HARVARD Kennedy School
TAUBMAN CENTER
for State and Local Government

Policy Brief
Urban Mobility Pilots

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Visiting Fellow

August 2020

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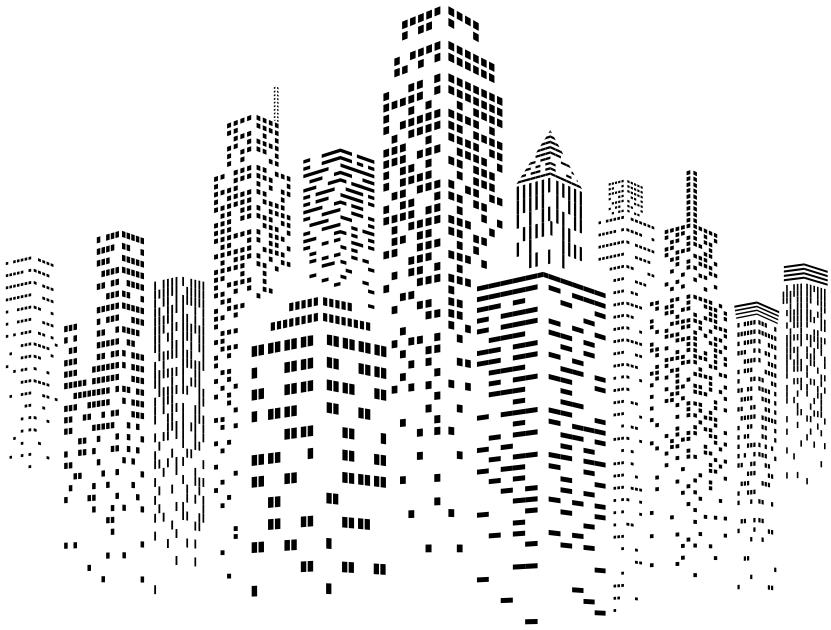

ABOUT THE AUTHOR

David Zipper is a Visiting Fellow at the Harvard Kennedy School's Taubman Center for State and Local Government, where he focuses on the future of urban mobility and local economic development.

David's perspective on cities is rooted in his experience working within city hall as well as in venture capital, policy research, and startup advocacy. He currently advises startups, mayors, and transit agencies about ways that new technologies are changing how people live, work, and travel in urban environments. His writing has been published in the *Atlantic*, *Slate*, *WIRED*, and *Fast Company*.

From 2013 to 2017 David was the Managing Director for Smart Cities and Mobility at 1776, a global entrepreneurial hub with over 1,300 member startups. David previously served as the Director of Business Development and Strategy under two mayors in Washington, DC, where he managed the city's first Five Year Economic Development Strategy, provided support to Washington's first startup incubators, and guided the city's response to the launch of ride-hail.

Before moving to Washington David served as Executive Director of NYC Business Solutions in New York City under Mayor Michael Bloomberg. Selected as a Truman Scholar and a Gates Scholar, he holds an MBA with highest honors from Harvard Business School, a MPhil from the University of Cambridge, and a BA with High Honors from Swarthmore College.

ABOUT THE TAUBMAN CENTER FOR STATE AND LOCAL GOVERNMENT

The mission of the Harvard Kennedy School's Taubman Center for State and Local Government is to support current and future public sector leaders in improving the governance of states, counties, metropolitan regions, and cities through research, teaching, programs, and convenings.

The Taubman Center works to:

- Develop the next generation of state and local government leaders
- Generate big ideas and solutions to state and local government challenges
- Help state and local government implement and scale solutions

The Taubman Center focuses on urban policy issues, including economic development, transportation, education, public infrastructure, land use, social services, public sector technology and data utilization, procurement, and performance management.

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EXECUTIVE SUMMARY

In recent years the adoption of smart phones, developments in autonomous vehicle technology, and improvements in battery design have enabled a variety of new urban mobility technologies to transport people and goods. Policymakers responsible for facilitating or regulating access to these vehicles often have little evidence to inform their decisions. This policy brief is intended to help such leaders utilize pilots—limited deployments that enable hypothesis testing—to determine whether widespread adoption of a new technology is likely to help or hinder a city's attainment of its overall transportation goals.

