Micromobility Potential in the US, UK and Germany

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INRIX

INTRODUCTION

Driving and public transportation have historically been the most popular ways to travel, but the explosion of micromobility technology has brought a wide variety of new options that could make urban mobility more efficient, accessible and convenient. The emergence of micromobility-as-a-service – defined as shared bikes, e-bikes and e-scooters – highlights both the consumer and commercial appeal.[1]

McKinsey Institute estimates the micromobility market size to be between $200 and $300 billion by 2030, and if deployed and managed effectively, will enable time savings, better travel experiences and reduced travel costs for people.[2] Cities will experience decreased vehicle emissions, potentially lower congestion and greater accessibility for non-drivers.

The benefits of micromobility services stem from their higher efficiency in terms of energy and space. For example, the minimum square footage of one parallel parking space is 212 square feet, whereas scooters and bikes require three to six square feet to park.[3] There's also a sharp contrast in energy efficiency; an e-scooter can travel up to 83-miles with the same amount of energy it takes an average gas vehicle to travel one-mile. However, nuance is needed in their adoption.[4] Not all modes and deployment strategies are equal in all environments (e.g. scooters on cobblestone roads or free-floating bikes parked on crowded sidewalks).

INRIX Research analyzed trillions of data points from hundreds of millions of connected devices to rank the Top 25 American, Top 5 British and Top 5 German cities where micromobility services could have the most significant impact on replacing vehicle trips. To come to this conclusion, we looked at the proportion of existing vehicle trips in a market that are three miles or less. Three miles was used as the ceiling for observation based upon the National Association of City Transportation Officials trip distance estimates.[5] However, differences in utilized trip length do emerge based upon mode. Scooters are frequently used for short-distance trips between a half-mile and a mile, while bike travel distances are typically more than one mile and less than three miles in length.

While some have started to accept these popular mobility platforms as the new normal, cities have faced significant challenges in managing them due to inadequate parking facilities, vehicle conflicts, pedestrian safety concerns and network coverage. Maximizing the potential of these services requires investment, analysis of road space and an understanding of local travel needs.

1 The National Association of City Transportation Officials defines shared micromobility as: "all shared-use fleets of small, full or partially human-powered vehicles such as bikes, e-bikes, and e-scooters."

2 McKinsey & Company. (2019). Micromobility's 15,000-mile checkup. [online] Available at: https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/micromobilitys-15000-mile-checkup

3 NYC Board of Standards and Appeals. http://www.nyc.gov/html/bsa/downloads/pdf/forms/memostandardnotesv6.pdf

4 Nast, Condé. 2018. "Forget The Car. E-Scooters Could Save The City". Wired. https://www.wired.com/story/e-scooter-micromobility-infographics-cost-emissions/.

5 Bike Share in the U.S.: 2017 | National Association of City Transportation Officials
"Bike Share In The U.S.: 2017 | National Association Of City Transportation Officials". 2019. National Association Of City Transportation Officials. https://nacto.org/bike-share-statistics-2017/.

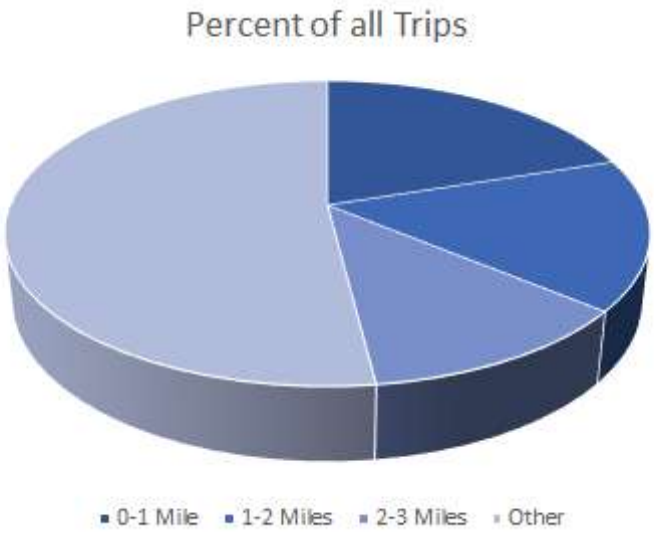
RESULTS

This study provides two major insights that will dictate the success of micromobility. First, it reveals the high proportion of trips across major urban markets that are suited to micromobility distances. Second, the city case studies identify particular neighborhoods with disproportionately high percentages of short car trips that could see the greatest benefit from micromobility deployments.

