Local Policies for Better Micromobility

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16. Abstract
This report highlights key themes from a series of ten interviews with U.S. cities with micromobility programs in their jurisdictions (Atlanta, GA; Austin, TX; Chicago, IL; District of Columbia; Denver, CO; Los Angeles, CA; Oakland, CA; Portland, OR; San Diego, CA; Seattle, WA). The research aims to shed light on both the regulatory process and identify best practices for dockless bike and scooter sharing policy. The following themes emerged among the cities interviewed: a) Data-sharing requirements for scooters and dockless bikes are critical for evaluation and monitoring for compliance with policies like equitable distributional requirements; b) Clear parking regulations for dockless bikes and scooters must balance flexibility and preserve community space ; c) Fines are effective tools to reduce bad behavior from users of micromobility devices, e.g., incorrect parking, or reckless riding behavior; and d) Clear classifications of micromobility devices will allow cities to target guidance and update regulations over time to improve clarity and outcomes. Finally, the paper concludes that more research is needed to refine these findings in this new and rapidly growing micromobility marketplace.

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The Pacific Southwest Region UTC conducts an integrated, multidisciplinary program of research, education, and technology transfer aimed at improving the mobility of people and goods throughout the region. Our program is organized around four themes: 1) technology to address transportation problems and improve mobility; 2) improving mobility for vulnerable populations; 3) improving resilience and protecting the environment; and 4) managing mobility in high growth areas.

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Disclosure

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Abstract

This report highlights key themes from a series of ten interviews with U.S. cities with micromobility programs in their jurisdictions (Atlanta, GA; Austin, TX; Chicago, IL; District of Columbia; Denver, CO; Los Angeles, CA; Oakland, CA; Portland, OR; San Diego, CA; Seattle, WA). The research aims to shed light on both the regulatory process and identify best practices for dockless bike and scooter sharing policy and identified the following five key findings: a) Data-sharing requirements for scooters and dockless bikes are critical for evaluation and monitoring for compliance with policies like equitable distributional requirements; b) Clear parking regulations for dockless bikes and scooters must balance flexibility and preserve community space ; c) Fines are effective tools to reduce bad behavior from users of micromobility devices e.g., incorrect parking, or reckless riding behavior; and d) Clear classifications of micromobility devices will allow cities to target guidance and update regulations over time to improve clarity and outcomes; Finally e) Cities are following a limited pilot (fewer provider) approach, while fewer are proceeding with open-competition and unlimited licensing. We conclude that more research is needed to refine these findings in this new and rapidly growing micromobility marketplace.

Local Policies for Better Micromobility

Executive Summary

To better understand the landscape of micromobility regulation and the effectiveness of different policies and regulatory processes, we interviewed regulators from ten different cities across the United States. Our structured interviews were designed to gather information about five aspects of micromobility's adoption and regulation in their cities: 1) general thoughts on micromobility; 2) micromobility's introduction and initial regulation; 3) the state of micromobility and its regulation at the time of the interview; 4) the future of micromobility and its regulation; and 5) the impacts of COVID-19 on micromobility.

The ten case study cities included in this report (Atlanta, GA; Austin, TX; Chicago, IL; District of Columbia; Denver, CO; Los Angeles, CA; Oakland, CA; Portland, OR; San Diego, CA; Seattle, WA) vary considerably along several metrics, including land use types and regulatory approaches. While these interviews are far from representative, and cannot reflect every city type, or every approach, these interviews provided a detailed and wide-ranging survey of the micromobility policy landscape. This detailed survey of various approaches will help regulators identify and compare strategies that fit best with their locality's characteristics and priorities. Furthermore, our interviews identified common concerns, including the need for improved regulatory flexibility and a lack of clear authority in the regulatory process.

Policy Best Practices

- Among our sample there was consensus that data-sharing requirements is a top priority and is critical for evaluation and monitoring for compliance with policies like distributional requirements.
- While parking policies vary, there is some agreement that clear dockless micromobility parking regulations can be beneficial, despite flexibility tradeoffs (although specific policies should reflect community preferences).
- Fines for incorrect dockless device parking and reckless or improper usage are an agreed-upon policy to influence better multi-modal integration and safer use (but adoption and implementation of this approach was not tested in this study).
- Clear classifications of micromobility devices will allow cities to target guidance and update regulations over time to improve clarity and outcomes.
- A structured pilot model was ranked the highest among our sample by city staff. This approach restricts participation to fewer providers and requires cities to choose the companies that will participate in the pilot. The alternative is an open-competition and or unlimited licensing approach, which was ranked less favorable. The least favorable is the rogue or unauthorized approach.

Cities in our sample ranked their experiences with micromobility on a five-point scale (5 = best) with some interesting findings. Overall, the average city ranking was a middling experience

(3.00) with slightly better experiences with pilots (3.58) and higher optimism for the future of micromobility (3.85). Ranking experiences during the early phase, what we refer to as the "introduction experience" shows favor for those cities who pilot (3.40) compared to those who have more open licensing systems (2.50). This difference is even larger between cities with a "competitive" pilot versus an "open" pilot (4.00 vs. 2.50).

The two cities that had an open pilot (Chicago and Denver) had marginally better average experiences (4.0) with their pilot than the cities with competitive pilots (DC, LA, Portland, and Seattle) with an average score of (3.38). Unsurprisingly, cities that reported a "rogue" or "unauthorized" launch of e-scooters saw the lowest experiential scores (2.13) versus those with a coordinated launch (3.70).

Given our small sample size, the experiential scores are not conclusive, but suggestive of some quality micromobility policy. This research goes beyond self-evaluation of micromobility policy, but also includes the *process* for regulatory compliance, as well as identifying best practices for *interacting* with micromobility companies. Our results should be particularly useful for cities in the Pacific Coast Region as they seek to leverage micromobility as a way to help the state meet its climate goals. Focusing regulations on reducing the negative consequences of micromobility, and expanding the benefits is an obvious goal of all policy makers. For micromobility, this is critical to their success in expanding access to public transit and other low- or zero-emission transportation modes.