The critical element of a successful urban mobility pilot is the development and articulation of hypotheses that the public sector will test with data, often with assistance from an external group. Communicating both these hypotheses and the metrics used to evaluate them at the start of a pilot can build credibility with both the general public and the private mobility companies considering participation. For this reason, much of the work to make a pilot "successful" will happen before the new technology ever arrives on the street.

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Because a pilot is inherently temporary, it will usually lead to one of three outcomes: expansion of the tested technology, termination of its approval, or the creation of a subsequent pilot to test new hypotheses that arose from findings of the previous one. A successful pilot can produce positive or negative findings; indeed, the only unsuccessful pilots are those that do not inform any conclusion at all.

NOTE: As this policy brief goes to press, the coronavirus pandemic continues to alter the deployment of many urban mobility technologies mentioned within it. Although the pandemic's ultimate impact on transportation remains unclear, continued development of technologies including electric batteries and autonomous drive solutions indicate that unfamiliar form factors will continue to appear on city streets. This brief can help policymakers develop and test hypotheses about the effect that these new mobility technologies will have on local goals such as equity, congestion mitigation, and pollution reduction.

BACKGROUND

From ride hail, to dockless scooters, to autonomous vehicle shuttles, private companies have introduced a steady stream of new mobility technologies on city streets over the past decade. Their arrival sparks a range of reactions from excitement to consternation among local officials uncertain about their impacts on public goals, such as reducing automobile trips or improving mobility options for low-income residents.

Ride hail's sudden and controversial emergence a decade ago pushed cities toward a more proactive role managing emergent mobility technologies, especially those that are shared across multiple users. When a company with such a technology proposes deployment, local leaders face a choice: they can approve its widespread use; they can block the technology entirely; or they can approve a limited deployment known as a pilot, which allows leaders to test hypotheses about the technology's impact on policy goals before deciding whether and how the technology should be permitted to scale. It is this third option that is the focus of this policy brief.

The brief is intended to help cities and transit agencies design and implement effective mobility pilots, which can help them uncover and scale emergent mobility technologies with impacts that align with a city's policy goals.

Three Options for a New Mobility Technology

1. *Outright Ban*: In 2017 the San Francisco Board of Supervisors banned sidewalk drones on most city streets.
2. *Open Permitting*: In 2018 San Diego City Council initially declined to implement restrictions on e-scooters that had suddenly arrived in the city.
3. *Limited Pilot*: In 2019 LA Metro, the transit agency of Los Angeles County, launched a ride-hail pilot with Via that provided free service to and from three rail stations.

WHY CONDUCT A PILOT?

For the purposes of this policy brief, a pilot is defined as a limited deployment of a new technology that transports goods or services in an urban environment. The scale of a pilot deployment is constrained, usually by the number of available vehicles and/or the area where those vehicles are permitted. A pilot is also temporary; it will ultimately result in either expansion or termination.

Local officials can use a pilot to test hypotheses about how a new technology could potentially improve the mobility network in support of clearly-defined outcomes for its residents, visitors, and businesses. Such improvement could come from a

reduction in cost, such as microtransit potentially providing a cheaper way to transport residents in low-density areas compared to a fixed-route bus, or from an improvement in mobility options and outcomes, such as shared scooters reducing the number of trips taken in a single-occupancy vehicle. Pilots give policymakers a chance to better understand a new technology's impact before committing to broader deployment that would require additional resources and be more difficult to reverse. The limited scale of pilots also allows public officials to manage risk in the event that the technology's deployment brings unexpected, negative effects.

It should be noted that some officials will launch mobility pilots for reasons other than to test hypotheses around local policy goals. They may have political motivations for seeking a limited deployment of a new technology, in which case success is based on metrics such as quality of media stories or the number of public complaints submitted. Political motivations include:

- **The desire to show public support for "innovation"** Local leaders may wish to create a perception of supporting new technologies, regardless of their efficacy. Even a small pilot could attract press attention that local leaders may value.
- **An attempt to gauge public reaction** Since a piloted technology is new, local officials may wish to know how intensely local residents or unions will protest its emergence. A pilot allows officials to gain such information without incurring the greater political risk of a broad deployment.

Pilots based on these political motivations have little need for quantitative data analysis, and they are outside the scope of this policy brief.