UNITED STATES ANALYSIS AND RANKING

Analysis of INRIX data, consisting of more than 50 million car trips taken during October 2018, showed 48% of all car trips in the Top 25 most congested US metro areas are less than three miles. Digging deeper, 20% of trips were less than 1 mile, 16% were 1-2 miles, and 12% were 2-3 miles.[6] (Figure 1) If a fraction of these vehicle trips were replaced with micromobility trips, American cities could reap significant benefits.

FIGURE 1: US TRIP SHARE BY DISTANCE



Honolulu, Hawaii; New Orleans, Louisiana; and Nashville, Tennessee comprise the Top-3 cities with the greatest profile for micromobility options to succeed. These three cities also feature warm or temperate climates with minimal topographic variation, providing further support for micromobility. The high proportion of short-distance trips, no matter a city's density or maturity of the public transit network, highlights the universal applicability of micromobility services. While automobile-centric sunbelt cities like Phoenix and Dallas have a lower proportion of very short distance trips (17% and 18% respectively) compared to denser cities like Chicago or New York (both 22%), they still have suitably-sized markets for micromobility. Micromobility-as-a-service has potential applications throughout the United States, independent of city size, location or characteristics. With the right data and analysis, any city can develop the structures necessary to achieve strategic success.

6 INRIX 2018 Global Traffic Scorecard

FIGURE 2: US CITIES BY MICROMOBILITY POTENTIAL

RANK	CITY	TRIPS 0-1 MILE	TRIPS 1-2 MILES	TRIPS 2-3 MILES	COMBINED
1	Honolulu	25%	19%	12%	55%
2	New Orleans	22%	17%	12%	52%
3	Nashville	22%	17%	12%	51%
4	Chicago	22%	17%	12%	51%
5	Charlotte	20%	18%	13%	51%
6	New York	22%	17%	11%	51%
7	Portland	21%	17%	13%	51%
8	Pittsburgh	23%	17%	11%	50%
9	Los Angeles	21%	17%	12%	49%
10	San Francisco	20%	17%	12%	49%
11	Boston	21%	17%	11%	49%
12	Seattle	21%	16%	11%	48%
13	Denver	20%	16%	12%	48%
14	Miami	20%	16%	12%	47%
15	Tampa	19%	16%	11%	47%
16	Philadelphia	19%	16%	11%	46%
17	Washington	20%	15%	11%	46%
18	Houston	19%	16%	11%	45%
19	Dallas	18%	16%	12%	45%
20	Atlanta	18%	15%	11%	45%
21	Austin	18%	15%	12%	45%
22	Orlando	18%	15%	11%	44%
23	Phoenix	17%	15%	11%	43%
24	Baltimore	18%	14%	11%	43%
25	Minneapolis	17%	14%	11%	41%
City Averages		**20%**	**16%**	**12%**	**48%**

