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Micromobility: Industry progress, and a closer look at the case of Munich

Shared micromobility continues to develop. What's changed, and what can we learn from one city's first 100 days with e-scooters?

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Shared micromobility is going places: one electric bike or scooter at a time! In our last publication on the topic—"Micromobility's 15,000-mile checkup"—we examined the industry's investment landscape, its economics, and potential global and regional market sizes for shared e-scooters, e-bikes, and e-mopeds. In this article, we provide an overview of micromobility's progress today and offer a detailed look into our micromobility "supermodel." Then, we dive deeper, studying Munich's embryonic market for e-scooters at the 100-day mark, and consider potential shared-micromobility developments covering additional mobility options, including shared e-bikes and mopeds.

Micromobility advances on multiple fronts

Shared-micromobility regulatory development remains fragmented globally, regionally, and even on a city level; some cities, such as London, remain highly restrictive, while others, such as Portland, Oregon, are not. Cities must make the trade-off between potentially cannibalizing car-based mobility and providing first- or last-mile solutions in combination with public transit, on the one hand, and the safety issues and pollution caused by damaged or otherwise unsafe micromobility vehicles, on the other.

Despite such uncertainty, shared micromobility is coming to several of Europe's cities where restrictions do not prohibit its use. What's more, some providers, such as Bird, claim to have significant positive unit economics even today. For these locally focused reasons, we chose to investigate shared micromobility's development at a city level.

To that end, we developed a shared-micromobility city-development supermodel. Starting from the mobility-mode split, which focuses on passenger kilometers traveled and trip distribution, we forecast mobility development through 2030. We considered the theoretical cannibalization potential of micromobility in three different scenarios focused on private-car usage, shared mobility, public transport, biking, and walking.

We investigated more than ten mobility use cases as to their fit with micromobility applications and corrected the theoretical cannibalization potential. Then, we estimated the customer adoption of micromobility options per use case and applied it to the theoretical kilometer cannibalization. The model includes additional correction factors, such as age fit, urbanization, and suitable weather conditions, to end up with the practical addressable kilometers. Finally, we used the results to estimate the shared-micromobility market size and vehicle parc by considering region-specific utilization estimates and pricings.

Modeling Munich's micromobility experiment

We applied our micromobility model to Munich to provide a 2019 perspective on how mobility in the city could develop via three different scenarios.

Today, car-based mobility dominates Munich, and includes roughly 50 to 60 percent of all kilometers traveled, with more than three-fifths of that done by private car. The city's excellent public-transport system handles 30 to 40 percent of the kilometers

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traveled, with walking and biking responsible for the remaining 5 to 10 percent (Exhibit 1). Shared micromobility does not play a major role today.

However, Munich, like nearly every big city in the world, suffers from congestion, especially during rush hours. Such traffic jams add about 15 to 20 minutes of travel time to a 30-minute trip in the mornings and evenings, increasing travel time by 60 percent. Furthermore, the number of cars per capita in Munich is roughly 700 per 1,000 citizens, which earns it sixth place in Germany, measured by penetration—a rate more than twice that of Berlin today.

E-scooters take to the streets

When we performed this analysis, e-scooters had been cruising Munich's streets for exactly 100 days. Six e-scooter providers (Bird, Circ, Hive, Lime, Tier, and Voi) installed more than 2,000 shared e-scooters in Munich within the first 100 days, affirming their belief in this new transportation mode.

According to civity.com, an e-scooter completes about 5.5 trips a day, with an average trip distance of approximately two kilometers. Provider Tier has a collaboration with Munich's transportation agency, MVG, that suggests micromobility might be not only a competitor to public transport but also a useful tool to close the first- and last-mile gaps to public-transport stations.

In our 2030 base-case modeling, we assumed that people adopt shared micromobility (including e-scooters, e-bikes, and e-mopeds) to replace cars for daily mobility use cases such as commuting, going to leisure activities, and traveling within the city center. The city council encourages this usage via better development of biking lanes accessible to micromobility vehicles, a regulatory framework that allows easy use of micromobility, and hubs that make the switch between micromobility and public transport convenient and seamless.