Cities vs Transit Agencies: How Urban Mobility Pilots Differ

Both cities and transit agencies can manage technology pilots to test hypotheses around local mobility goals. However, there are key differences in how they are likely to approach them.

City-led mobility pilots usually entail the issuance of permits for private companies operating vehicles like shared e-scooters on public sidewalks and streets. Cities often charge a fee for the issuance of such permits, which allows the pilots to at least partially cover added public sector expense. Taxpayer funds may not be required.

That is less likely to be case for pilots led by transit agencies, especially if the pilot involves the replacement of existing transit service with new, privately provided transportation (an example: the regional transit agency of Dayton, Ohio, partnered with Lyft in 2017 to replace lightly-used bus lines with on-demand ride hail service). Because taxpayer and farebox revenues are redirected, transit-led pilots may face a higher level of public scrutiny. There may also be implications for a transit agency's federal funds, which are tied to ridership levels on vehicles directly managed by the transit agency.

BEFORE A PILOT LAUNCHES

Successful pilots—those that produce information supporting subsequent expansion or termination—are predicated on careful, deliberate design. Local officials position themselves for success by being clear about the new knowledge the pilot is designed to reveal, the metrics to be used in evaluations, and the ways that data will be collected and validated.

Step One: Decide on Learning Objectives

The first step to conducting a successful mobility pilot is specifying what local leaders wish to learn from it. If they have agreed to a pilot, they likely have at least a hunch for how a new technology's deployment could help achieve policy goals. For example, in 2018 local officials in Arlington County, Virginia believed that e-scooters could support the local Master Transportation Plan's goal of reducing car, taxi, and ride hail trips (see box). This is an example of a *hypothesis* about how local residents will respond to a new technology's availability. With data and analysis, a pilot can allow local leaders to test whether people behave in a way consistent with expectations.

Hypotheses can be based on cost savings or local policy goals, such as those identified in the City of Seattle's New Mobility Playbook. They could imply positive or negative societal impacts, such as:

- "Dockless scooters will attract new riders to public transportation" (positive)
- "Shared e-bikes will reduce the number of automobile trips between one and five miles" (positive)
- "Shared moped trips are more dangerous than alternative means of transport" (negative)
- "Autonomous shuttle service cannot move people at a lower cost than a traditional bus" (negative)

Step Two: Identify Metrics

A second step is to identify clear metrics. Local officials could test multiple hypotheses concurrently within a single pilot. For each hypothesis, local officials must identify *metrics* that allow for it to be tested. For example, a hypothesis that sidewalk drones cause pedestrian congestion could be tested by calculating the extent to which the presence of sidewalk drones changes the average pedestrian walking pace or the likelihood that a pedestrian on a given stretch of sidewalk will opt to walk in the street instead of on the sidewalk. A hypothesis that dockless scooters support public transportation ridership could be tested by identifying the percentage of scooter users during a pilot who took a trip to or from fixed-route transit service, and then asking

them what mode(s) they would have used if scooters were unavailable (other examples of micromobility metrics can be found in the Shared Micromobility Policy Toolkit produced by UC Berkeley's Institute of Transportation Studies).

Step Three: Plan for Data Analysis

As metrics are selected, a third step for local officials is to secure *analytical capacity* necessary to collect and draw conclusions from data. Such analysis could be conducted internally or externally through a third-party vendor, university, or another partner. For example, the non-profit Center for Neighborhood Technology helped the Chicago Department of Transportation evaluate the success of an e-scooter pilot program running from June through October 2019. It is important to clarify how data will be collected, who will evaluate it (and how), and the ways in which that evaluation will be presented to decision makers. The city and its partners may need to collect baseline data prior to the pilot's launch in order to enable before/after analyses following deployment.

Step Four: Be Transparent

Finally, officials should provide *transparency* to both the public and to technology companies about the hypotheses being tested, the metrics used in the evaluation, and the pilot's timeline. Openness about the goals of the pilot can help the public move past initial questions of "why do we need this?" especially in cities where public right of way is already in high demand, or "why is the city spending its time on this instead of something else?"

Clarity around metrics to private mobility companies is equally critical, for several reasons. At an operational level, local leaders will want to collect data in standardized ways across all pilot participants. For that reason, companies need to know what data they will be expected to provide, in what formats, and at what frequencies. Transparency around metrics can also help companies understand what the city sees as a positive outcome from the pilot—and, presumably, a pathway toward its future expansion, including new permits and/or public investment. Due to the fixed costs of establishing operations in a new market, mobility companies may need to achieve wide deployment in order to achieve profitability. They are therefore less likely to take part in a pilot if they do not see potential to eventually expand service.