Introduction

Micromobility services such as shared e-bikes and e-scooters have expanded rapidly over the past several years in urban areas, improving access to transit and providing fun alternatives to driving. Expansion in some cities has been too fast for local governance and infrastructure to keep up, creating some controversies. In many cities, there has been a great deal of attention placed on the lack of supportive parking infrastructure for shared bikes and scooters, which led to instances of improperly parked vehicles blocking sidewalks or vehicle priority lanes. This parking issue is in most cases a minor public nuisance, but it can raise a more significant hazard for people with disabilities. Furthermore, a lack of dedicated traffic lanes has led to some safety hazards when micromobility services interfere with automotive or pedestrian traffic. Some cities have dealt with these problems by simply banning micromobility services outright, causing frustration for residents who feel deprived of the benefits that these services can offer. Moreover, policies surrounding micromobility vary widely in scope and stated aims. For example, some cities have lock-to requirements (a requirement to lock the device to an object to end a ride) while others have drop zones (areas where a device must be left to end a trip) and others have general right-of-way requirements (devices are not to be left in, for example, the middle of sidewalks).

Given that the rapid growth of micromobility, especially e-scooters, seems poised to continue, there is a distinct need to understand which policies are most effective in maximizing the benefits and minimizing the costs of micromobility services. There is also a need to understand how different micromobility policies affect broader transportation systems, and for strategies to ensure policy consistency across jurisdictional boundaries. To date, there have been few studies that examine local government approaches to regulating micromobility services, summarized below. Our interviews focused on:

1. Safety and right-of-way management
2. Flexibility and authority for agencies regulating micromobility
3. Increasing access among low-income and disadvantaged users
4. Incorporating micromobility into existing transit systems
5. Managing preemption concerns

Literature Review

Micromobility, at least in its newest iteration as dockless sharing devices, is relatively new as a subset of transportation options. The most important literature so far in this nascent field is the foundational reviews of the landscape of policies governing micromobility across the United States. In chronological order, these are DuPuis et al. (2019), Fang et al. (2019), and Anderson-Hall et al. (2020), and Janssen et al. (2020).

Overall, these foundational studies survey micromobility penetration and regulation across the US. All four suggest that current regulation is both confusing and often ineffective and

inefficient. Specifically, DuPuis et al. (2019) identify the general challenges and opportunities presented by micromobility, namely safety, curb-space management, and first and last mile usage. This work also reviews policies from six cities (San Francisco, Washington DC, New York City, Kansas City, Norfolk, and Los Angeles) with relatively different approaches. Dupuis makes several general policy recommendations, including an expanded focus on trip-data sharing plans, equity, and, importantly, the use of pilot programs to test policies and regulations. Specifically, they recommend that cities require data-sharing, implement policies like regional balancing (requiring devices to be spread across different geographical areas that are often segregated by race, ethnicity, and income) and have low-income plans and cash-based options, and, at first, use pilots to test various policies and regulations. Similarly, Anderson-Hall et al. (2020) identifies various approaches across six different cities and also identifies seven different "regulatory dimensions'' on which micromobility could be managed or influenced.

Most important to note, however, is the exceedingly thorough review conducted by Fang et al. (2019) which covers all 50 states, 101 cities, and 20 college campuses. This research not only identifies specific regulations within all of these entities but uses this information to highlight the confusing, disjointed, and patchwork nature of micromobility regulation. For example, various micromobility devices fit both the definition of a vehicle *and* a pedestrian in many US states, thus possibly making users subject to contradictory and conflicting regulations. Simply put, the state of micromobility regulation at the time of publication (and arguably at the time this is written) is confusing, inconsistent, and unnecessarily burdensome.

Finally, Janssen et al. (2020) expands on this research by conducting an over-time analysis of ten mid-sized cities on twelve policy dimensions. They find that, across these ten cities, there has been wide-ranging policy agreement across device removal, safety and speed limits. There is also agreement relating to operating bonds, which are typically formal agreements between cities and operators about content and duration of access to city infrastructure. Where there has been disagreement, however, there has also been movement towards a consensus regarding policies aimed at increasing equity, parking regulations, and the expansion of approved fleets. While this research is able to identify policies and their change over time, they are unable to assess the effectiveness or success of older versus newer policies. However, Janssen et al. did include rankings based on their Bicycle Friendly Community ranking provided by the League of American Bicyclists, identifying that Austin, Denver, Louisville, and Seattle are cities with a higher "mobility status", with policies that are more friendly to bicycling and walking.

Other research has focused on specific policy recommendations with Shaheen and Cohen (2019) developing and recommending a policy toolkit for micromobility regulations and Johnston et al. (2020) assessing the equitability of e-scooter access and making policy recommendations for improving it. Shaheen and Cohen survey many current policy dimensions including curb space management, enforcement, pilot programs, and data standards. Importantly, they identify key policy options and factors that these regulations should consider, such as equity and data sharing. Johnston et al. provide analysis of equity and access to

micromobility and how to increase both in five cities. This research not only identifies current inequities in micromobility access, but also how historical legacies of institutional racism compound these inequities. Finally, the authors identify policies aimed at increasing equitability such as distribution requirements, discounted pricing, alternative payment and activation options, and community engagement.

Overall, research has been focused on the implemented policies and how they have evolved, while also making recommendations for future improvements. However, above and beyond the general dearth of research on this new travel option, there has been a distinct lack of research on how cities have decided upon regulations and how their interactions with micromobility companies have informed or influenced that decision-making process.

City Selection

Having surveyed the academic literature regarding micromobility policy, as well as news articles, the following cities (Table 1) were identified as potential candidates for surveying based on their policies and penetration of micromobility. Highlighted in blue are those that were selected for surveying. The selection criteria prioritized obtaining a sample that was diverse in population size degree of regulation, geographic location and micromobility penetration (while not included in Table 1).