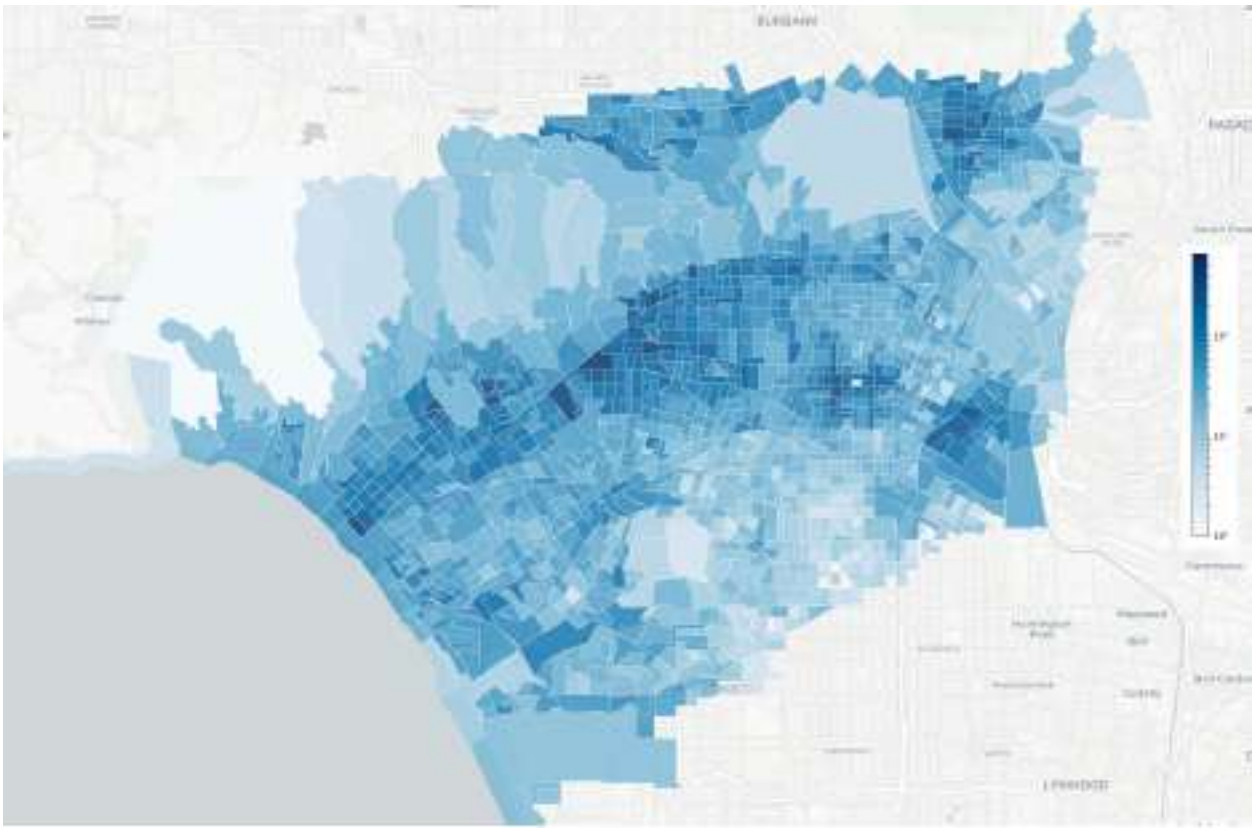
CITY-LEVEL STUDIES

While overall travel trends provide insight into the potential, city-level analysis identifies where shared bikes and scooters could provide the most significant impact. By mapping trips down to the census block level, localized travel patterns emerge. Based upon this information, decision-makers have a powerful tool to identify and prioritize investments. INRIX Research analyzed Los Angeles and New York City to highlight how vehicle trip data could be employed in the development of micromobility services.

LOS ANGELES: SANTA MONICA, HOLLYWOOD, AND DOWNTOWN

When mapping trip origins and destinations to census block tracts, a clear pattern emerges in Los Angles spanning from Santa Monica, through Beverly Hills to Hollywood (darker blue band from west to east in Figure 3). This corridor exhibits a higher proportion of short-distance trips compared to elsewhere in Los Angeles. The high number of short trips highlights the current lack of appealing mass transit services, which is being addressed via the expansion of the Purple Line. Micromobility solutions provide a valuable alternative to driving even before the opening of the Purple Line and will expand the serviceable area of the line following its opening.