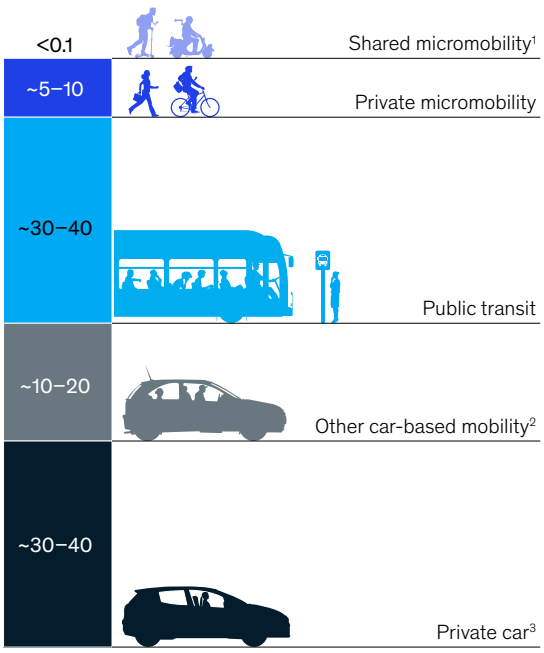
In this base case, our model estimates about 250 million shared-micromobility trips in Munich in 2030, which represents approximately 8 to 10 percent of all trips in Munich that year (Exhibit 2). This is roughly four to five times higher than in our pessimistic scenario, where we assume that shared micromobility would remain a niche phenomenon beyond its hype in the beginning, rather used for sightseeing tours or for fun. Our disruptive case, on the other hand, shows that micromobility could account for more than 15 percent of all passenger trips in Munich in 2030 if the city invested heavily in private and shared-micromobility infrastructure.

Of these 250 million micromobility trips in 2030, about 30 to 40 percent would have used car–based mobility if shared micromobility were not available. This includes direct cannibalization of private-car trips as well as indirect cannibalization, meaning that other modes of transport, especially public transport, will become more attractive as a result of the opportunity to close the first- and last-mile gap with shared-micromobility solutions and thus cannibalize private-car trips.

Exhibit 1

Mobility in Munich today is dominated by private cars.

Distribution of passenger-kilometers traveled in Munich today ('mode split'), % of kilometers traveled



[1] Includes shared e-bikes, e-mopeds, and e-scooters.
[2] Motorized individual transport: passengers.
[3] Motorized individual transport: drivers.

Source: *Mobilität in Deutschland, Kurzreport Stadt München*, 2019; McKinsey analysis

Exhibit 2

Analysis estimates that there will be 250 million shared-micromobility trips by 2030.