Degree of Regulation

The “degree of regulation” categories in Table 1 are not comprehensive or determined by a rigorous calculus, but instead give a general description of the regulations surrounding dockless e-scooters and bikes. The three categories (permissive, mixed, and restrictive) range from fewest number of regulations to most regulations. These regulations include, but are not limited to, night-riding bans, caps on numbers of devices, lock-to or other parking requirements, geographical restrictions (e.g., no scooters allowed in the central business district of Chicago), and competitive/limited pilots. Permissive locations, such as Austin, TX, had very few of these regulations. Mixed locations, like Los Angeles, had some permissive regulations in certain zones (e.g., geofencing) with some more restrictive locations. Chicago, had relatively more restrictive regulations covering much of the city. Importantly, we make no normative judgement regarding these regulations, or the absence of them, we simply used these categories for the selection of a diverse set of cities, and to make observations about the different regulatory approaches.

Table 1. Cities Examined and Identified for Interviews by Regulatory Type and Micromobility Penetration (Information updated in May 2021)

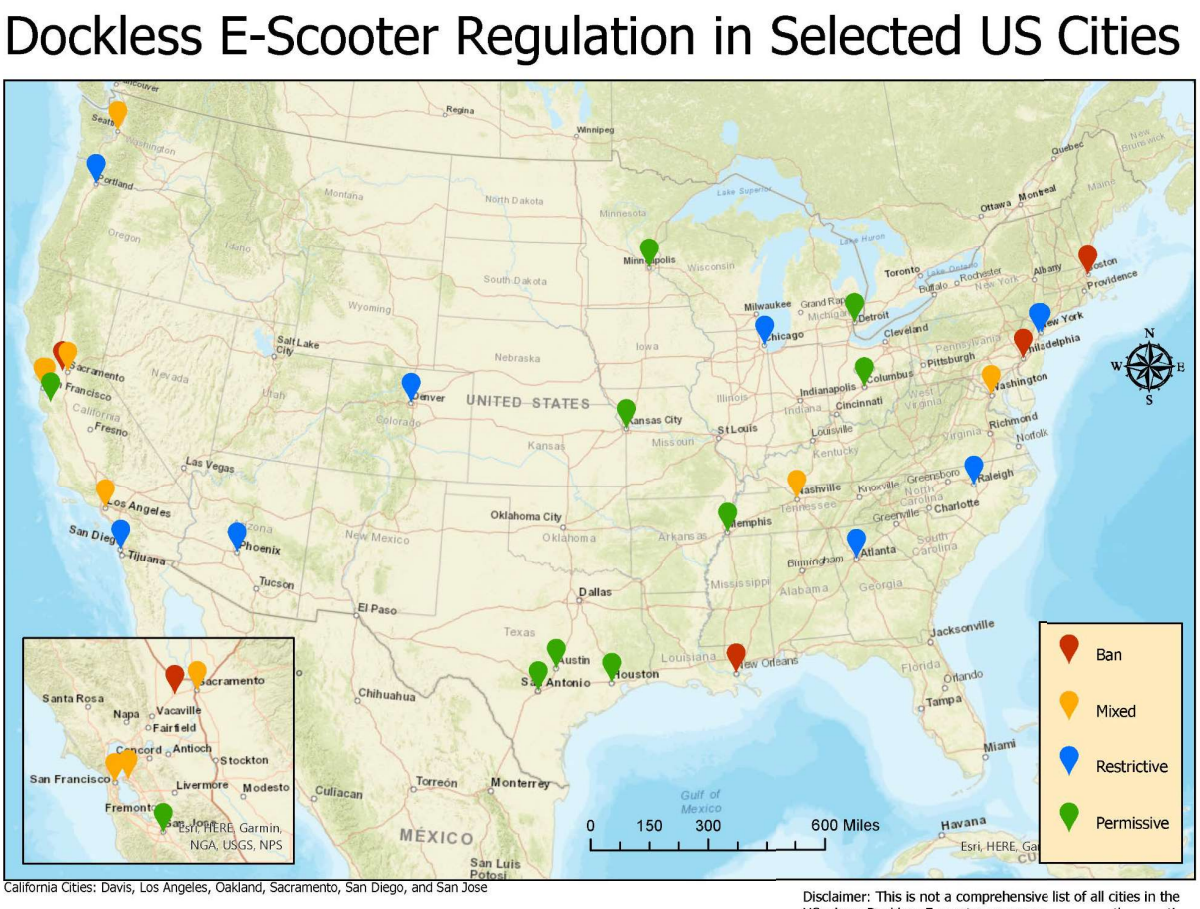
City	Degree of regulation (Scooters)	Degree of regulation (Dockless Bikeshare)	Micromobility Penetration
Atlanta, Georgia	Restrictive	Restrictive (night ban)	Medium (4.5k scooters, 1k e-bikes)
Austin, Texas	Permissive	Permissive	Very High (~10k devices)
Boston, Massachusetts	Ban	Permissive	Temporary Ban, low bike share outside of the city (Lime pulled out in 2020)
Chicago, Illinois	Restrictive	Restrictive/Ban	High (~10k devices)
Columbus, Ohio	Permissive	Permissive	Medium
Davis, California	Ban	Permissive	None (Jump/Lime pulled out)
District of Columbia	Mixed	Permissive	High (~10k e-scooters, ~4k e-bikes)
Denver, Colorado	Restrictive	Permissive	Medium (~3k e-scooters, ~600 e-bikes)
Detroit, Michigan	Permissive	Unknown, no dockless	Unknown
Houston, Texas	Permissive	Permissive	Unknown
Kansas City, Missouri	Permissive	Permissive	High
Los Angeles, California	Mixed	Mixed	High (37,000 devices)
Memphis, Tennessee	Permissive	No dockless, docked city (Explore)	Medium, Lime leaves Bolt joins
Minneapolis, Minnesota	Permissive	Mixed	High
Nashville, Tennessee	Mixed	Unknown	Unknown
New Orleans, Louisiana	Ban	Ban	State ban