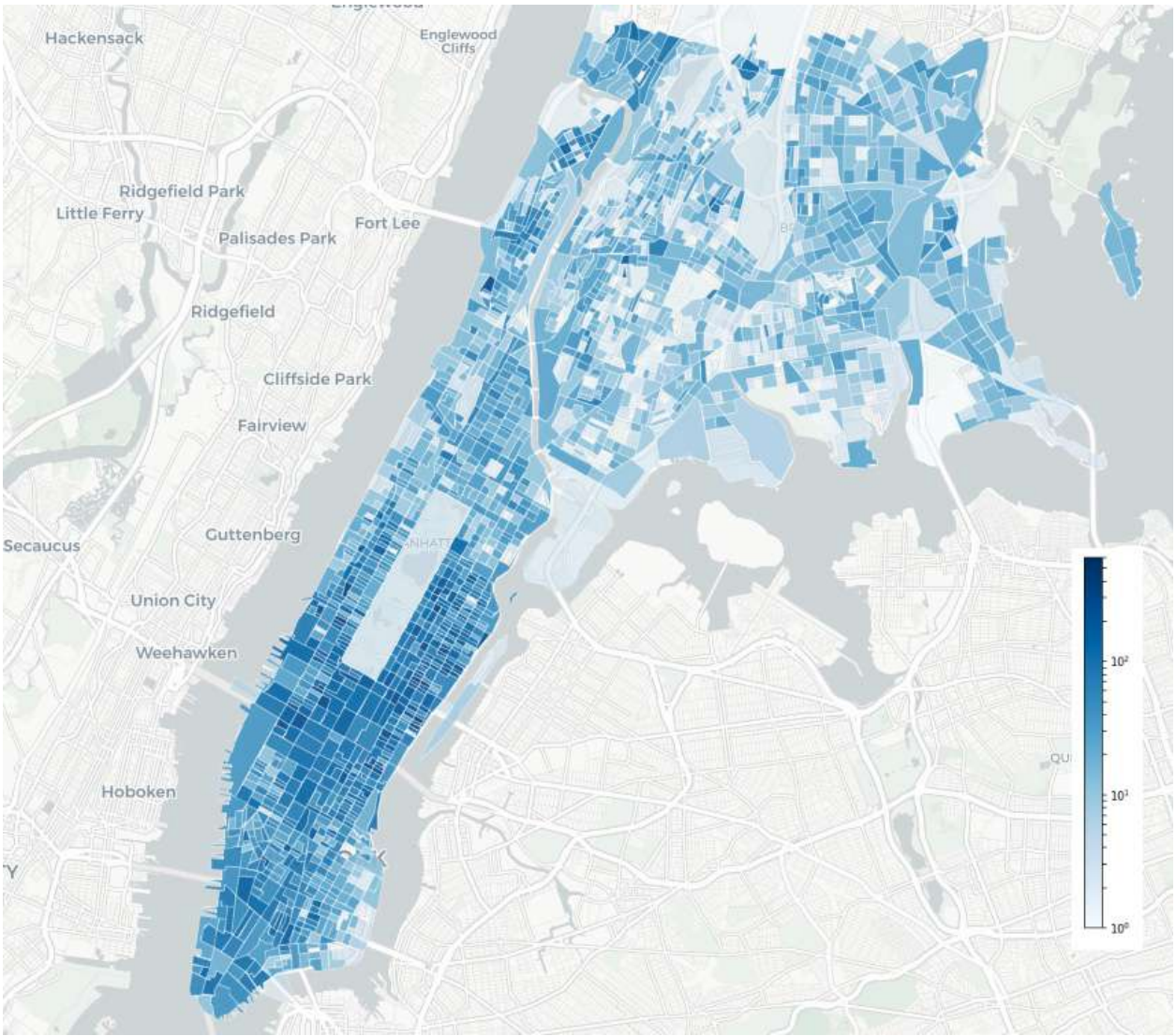
FIGURE 3: LOS ANGELES VEHICLE TRIPS BY CENSUS BLOCK



NEW YORK CITY: MANHATTAN

The highest number of short-distance trips in Manhattan occur in Midtown and the Upper East Side. While Manhattan has the highest transit coverage of any major American city, the Upper East Side has lower access than the Upper West Side, which corresponds to greater proportion of short-distance trips. Similar to Los Angeles' Purple Line Extension, New York City has pursued rail expansion to address low transit accessibility via the 2nd Avenue Subway Extension, with its first phase opening 2017, and proposed second phase to 125th St. Micromobility-as-a-service could provide a valuable alternative to driving in lower transit service areas, and increase the catchment area for existing stations. With congestion tolling and the continued expansion of the protected cycle network in New York City, shared micromobility services could safely provide critical first- and last-mile connections to neighborhoods throughout the city.