Number of shared-micromobility trips in Munich, million

Today **<0.1**

Pessimistic scenario 2030 **~50–65**

Shared micro-mobility remains niche phenomenon beyond hype in the beginning

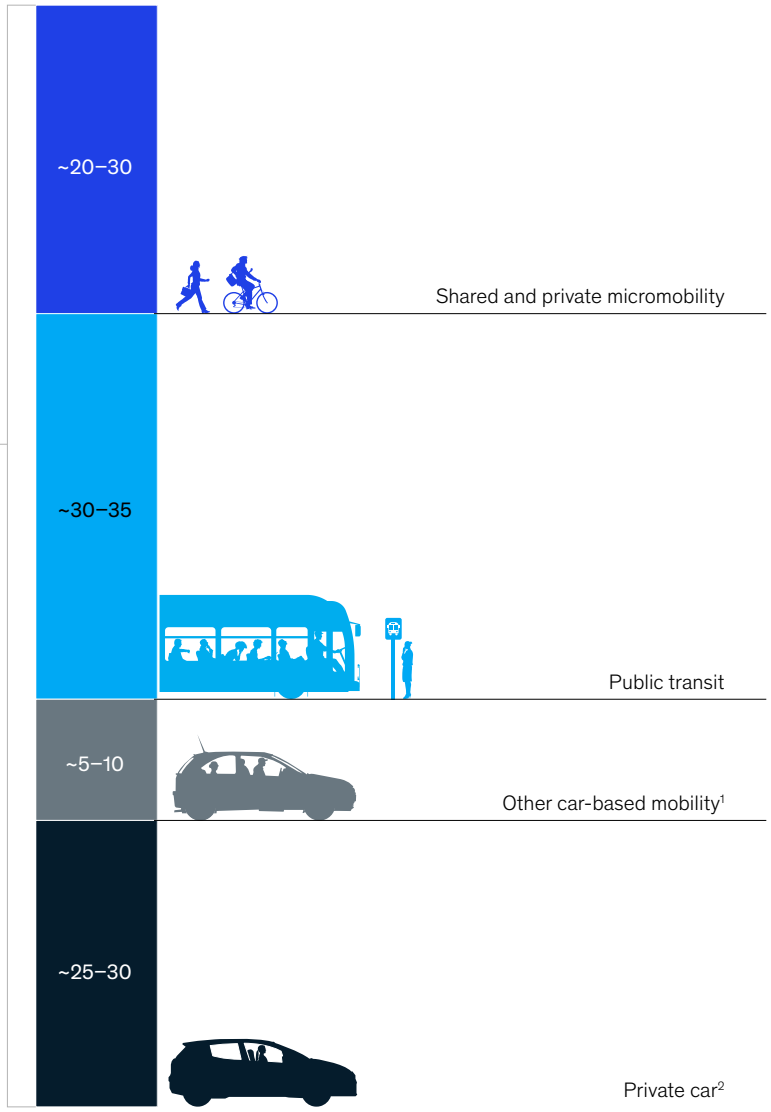
Base scenario 2030 **~250**

Citizens adopt shared micromobility as additional mobility mode, which is further incentivized by the city

Disruptive scenario 2030 **>350**

City invests heavily in private- and shared-micromobility development and infrastructure

Cannibalization of transportation modes by shared-micromobility trips, 2030, base scenario, % of total trips



[1] Includes taxis, car rentals, car sharing, and other modes of non-private-car mobility.
[2] 10–20% by indirect cannibalization.

Source: *Mobilität in Deutschland, Kurzreport Stadt München*, 2019; press search; Statistisches Amt München, 2018; McKinsey analysis

Exhibit 3

Micromobility could have a significant impact in Munich by 2030.

80,000

tons of CO_2 emissions reduced; the equivalent of the yearly CO_2 emissions of 10,000–15,000 Germans

4

hours saved per passenger per year; the equivalent of half an average working day per passenger

130

hectares of green areas added; the equivalent of 180 football fields

Source: INRIX 2018 Global Traffic Scorecard; Kraftfahrt-Bundesamt; Landeshauptstadt München; *Mobilität in Deutschland, Kurzreport Stadt München*, 2019; press search; Zukunft Mobilität; McKinsey analysis

Furthermore, one-third of shared-micromobility trips would come from public transport in 2030, based on the assumption that Munich will promote public-transit ridership in the future. Because of this cannibalization of car-based mobility in Munich, our base-case modeling shows the potential impact in 2030 (Exhibit 3). Micromobility could save an estimated 80,000 tons of car-based carbon-dioxide (CO_2) emissions compared with today—and this corresponds to the CO_2 emissions of about 10,000 to 15,000 citizens in Germany per year. The resulting impact on congestion could lead to savings of about four hours per passenger per year. Furthermore, the saved space—inner-city parking spaces might account for approximately 130 hectares—would equal several new parks with a total size of about 180 soccer fields or roughly 600 kilometers of new bike lanes.

Micromobility could enable Munich to begin to unwind its heavy traffic congestion, but success will require strong public–private partnerships and a conducive regulatory environment. Stakeholders will also need to tackle today's challenges and pain points, including driving-safety concerns, weather protection, and the integration of a seamless mobility offering.

We plan to update our perspective on a yearly basis to take the latest mobility developments into account and to track the future of shared micromobility even further and more precisely. This modeling approach can apply to every city worldwide, giving stakeholders a means of determining future opportunities and challenges as the micromobility story unfolds.

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