City	Degree of regulation (Scooters)	Degree of regulation (Dockless Bikeshare)	Micromobility Penetration
New York City, New York	Restrictive	Restrictive/Ban	Low (3k e-scooters)
Newark, New Jersey	Restrictive	Restrictive	Low (2k e-scooters)
Oakland, California	Mixed	Docked city, adding dockless (through city)	High
Philadelphia, Pennsylvania	Ban	Ban	State ban
Phoenix, Arizona	Restrictive	Permissive	Unknown
Portland, Oregon	Restrictive	Permissive	Medium
Raleigh, North Carolina	Restrictive	Restrictive	Low (~750 e-scooters)
Sacramento Region, California	Mixed	Permissive	High
San Antonio, Texas	Permissive	No dockless, docked city	Medium
San Diego, California	Restrictive	Restrictive	Medium (~6.4k e-scooters)
San Francisco, California	Mixed	Permissive	High
San Jose, California	Permissive	Permissive	High
Seattle, Washington	Pilot program	Permissive	Medium (~5k devices)

Note: Cities highlighted in blue were selected for surveying so as to have a set of cities that were diverse across regions, population sizes, and micromobility policies and penetration.

For further illustrative purposes, Figure 1 displays a map of the continental United States highlighting the reviewed cities and listing their degree of regulation of dockless e-scooters.

Figure 1. Map of Dockless E-Scooter Regulation in Selected US Cities



Interview Details and Design

We conducted interviews from April 2020 to February 2021 with those in charge of regulating micromobility, or specifically e-scooter programs in a given city. Occasionally, we also received information about regional policies and their interaction with city-level regulation in a few cities. Our interview structure was flexible with branching options given the broad options that were available to cities. For example, the interview was designed such that if a city utilized an initial pilot, we could probe for information concerning the decision--making surrounding the policies of the pilot and its results whereas if a city instead banned devices or allowed immediate licensing we could probe about those specific experiences. We did, however, have consistent questions that were asked of all interviewees including their perceptions of micromobility currently and its prospects in its incorporation into their city. Furthermore, we had questions that highlighted the major policies each city had enacted, like data-sharing, lock-

to (requiring devices to be locked to an object when a ride is finished), vehicle parking policies and equity requirements.

In order to assess experience, we asked three quantitative questions (on a 1–5 scale, 1 being the worst (most pessimistic) and 5 being the best (most optimistic) about cities' experiences with the introduction of micromobility, their experience with their micromobility pilot (if applicable), and their optimism/pessimism about the future of micromobility in their city, respectively. The means of these various questions are reported in Table 2, for the entire sample and substantively important subsets; the exact question wordings can be found in the appendix. Importantly, while these questions help to shed some light on the different experiences and perspectives cities have in respect to micromobility, the small sample size of 10 does not allow us to draw any statistical conclusions related to these differences.

Table 2. Means of Quantitative Questions by Important Categories

	Experience with Introduction of Micromobility (1-5)	**Experience with Pilot (1-5)**	**Optimism-Pessimism about Future of Micromobility (1-5)**
Mean of All Cities (n=10)	3.00 (1.09)	3.58 (0.58)	3.85 (0.85)
Mean of Cities w/ Licensing (n=4)	2.50 (0.58)	NA	3.88 (0.85)
Mean of Cities w/ Pilot (n=6)	3.40 (1.29)	NA	3.83 (0.93)
Mean of Cities w/ Limited/Competitive Pilot (n=4)	4.00 (1.00)	3.38 (0.48)	3.63 (1.11)
Mean of Cities w/ Open Pilot (n=2)	2.50 (1.41)	4.00 (0.71)	4.25 (0.35)
Mean of Cities w/ Rogue Launch (n=5)	2.13 (0.63)	4.00 (0.71)	4.30 (0.57)
Mean of Cities w/ Coordinated Launch (n=5)	3.70 (0.84)	3.38 (0.48)	3.40 (0.89)

Note: Standard Deviations are reported in parentheses in each cell. Atlanta, Austin, Denver, Los Angeles, and San Diego had rogue launches, whereas Chicago, DC, Oakland, Portland, and Seattle had coordinated launches.

Overall, the descriptive statistics shown in Table 1, demonstrate that on average cities had middling experiences with the introduction of micromobility (3.00). Cities that had structured pilot programs[1] had slightly better experiences (3.58) and higher optimism for the future of micromobility (3.85). While these differences are slim and the sample size is small, this finding does show a mild preference from city staff for the pilot model. When quantifying the city staff's experience with the introduction of micromobility into their city, cities with "immediate licensing," who provided permits to a larger number of applicants, ranked their experience as lower (2.5)[2], and those with a more structured pilot had slightly more favorable than average experiences (3.40). However, within the pilot group we witness the largest experiential difference; cities with a competitive pilot had an average positive experience (4.0) versus an open pilot (2.50). Cities with a rogue/unauthorized e-scooter launch were the least enthusiastic about the experience (2.13) versus those with a coordinated launch (3.70).

General Trends in Micromobility Policy

Given the structure of our interviews, focusing both on the appearance and initial regulation of micromobility and the current/near-future state of micromobility, we identified general trends that correspond to nearly all of our cities interviewed. Overall, we identified two trends within the introduction of these devices *piloting* and *immediate licensing*, and two more within the current and near-future regulation of these devices, *partnership* and *open-competition*.

The overall takeaways from these responses are that 1) cities with pilots and coordinated launches had a better experience with the introduction of micromobility, 2) cities with open pilots had better experiences with their pilots than those with closed pilots, 3) there is no discernable difference in the optimism/pessimism for the future of micromobility between cities with pilots and those with immediate licensing, and 4) perhaps counterintuitively, cities that had rogue launches are more optimistic about the future of micromobility than cities that had coordinated launches.

Trends in Introduction of Micromobility Devices

Use of Pilots for Introduction

The most common trend with the introduction of micromobility was cities opting to use a pilot program to draft initial regulations and set criteria for entrance into the city. On average reported experiences with launches were slightly more favorable among the six cities that implemented a pilot, versus an immediate licensing approach. Two cities (Chicago and Denver) used open pilots where providers could operate if they met requirements and four cities (DC, LA, Portland, and Seattle) opted for a limited, strict pilot program only allowing a few companies who scored highest on their criteria, slowly expanding it over time. As previously

[1] See "Use of Pilots for Introduction" below on page 20 for more information on the pilot regulatory model.
[2] See "Use of Immediate Licensing" below on page 21 for an explanation of the "immediate-licensing" regulatory model

mentioned, the highest overall experience scores went to competitive or restricted pilots (4.0) versus an open pilot, where any company who qualified could participate (2.50).

