹³⁸ The three companies have also hired locally, and have agreed to consumer and labor protections.¹³⁹

It is also a hopeful sign that companies such as Superpedestrian and Spin appear to recognize the responsibilities inherent in their positions as providers within a public transportation ecosystem. As Paul White, the senior director of public affairs at Superpedestrian expressed it:

Shared micromobility operates in the public right of way and only with the permission of cities—anything inclusive or unaffordable runs counter to city values. Doing right by equity requires a fundamental understanding that we’re not tech companies, we’re more like a public transportation service and therefore, we have a responsibility to serve everyone.¹⁴⁰

VII. Conclusion: Achieving Liveable Cities with Diverse and Equitable Transportation Options

The dropping of white bikes in Amsterdam ignored legal ramifications and eventually led to a world-wide embrace of bikesharing programs. The flocking of Bird scooters to Santa Monica created chaos, and led to hundreds of thousands of dollars in fines, but paved the way for

¹³⁷ Operationalizing Equity in Scooter and Bike Share, *supra* note 133.

¹³⁸ DOT Press Releases - NYC DOT Announces Launch Date of E-Scooter Pilot in the East Bronx, <https://www1.nyc.gov/html/dot/html/pr2021/pr21-030.shtml> (last visited Apr 4, 2022).

¹³⁹ *Id.*

¹⁴⁰ Operationalizing Equity in Scooter and Bike Share, *supra* note 133.

the adoption of shared e-scooters as a viable transportation mode. The usage of e-bikes by low-wage workers in New York City flaunted the law, but eventually led to enabling legislation for municipalities across New York State. In short, each of these legally dubious provocations pushed authorities and led on balance to positive change.

It has been argued that traditional “hard law” systems based on statutes and regulations react too slowly to effectively govern emerging technologies.¹⁴¹ Such technologies develop too rapidly, and are too rapidly adopted to be readily policed by traditional legal systems. Rather, a “soft-law” approach based on anticipatory governance has been proposed as a way to rapidly adapt to rapidly changing technologies.¹⁴² As a measure of the ossified response of traditional legal systems, it took a global pandemic and intensive lobbying for New York to finally modernize its laws to allow electrified micromobility vehicles in the form of e-scooters and e-bikes. The progressive city of Boston is still unable to integrate these green solutions into its overburdened transportation system. But a whole range of electrified vehicles could adapt—with existing engineering technology—to the unique challenges of urban transportation systems, including not just e-bikes and e-scooters, but also autonomous cabs, micro-cars, and high speed bikes. What will the legal status of such vehicles be? Can we adapt our legal structures rapidly enough to govern them, before the next technological advance arrives? Or will we, bogged down by inflexible rules, remain wedded to “4000 pound vehicles,” personally owned and operated, electrified perhaps, but still clogging city arteries and diminishing urban quality of life?

For progress to be achieved, certain provocations may be required, a certain willingness to challenge the rules, to drop white bikes, or electrified scooters on the sidewalks, and to let the

¹⁴¹ Ryan Hagemann, Jennifer Huddleston & Adam Thierer, *Soft Law for Hard Problems: The Governance of Emerging Technologies in an Uncertain Future*, 17 COLO. TECH. L.J. (2018).

¹⁴² *Id.*

law catch up. But, such provocation cannot be an end unto itself. Beyond any provocation, there must be a willingness of stakeholders to work together to push change forward—just as Luud Schimmelpennink worked within the system to help establish the earliest successful bikesharing systems, and Lime and Bird helped draft and lobby for the laws allowing e-bikes and e-scooters in New York.

As the examples of New York and Boston Metro illustrate, the process for integrating micromobility into urban transportation systems is ongoing, and will likely continue to comprise “controlled chaos.” But progress has been made. And to quote Bill McKibben, “The Future is Electric.”¹⁴³

¹⁴³ Bill McKibben, *The Future Is Electric*, NEW YORK REVIEW OF BOOKS, <https://www.nybooks.com/articles/2021/11/04/the-future-is-electric/> (last visited May 1, 2022).