Private companies may also be able to provide useful feedback on the pilot's design. Companies providing shared fleets of vehicles like e-scooters or e-bikes are unable to provide a good user experience without a sufficiently large fleet or a broad enough geographic range (imagine the futility of conducting an e-scooter pilot in a five-block area, or one with only ten total vehicles available). Companies are likely to know their customer behavior well, and they could share insights that improve pilot design.

Arlington County, Virginia, and E-scooters

Scrambling to manage shared e-scooters that had appeared unexpectedly on local streets, officials in Arlington County, Virginia quickly prepared a Memorandum of Agreement (MoA) in October 2018 that allowed e-scooter companies to operate during a nine-month pilot period. Paul DeMaio, the County's Shared Mobility Manager, met personally with-e-scooter companies while the MoA was under development, and he continued to hold monthly meetings with them throughout the pilot period to gather their feedback. A key hypothesis to test was whether e-scooters would reduce automobile trips within the County.

The MoA allowed each approved e-scooter company to operate 350 devices in the County, with an additional 50 allowed if a company demonstrated that their vehicles were used at least three times per day on average over a 30-day period. The County hired a data analytics firm to validate e-scooter ridership data submitted by the companies, one of which received approval to add an additional 300 vehicles to its fleet due to demonstrated demand.

The County also collected information from residents through an online form that asked questions about their user experience. Notably, 13 percent of respondents claimed that e-scooters replaced use of a personal vehicle and an additional 19 percent claimed it replaced a ride with a ridehail vehicle or taxi. Those numbers gave transportation staff confidence to recommend that County continue permitting e-scooters when the pilot ended in late 2019.

Key Dos and Don'ts of Urban Mobility Pilots

DO:

- Be public, transparent, and thorough in communicating the hypotheses tested through the pilot, and explain how they relate to local mobility goals such as reducing pollution, improving equity, providing congestion relief, etc;
- Specify target goals for each metric being measured;
- Invite potential corporate participants to offer feedback on the pilot's design prior to launch;
- Collect relevant "before" data in advance of the pilot's launch for a clear understanding of baseline conditions;
- Ensure that all companies participating in the pilot define key metrics in the same way and collect and share data in the same way;
- Develop a plan to expand deployment of the new technology in the event that the pilot shows positive outcomes; and
- Share findings publicly so that residents, policy makers, and peer cities can learn.

DON'T:

- Wait until the pilot is live to determine thresholds for success or a pathway toward scaled deployment;
- Limit the pilot to such a small geography or a constrained number of vehicles that the user experience will inevitably be poor;
- Extend the pilot period without offering a public explanation; and
- Accept data submitted by companies taking part in the pilot without validation.

DURING THE PILOT

The launch of a pilot is an exciting moment that can attract the attention of media and local residents. This spotlight provides a valuable opportunity to inform the public about why local leaders are conducting the pilot, and what hypotheses they are testing.

Most pilots take place over a period of months. During that time the city and its partners will collect data to confirm or reject initial hypotheses and ultimately decide whether to support a broader deployment of the mobility technology. Much of the data will come from the mobility companies providing vehicles during the pilot (i.e., ridership information for scooters or autonomous shuttles). Such companies have a vested interest in the outcomes of the pilot, so local leaders are wise to validate submitted data to ensure its accuracy. This could be done through spot-checks by city staff, or through services provided by a data analytics company that can help spot discrepancies. In certain situations, such as hypothesis testing around the impact of new mobility services on transit ridership, local leaders may choose to supplement quantitative data with user surveys to gain a better understanding of behavior.

Returning to the theme of transparency, it can be advantageous for local leaders to publicly release information about the progress of a mobility pilot. An example: Pierce Transit in Tacoma, Washington received a federal MOD Sandbox grant to provide subsidized ride hail trips to a number of transit stops. Throughout the pilot, the agency has posted usage data on its public website. Such transparency can help local residents and mobility companies alike learn about the pilot and follow its progress, and it help the public anticipate the agency's next steps when the pilot concludes.