Some cities share that pilots were not an option since the devices were already present, due to rogue launches. Still others thought that limited/competitive pilots are unfair and stifle competition and innovation.

Use of Immediate Licensing

Four cities in our sample (Atlanta, Austin, Oakland, and San Diego) opted for immediate licensing, drafting rules and then allowing any number of eligible companies to receive a license and operate in the locality. In general, it seems that those cities with a more stringent pilot program tended to move in the "partnership" direction, explained below, whereas those that had immediate licensing tended to maintain that system while adding more regulations and requirements as they saw fit. Regardless of the style of introduction, interviewees consistently agreed upon the policies and regulatory dynamics mentioned earlier, and immediate licensing did not necessarily mean less stringent regulations or requirements for operation.

Pros and Cons of Pilots vs. Immediate Licensing

Overall, while among these two general categories (pilots and licensing) cover the interviewed cities well, it is best to think of the types of introductions as a spectrum, where at one end cities were very limited and selective with providers and at the other end there was no pilot, and very limited requirements and restrictions for initial entry.

The pros and cons of pilots versus immediate licensing are difficult to assess, and dependent on other complicating factors. The stated advantages in our sample cities who chose immediate licensing included the ability to circumvent state-level preemptive policies that might have restricted a more structured launch. Interestingly, in our survey the two cities that had an open pilot (4.00; Chicago and Denver) had marginally better experiences with their pilot than the cities with competitive pilots (3.38; DC, LA, Portland, and Seattle). As for their optimism/pessimism for the future of micromobility, there was no significant difference between cities with immediate licensing and pilots (3.88 vs. 3.83). However, there was a marginal difference between cities that had competitive pilots and those with open pilots (3.63 vs. 4.25). The largest difference in optimism/pessimism was between cities with rogue launches and those with coordinated launches (4.30 vs. 3.40).

The challenges associated with immediate licensing broadly fall into two categories: public perceptions and feasibility/public benefit. The first con is that both public outcry and poor perceptions before regulations are drafted may hurt public opinion of micromobility, and delay future regulatory efforts. However, we are unable to determine if the levels of public outcry during this pre-regulation phase, which were relayed as the "wild-west" by some interviewees, are worse within pilot systems, given new pilots can feel rogue to disengage or disaffected residents.

Secondly, some cities are unsure if dockless e-scooters are either likely to stay around long-term, given the volatile nature of venture-capital funded businesses. Some cities doubted if micromobility had significant public benefits, primarily as an effective method for moving individuals out of cars. Finally, and perhaps most-obviously, immediate licensing may not give as much direct control as some pilots. However, cities like San Diego that chose the immediate licensing path were able to implement significant changes to regulations even without a pilot. Therefore, while pilots can allow for more nuanced control of the process of introducing e-scooters to a city and potentially reduce public outcry against them if the community is engaged during the pilot process.

Trends in Regulation of Micromobility Devices

Given that these trends are relatively new, mostly due to how new micromobility itself is, it is hard to recommend one or the other, particularly given the distinct preferences interviewees had regarding these approaches. The major benefit from partnership appears to be lower costs and incorporation into the city's broader transportation system and the ability to require more of the providers (such as reduced fares and integration with transit systems and apps) in exchange for guaranteed revenue. Successful bikeshare programs (those that maintain profitability and have attracted significant ridership), like that in Seattle, have followed very similar approaches to great effect. However, this approach has two major threats: the partnered provider goes out of business and the lack of competition stymies growth. The former consideration was mentioned often by cities following the partnership route and even those that chose open-competition. However, the stability offered from an exclusive partnership could itself help buoy micromobility companies to stay in business. The latter concern comes from interviewees that stressed the benefits of competition driving innovation. These could be very valid concerns, but it is too early to tell which are salient and consequential.

Partnerships

A partnership model was common among our sample, and includes the city forming a discrete partnership usually with one or two providers. The logic behind this strategy is similar to that behind successful bikeshare programs (see Seattle, DC, or NYC), in that costs can be lowered, more stringent regulations and device technology can be required, and integration with other city services, like transit, is more feasible. This strategy offers a more consistent and exclusive revenue stream for providers, which itself is relatively safer for the city if they are seeking to provide diverse and numerous transportation options, and longer term partnerships.

Open-Competition/Licensing

The most common trend in our interviewed cities is the expansion of pilot programs or the establishment of a formal licensing program allowing for open competition. Most of these programs, in increasing vehicle caps and extending availability to other providers, have also expanded equity and safety requirements. These programs are similar to most cities' response to and regulation of transportation network companies (TNCs), in allowing competition

between providers as long as they meet the various eligibility criteria and pay fees associated with conducting business in the city.

Shared Experiences and Perceptions

Among the cities interviewed, there were notable similarities experiences with and perceptions of micromobility. In this section we highlight these shared experiences and perceptions that relate to the future of micromobility

Goals of Micromobility

Similar to perceptions surrounding the incorporation of micromobility, there is also significant agreement on the stated goals of including micromobility in respondents' broader transportation plans. Simply put, every city is interested in including and expanding micromobility to reduce the use of cars generally and personal vehicle travel specifically. In conjunction with this goal, the vast majority of respondents stated their desire for integrating micromobility with both city- and regional-level public transit. Specifically, many respondents would like to see first and last-mile incentives (e.g., reduced fares for starting or ending a trip at a transit stop) and direct integration into transit apps. Finally, some respondents noted the possibility of increasing economic and racial/ethnic equitability in access to affordable and non-congestive transportation by allowing micromobility. Explained in more detail below, Portland, OR was successful in doing exactly this through a partnership with Spin.