FIGURE 4: NEW YORK CITY VEHICLE TRIPS BY CENSUS BLOCK



UNITED KINGDOM ANALYSIS AND RANKING

Analysis of the over 30 million car trips in the UK reveals a much higher proportion of short-distance vehicle trips compared to cities in the US. It is attributable to higher density levels than typically seen in the US (e.g. UK drivers have shorter distances to travel to find the same goods), which comes from cities that were developed before the automobile or around public transit. The pattern of land use makes UK cities, on average, more appealing for micromobility solutions due to the greater opportunity for car trip displacement. The effect of density is reflected in the higher proportion of short trips than in the US with 18% of trips being 0-1 mile, 39% 1-2 miles and 10 % 2-3 miles, versus 20%, 16% and 12% for the US. In total 19% more of vehicle trips in the UK are less than 3 miles compared to the US.

FIGURE 5: UK CITIES BY MICROMOBILITY POTENTIAL

RANK	CITY	TRIPS 0-1 MILE	TRIPS 1-2 MILES	TRIPS 2-3 MILES	COMBINED
1	Manchester	19%	41%	10%	69%
2	Birmingham	17%	41%	10%	68%
3	Glasgow	19%	38%	9%	66%
4	London	18%	38%	10%	66%
5	Sheffield	17%	37%	9%	64%
City Averages		**18%**	**39%**	**10%**	**67%**

LONDON

London exhibits a highly balanced distribution of short duration trips compared to Los Angeles and New York City. It is a product of high public transport coverage and the prevalence of distinct neighborhoods, a reason for London being called a 'city of villages.' London's unique form connected by public transport reduces the need for vehicle trips by providing services easily accessible by walking or public transport. Due to this legacy of walking and public transport (the Metropolitan subway line having opened in 1863), means fewer identifiable areas for the adoption of micromobility services, since the city has a highly efficient spatial form. However, according to INRIX trip data, West London has the highest potential for micromobility services based upon trip length data.

FIGURE 6: LONDON VEHICLE TRIPS BY CENSUS BLOCK

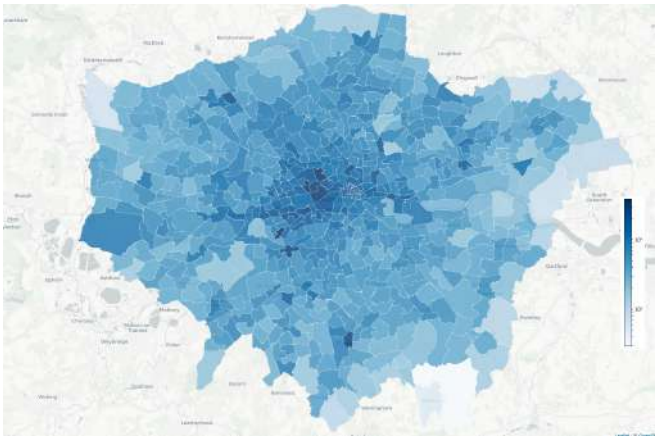
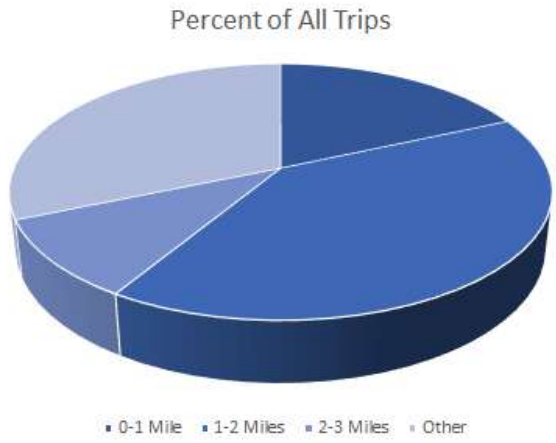


FIGURE 7: UK PERCENTAGES



GERMANY ANALYSIS AND RANKING

From the nearly 25 million trips observed in Germany, INRIX research found the proportion short-distance trips fall between those of the UK and the US with 15% of trips being 0-1 mile, 34% 1-2 miles, and 9% 2-3 miles. It is attributable to city population densities that are greater than those typically found in the US, but less than those in the UK. Unsurprisingly, the top two German cities are also the two densest cities in Germany—Munich and Hamburg.