Kansas City Area Transportation Authority and Microtransit

An article in the *Wall Street Journal* in 2015 led Kansas City Area Transportation Authority (KCATA) executives to grow interested in the potential of on-demand shuttle services known as microtransit to boost transit ridership. After reaching out to leaders at Bridj, a microtransit pioneer, KCATA secured $1.3 million in local funds to conduct a one-year microtransit pilot in March 2016. Commuters could request a ride through an app, with rush-hour service available in downtown Kansas City as well as several nearby neighborhoods.

Demand for the new service was tepid, with 1,480 rides provided during the year that the pilot was in operation. KCATA chose not to continue the Bridj pilot, but the agency applied several lessons from the experience to a new KC Microtransit service that launched with TransLoc in January 2019. Unlike the Bridj pilot, KC Microtransit provided service outside of rush hour, allowed rides to be booked by phone or the web in addition to an app, and established a service area away from downtown to avoid cannibalizing current transit service. As of fall 2019, monthly ridership on KC Microtransit was 14 times higher than under the Bridj pilot, and the per-rider subsidy had fallen by over 90%.

CONCLUDING A PILOT

A pilot is a success if it produces data that informs a public decision to either accept or reject its hypotheses about the new mobility technology. Findings may be uniformly positive or negative, or they may be something of a mixed bag. As an example of the latter, consider a city concluding that a new micromobility deployment replaces car trips, but also produces an increased likelihood of injury compared with other modes. In these situations local leaders may wish to create a kind of ledger sheet, with positive findings on one side and negative ones on the other, before reaching an overall decision.

Based on findings, the pilot will conclude in one of three ways:

- **Expansion** Local agencies conclude that the pilot's alignment with policy goals is confirmed, and deployment should be scaled. Adjustments to city regulation and/or funding may be required (ideally local leaders developed the expansion plan as a contingency before the pilot launched).
- **Termination** If the results of the pilot cause local leaders to conclude that their initial hope for cost savings or mobility improvement was false, they may confirm the technology's termination, at least for a period of time.
- **A New Pilot** Pilots may not confirm local leaders' hypotheses of potential benefits, but instead suggest other, unexpected ones—or raise new questions (i.e., a sidewalk drone pilot that does not suggest a risk to pedestrians, but does indicate a potential to induce more total retail delivery trips). In this situation a new pilot may be necessary to test new hypotheses of the technology's impacts.

A mobility pilot is a success if it provides information that informs a policy decision around subsequent deployment of the technology being tested. Sometimes commentators describe pilots as "failing" if the information gathered leads to a decision to terminate use of the technology. That is the wrong terminology. Commentators should say that the pilot *succeeded* in answering the question the community sought to answer; it was the technology that *failed*.

Once local leaders determine their intended course of action, they will need to communicate it publicly. This process will be easier if residents and local media already know what hypotheses the city was testing, especially if data collected during the pilot was made public while the pilot was ongoing.

Although local leaders are accountable to their residents, they can assist their peers elsewhere by making the results of their pilot public for others to see. Companies developing new mobility technologies usually envision deployments across many cities,

so there is a strong likelihood that other local leaders will find value in the experience of an early adopter. Organizations like the National Association of City Transportation Officials and the American Public Transportation Association collect repositories of such information and disseminate it to member cities and transit agencies.

CONCLUSION

As technological innovation produces increasingly creative vehicles and tools designed for streets and sidewalks, the responsibilities of local leaders to manage them grows in both complexity and importance. City departments of transportation and transit agencies have traditionally been expected to build streets and operate buses, not generate hypotheses for new technologies and select metrics to evaluate their potential impact. But these abilities are becoming essential.

Measuring urban mobility pilots is critical in order to manage them. First, local leaders are wise to schedule a launch only when clear hypotheses and metrics are set; it is more difficult to establish such criteria after a new technology is in use on city streets. Second, it is necessary to have accurate, validated data in order to draw the correct inferences. And finally, it is not enough to selectively measure the right things; a successful pilot requires local officials to use the evidence in their decision making.

To underscore a key point, a successful pilot could conclude that a new technology would be an ideal addition to the local mobility network, that it would have no impact, or that it would be disastrous. The only "failed" pilots are those that do not inform policy choices one way or the other. If a pilot helps local leaders to learn, it has done its job.

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