Policy Recommendations

Overall, there was a surprising amount of policy consensus and agreement about regulatory dynamics with micromobility across the cities interviewed. Many policies closely matched recommendations made in previous research. The general policies and regulatory processes are listed below and are subsequently explained in further detail:

Policy Best Practices

- Data-sharing requirements are critical for evaluation and monitoring for compliance with policies like distributional requirements
- Some sort of clear parking regulation, while weighing the tradeoff of less flexibility, is beneficial (though the specific policies vary widely, with many only recently implemented)
- Fines for incorrect parking and usage need to be passed to the user to actually influence behavior
- The use of sub-permits (increasing the number of permitted scooters per company) is an effective way to ensure compliance with strict regulations and incentive-based regulations
- The use of low-income plans and cash-based payment options can increase access to micromobility services and potentially access to transportation as well

- Having a clear classification of micromobility devices is very helpful for clear guidance and updating regulations over time

There was unanimous agreement on the importance of a clear data-sharing standard for both program evaluation and for policy enforcement. Every city, except Oakland, has adopted the Open Mobility Foundation's (OMF) Mobility Data Specification (MDS) (and even then, Oakland requires similar private data as MDS as well as a public General Bikeshare Feed Specification (GBFS) feed). Those cities that did not initially have a data-sharing requirement also consistently noted the major drawbacks from its absence.

There were differences in the parking policies used by various cities, with some cities like Chicago and Oakland opting for a lock-to requirement and others opting for standard Americans with Disabilities Act (ADA) requirements (devices cannot block sidewalk and business access) like Austin and Atlanta. Others, like Seattle and parts of Los Angeles, have taken a middle-ground approach have opted for drop-zones where devices must be placed when a trip is completed. Regardless, all cities interviewed are grappling with how best to reduce incorrect parking that blocks important access for abled and disabled people while still maintaining the benefit from the flexibility that dockless devices have over those that are docked. That being said, many of those interviewed noted that parking complaints were already low, as compared to news reports, and also pointed to research that found that mis-parking itself is relatively low, especially compared to cars and ride-hailing vehicles (Brown et al. 2020). Finally, when considering lock-to requirements, cities had major concerns and considerations about what devices could be locked to and whether incorrectly-locked devices would cause a greater burden given the inability to move those devices by non-users or regulators. However, Chicago's pilot with requiring lock-to technology was considered successful and these burdens were not perceived to be too great (City of Chicago 2020).

Every city interviewed had some fine system in place to punish improper parking and usage (e.g., sidewalk riding in cities where that is banned), but all also had difficulties with getting providers to actually pass the fines on to riders. With companies incurring the costs of users' behavior, fees for incorrect parking and usage have not been effective in reducing those costly behaviors. Many cities specified in their interviews that overcoming this barrier and ensuring that fines were passed on to users was important in their future dealings with providers.

All cities interviewed used sub-permits and attested to their effectiveness in ensuring provider compliance with regulations. These permits can act as both, so to speak, a carrot and stick for ensuring regulatory compliance in that they can be used to reward providers that go above and beyond requirements (or those who consistently stay in compliance) and the threat of removal of these permits ensure continued compliance with regulations. Those interviewed consistently mentioned the benefit of using these permits and all recommended their use in other cities.

Every city interviewed either had an explicit requirement for low-income plans and cash-based options (Austin, DC, Denver, LA, Oakland, Portland, and Seattle) or incentivized them through equity ratings in their selection criteria (for limited pilots; Atlanta and Chicago) or through

lowering fees for vehicles (San Diego). These policies are important for increasing access to micromobility for low-income and disadvantaged communities and has the potential to increase total transportation access for those who are carless.

Finally, cities consistently, especially if their city/state-code did not initially have a classification for dockless devices, mentioned that having a clear classification and thus regulation of devices was important for implementing and updating regulations. Furthermore, it was important for users to understand the regulations regarding their use of micromobility devices.

Key Institutional Considerations

- Flexibility in instituting, evaluating, and then adjusting regulations is extremely helpful in the fast-changing world of micromobility (the opposite has hamstrung regulators and led to inefficient status quos)
- Open connections, conversations, and collaborations with other cities (and to some degree the providers themselves) were extremely beneficial when considering new policies and adjusting current regulations
- Almost every city has faced the challenge of balancing beneficial regulations (e.g., lock-to requirements can reduce parking violations) with the costs they impose (e.g., stringent lock-to essentially makes dockless micromobility docked)

Expanding on these points, our analysis concluded that the most important regulatory dynamic noted by interviewees was the need for flexibility and authority in implementing and updating regulations. Many cities were incredibly hampered by a requirement to go to the city council or mayor for any regulatory update, most often occurring early on in regulation, such as in the initial pilot stage. On the opposite side, regulators benefited greatly when they had both flexibility and authority to study micromobility usage from MDS and user-surveys and were able to quickly make decisions based on that information. Simply put, as an emerging and quickly-evolving transportation option, regulators need the ability to quickly and effectively react to changes and new findings regarding micromobility. This will allow them to have a clear mechanism to respond as new types of micromobility devices emerge into the market.

Every interviewee also pointed to the benefits of open connections and collaborations with other cities and regulators. While cities vary significantly in size, spread, public transit access, weather, and general demographics (including greater or lesser racial segregation), discussing effective and ineffective policies was beneficial for these regulators. Given that cities often take vastly different approaches, any given regulator can learn many “dos and don’ts” regarding regulation from these conversations or reviewing, in the best of cases, public reports on their micromobility program.

Cities also face a significant tradeoff between the benefits of various more stringent regulations and the costs of reducing flexibility in use, one of the primary benefits of dockless micromobility. Given this almost inherent tradeoff, cities mentioned the importance of deeply

considering tradeoffs and being open to updating policies based on any given regulation's effects on ridership and usage.

Notably, some cities face the threat of preemption from what is perceived as "over-regulation" from their state governments. Given these dynamics, affected governments must not only consider the previously mentioned balance but also the increased threat of preemption from additional regulations. In these scenarios, regulators mentioned drawing upon previous preemptions regarding ride-hailing companies (e.g., Uber and Lyft) in avoiding preemption in the micromobility space.