FIGURE 8: GERMAN CITIES BY MICROMOBILITY POTENTIAL

RANK	CITY	TRIPS 0-1 MILE	TRIPS 1-2 MILES	TRIPS 2-3 MILES	COMBINED
1	Munich	17%	32%	11%	60%
2	Hamburg	15%	35%	10%	59%
3	Berlin	16%	30%	10%	56%
4	Frankfurt	14%	33%	8%	55%
5	Cologne	13%	30%	8%	51%
City Averages		**15%**	**34%**	**9%**	**59%**

MUNICH

Munich has the highest proportion of short distance trips in Germany with 60% of vehicle trips being less than 3 miles. When looking at the distribution of trips across the city, a disproportionate number fall in the city center and region directly north of it. With concentrated investments in micromobility services, Munich could achieve outsized impacts due to the high number of short distance trips in a relatively small geographic area.

FIGURE 9: MUNICH VEHICLE TRIPS BY CENSUS BLOCK

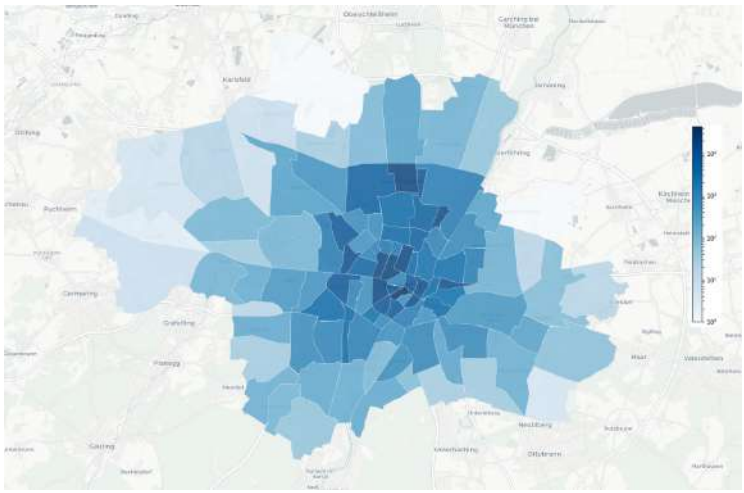
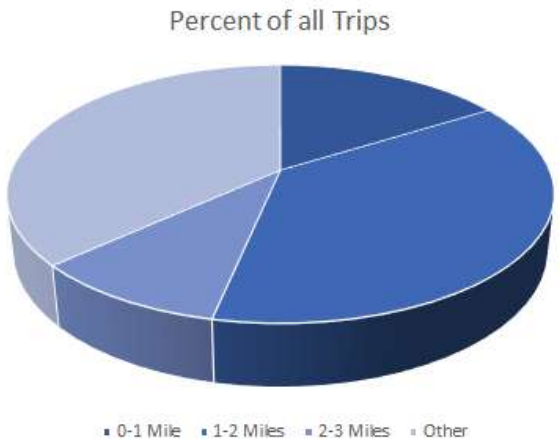


FIGURE 10: MUNICH PERCENTAGES



CONCLUSION

Micromobility faces a promising future by replacing short distance vehicle trips and providing currently underserved first- and last-mile solutions for public transit riders. The exceptionally high number of short duration trips found in all three countries highlights micromobility's massive market potential. Their flexible networks enable dynamic management of transportation networks providing travelers with fast, efficient alternatives to driving.

The ultimate success of these new offerings will be predicated on two key steps: cities having a clear understanding of where micromobility is best positioned to offset vehicle travel; and cities having the necessary tools to engage with and manage these services. Leveraging trip data and insights can provide a foundational view of how people currently move through a city's road networks.

The next challenge has proven more difficult. Cities must effectively partner with and integrate private micromobility offerings. A key challenge being how cities, which have traditionally managed road space with paint and signs, incorporate app-based services.

In July, INRIX expanded its AV Road Rules platform to include support for rules and regulations for on the road, at the curb, and on the sidewalk for micromobility offerings, including features like bike lanes and pick-up/drop-off areas for dock-less scooters or bikes. By leveraging a common platform to manage diverse mobility options, cities can ensure more micromobility solutions will solve transportation problems and deliver on the promises of safety, efficiency and access.

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