Perceived Challenges of Incorporating Micromobility

There is significant consensus surrounding the perceived challenges of incorporating micromobility into a city's broader transportation system. Specifically, parking and safety are overwhelmingly considered to be the largest challenges facing micromobility. As mentioned earlier, considerations surrounding parking are widespread due to the complaints that improper parking spawns and safety is also very salient. Cities like Atlanta, which had a rash of fatal accidents, are especially concerned with safety. However, even in cities that have had no fatal accidents, safety is still a high priority (see below for Oakland's wheel-size regulation to increase safety). Finally, many cities mention the related challenge of perceptions of micromobility from non-riders. These possibly negative perceptions, often spurred on by incorrect parking and reports of significant accidents, have been reported by respondents to hinder the adoption and spread of micromobility in their cities.

Increasing Transit Integration

Mentioned in brief above, the vast majority of respondents would like closer/better integration of micromobility services with transit. However, in all of these cities there exist significant hurdles to these integrations, with some much more than others. This is based on the often disjointed or segmented transit systems in these cities and regions, with different departments or wholly different organizations managing separate systems with their own payment options and apps. For example, one respondent noted the difficulty in achieving this integration when working with twelve different public transit operators.

Improving Safety: Larger Wheel-Sizes

One often-cited concern with micromobility devices, especially e-scooters, is their safety. Many cities, or their state already require helmets or limit device usage to those over the age of 16 or 18. However, one of the fundamental differences between bicycles and scooters highlights a possibly simpler solution: larger wheel sizes. Smaller wheels are more prone to significant disruptions to riding and thus crashes from smaller obstacles, such as potholes. Larger wheels, like those traditionally used on bicycles, are less prone to these disruptions and crashes. Based on this information, Oakland opted to require a minimum wheel-size of all scooters in their latest pilot. While too soon to determine any significant effects from this regulation, this could be a relatively cheap and cost-effective policy to reduce crashes on e-scooters.

Responsiveness to COVID-19

While already reported in detail by Spin (2020), Portland's partnership with Spin (removing city-assessed fees) has been highly effective in increasing ridership and ride-times, especially in underserved areas. Specifically, a 50% reduction in fares led to a 46% increase in overall ridership and a 137% increase in ridership in East Portland, a "priority underserved area." This is one of the best examples of the possible effectiveness of the partnership model mentioned above, as reduced fares increase usage, even during a pandemic, by a very large amount, especially among underserved areas.

Future Policies Under Common Consideration

There was consensus among the cities that additional policies were likely and necessary to address challenges and respond to market shift. Some policies under consideration included:

- Changes to device parking policy (e.g., requiring lock-to or requiring parking zones, increasing lock-to infrastructure)
- Banning sidewalk scooter use
- Implement or expand low-income subscriptions or a price-cap for low-income areas
- Partnership approach and improving connections to transit

Conclusion

Our series of interviews have shed light on both the regulatory process and resulting policies surrounding micromobility in a diverse set of cities from across the US. While the sample size is modest, we were able to highlight important trend, topics, and identify where there is consensus and agreement on best practices.

The overall takeaways from our study of experiential differences among our city sample is that 1) cities with pilots and coordinated launches had a better experience with the introduction of micromobility, 2) cities with open pilots had better experiences with their pilots than those with closed pilots, 3) there is no discernable difference in the optimism/pessimism for the future of micromobility between cities with pilots and those with immediate licensing, and 4) perhaps counterintuitively, cities that had rogue launches are more optimistic about the future of micromobility than cities that had coordinated launches.

Best practices for micromobility policy include expanded data collection, clear and enforceable parking policies, the use of fines to encourage better parking and riding behavior, the use of permits structures that encourage better provider behavior, clear classifications for device types, larger safer wheels. Cities were already considering opportunities for expanding micromobility and transit integration, implementing low-income supportive policies, as well as more stringent parking and rider restrictions (e.g., sidewalk riding bans).

Regulators should continue to learn from each other, consider the potential costs and benefits of these major policy options and identify whether they are likely to prove effective in their city. In that vein, future scholarly work should study these two options more deeply to determine their effectiveness in accomplishing cities' goals, and expanding our understanding of city perspectives beyond city staff experiences. More research is needed to refine these findings in this new and rapidly growing micromobility marketplace.

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Data Management

Products of Research

Interviews were conducted with 10 cities across the United States (see above for more information). Interviews were conducted and recorded remotely using Zoom, with responses to questions were also transcribed in text files.

Data Format and Content

Each virtual interview was recorded and saved as a .mp4 file. Transcriptions were each saved as a .docx file. The names of the participating city staff were agreed to be kept confidential. No single person will be associated with the interview, or the statements enclosed in this report.

Data Access and Sharing

Only the UC Davis research team has password protected access to the data, and the names of the interviewees. There is no plan to release data more widely, due to confidentiality requirements and assurances provided to every city interviewed.

Reuse and Redistribution

The raw video file data cannot be reused or redistributed due to cities' confidentiality requirements. The data enclosed in this report is available for reuse, with authors permission or using standard citations.

Appendix

Interview Questions

Personal Info:

Name:
Title/Role:
Description of Role: (e.g., And what does your job entail?)

General Micromobility Information:

First, we'd like to ask you about your overall perceptions of micromobility and its regulation.

- How would you describe the level of micromobility adoption/pervasiveness in your city? How do you measure it? Surveys, reported data from providers? [None, low, medium, high]
- Would you describe your city as permissive/accepting or restrictive/cautious of micromobility, or somewhere in between? Can you give examples to support your view?
- What are the major challenges posed by and concerns you have about incorporating micromobility in your broader transportation plan?
- What are the primary goals you hope to reach by including micromobility services in your jurisdiction?
- On a scale of 1 to 5, with 1 being very pessimistic and 5 being very optimistic, how positively or negatively do you feel about the opportunities for micromobility and its incorporation into your broader transportation plan.

Micromobility Introduction:

In this section we'd like to ask you about the introduction of micromobility companies in [your city].

On a scale from 1 to 5, with 1 being very poor and 5 being very good, overall, what was your experience with the introduction of micromobility?

Did a company launch without communicating with your city?

- [**If yes**, ask:] What was your city's response? What guidance did you look to when [your organization] started to draft micromobility service ordinances?
    - [If R **mentions pilot**, jump to **PILOT**]
    - [If R **does not mention pilot**] Did your city opt to use a pilot program in response to the introduction of micromobility? [Jump to **PILOT]**
- [**If no**, ask:] How did you coordinate with micromobility providers to anticipate the launch, did you begin with a pilot? [Jump to **PILOT**]

PILOT

- [**If yes** to **pilot**, ask:] What were the initial criteria for entrance to the pilot program? [probe for detailed information about the selection process]

- What were the initial ordinances/regulations for these companies? [probe for # of providers; # of vehicles per provider; # of total vehicles; sidewalk, night-riding, age, and helmet regulations, etc.]
  - Which were most important to [your organization]?
  - In that same vein, what were the primary goals of [each ordinance mentioned]?
- What guidance did you look to when starting this pilot? [Probe for NGO material, business material, other local governments/regulators, and state policymakers]
- What were the overall results of your first pilot? Again, from 1 to 5, with 1 being very poorly and 5 being very well, how well did your pilot run?
  - Did you implement a temporary or permanent ban after the pilot?
    - [**If yes**] What were the main motivations for the ban?
      - What were the results? Did you reopen a pilot or continue with the ban?
        - [**If ban continued, JUMP TO MICROMOBILITY NOW**]
    - [**If no, or temp ban lifted**] Did you enact or remove any regulations/ordinances as a result of the pilot? Why? [probe for policy goal motivations, info they learned from the pilot]
      - Did you expand/shrink the pilot in regard to # of total vehicles and/or # of providers? Why? [probe for policy goal motivations, info they learned from the pilot]
      - [Can probe here in general to get information about the process of pilots (many cities have had multiple pilots with pauses in between, or have continued a single pilot with updated policies)]
      - [**JUMP TO MICROMOBILITY NOW**]

- [**If no** to **pilot**, ask:] What path did you take and why did you decide against a pilot?
  - [**If ban implemented**] What were the main motivations for issuing the ban?
  - [**If ban not overturned/replaced (existing ban)**] Did your local government have the ability to overturn the ban? If so, why did you choose to not overturn it?
  - [**If no pilot** and **no ban**] [Probe, if need be, for more information on why the locality felt they did not need a pilot program and went with a laissez-faire strategy.]

Micromobility Now:

Introduction: In this section of the interview, we'd like to ask you questions concerning the current state of micromobility prior to COVID-19 in [insert city/locality here]. We are primarily interested in what your policies are, the motivations behind and the goals of these policies, and their outcomes/results related to these goals.

First, could you give a list of providers who are currently operating in your city?

Could you give a brief overview of, or provide a document that describes, the *current* set of policies regulating micromobility in [insert city/locality]?

- In general, how did [insert name of regulatory body] decide upon regulations? What were your motivations? What did the process look like?
    - What sources of information did you employ when considering policies? Do you have open connections/partnerships with other cities or localities? [Probe about connections to other cities/localities, NGOs, universities, hospitals, businesses etc.]
        - How influential were each of these sources in your process?
        - To the best of your knowledge, were you the first locality to implement any of these policies?
            - [**If novel policy implemented**] How did you create [novel policy]? What did that process look like?
- Overall, how was the final set of policies chosen? Are you currently satisfied with this set of policies or are you considering new ones?
- [**FOR EACH POLICY**]
    - What are the goals of [insert policy]? Have you logged statistics to track the effectiveness? In that vein, how effective has said policy been in achieving those goals? [Ask about the goals of each policy (or set of related policies), and then how effective those policies have been in achieving their stated goals, IMPORTANT: probe for evidence for their conclusions.]
- [If not mentioned] Did you have specific goals to change travel patterns?
    - Has a policy for micromobility improved access to transit? How do you measure this?
    - Are there any opportunities presented by micromobility to improve transportation in your city?

Micromobility's Future:

Introduction: In this section of the interview, we'd like to ask you some questions pertaining to where [regulatory body] sees micromobility and its regulation going in the future. We are primarily interested in what policies you are considering implementing, the perceived challenges of or benefits from micromobility, and how micromobility in general may or may not fit into [insert city/locality name]'s broader transportation plan.

- First, are you currently considering any additional policies? Where are these policies in the pipeline [refer to the process that they described earlier for deciding upon policies]?
- How did you decide to consider this policy [sources]? Are they in response to specific problems? If so, how are the problems identified?
- Do you perceive any benefits that could be had from integrating micromobility into your transportation system? What additional policies would you have to implement and what behaviors would have to change from companies to see these benefits realized?

Micromobility and COVID-19:

In this final section of the interview, we'd like to ask you about your city's micromobility experience in the context of the COVID-19 pandemic. Overall, we're interested in the behavior of companies in your locality, your response(s) to that behavior, and your expectations for micromobility following the pandemic's conclusion.

- Did micromobility companies pull out (i.e., remove their vehicles) once shelter-in-place orders began? **[LOG EACH COMPANY'S RESPONSE, ASK FOLLOWING QUESTIONS ABOUT EACH]**
    - [**If so**] How has the reduction in micromobility affected transportation? How do you know?
        - [**If affected**] Have you attempted to remedy these problems? If so, how?
    - [**If so**] Were you given any warning or was there any conversation with the companies regarding the removal?
        - Do you know the future plans of the companies? Are they planning a return? Do you have an idea of the ETA?
            - [If planning a return] Are they coordinating with you on their reentry?
            - [If permanent removal] Do you plan on allowing more companies to enter in their place?
    - [If not] Do you know the companies' current plans in regard to COVID-19? Are they planning on continuing service for the foreseeable future?
- [If restrictive] Has the pandemic pushed you to consider any different regulations including a relaxation of rules?
- [If permissive] Has the pandemic pushed you to consider any different regulations?