An Overview of Shared Mobility Growth, Trends, and Indicators to Watch

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Presentation Overview

- Shared Mobility, Trends, and Indicators to Watch
- Shared Mobility Growth and Industry Benchmarks
- Shared Mobility and Public Transportation
- Integrated Mobility and Emerging Technologies
- Concluding Thoughts

Shared Mobility, Trends, and Indicators to Watch

HYPE?

Uber Proposals Value Company at $120 Billion in a Possible IPO

Eye-popping offering, which could take place early next year, is nearly double the ride-hailing company's valuation in a fundraising round two months ago

How Many Uber and Lyft Drivers Are in Recalled Cars?

Uber, Lyft could solve transportation problems

"We're heading towards hell": Expert shares concerns with self-driving cars

How Self-Driving Cars Could Shape Our Future

Once challenges are surmounted, the world (and world of business) may be altered forever.

Blockchain Becoming Integral To Leading Vehicle Brands With The Future In Mind

Five myths about autonomous vehicles

The Evolution of Mobility

Motorization

- Strong public sector involvement in policy and infrastructure
- *Proactive Government and Industry*

Rise of Environmental and Safety Regulation

- Strong public sector involvement in regulation
- *Proactive Government*

Transportation Demand Management

- Moderate public sector involvement in programs, such as carpooling/vanpooling
- *Proactive Government*

The Rise of Sharing

- Private-sector driven innovations in mobility
- *Proactive Industry; Reactive Government*

The Rise of Disruption

- New technologies and modes disrupt the marketplace (e.g., AVs, SAVs, EVs, UAM)
- *Proactive Industry; Reactive Government??*

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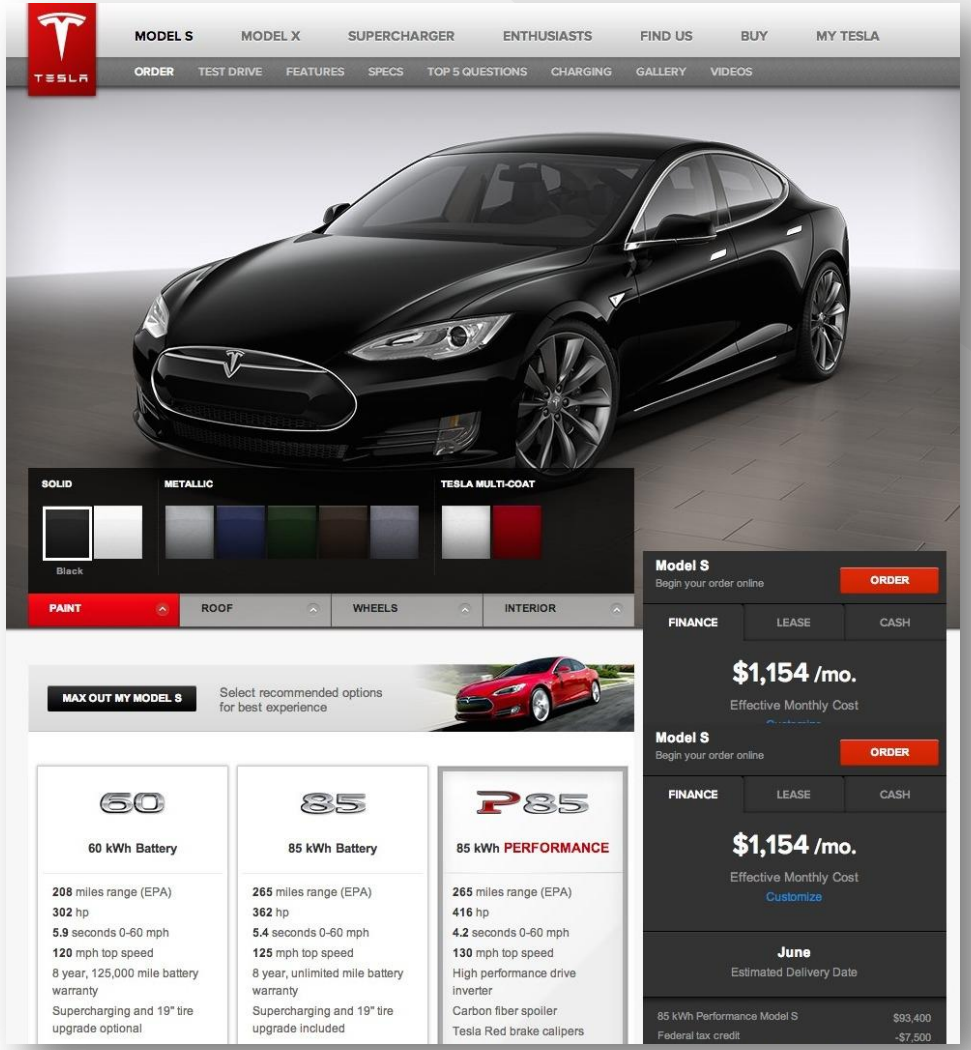
Three Digital Trends Impacting the Economy

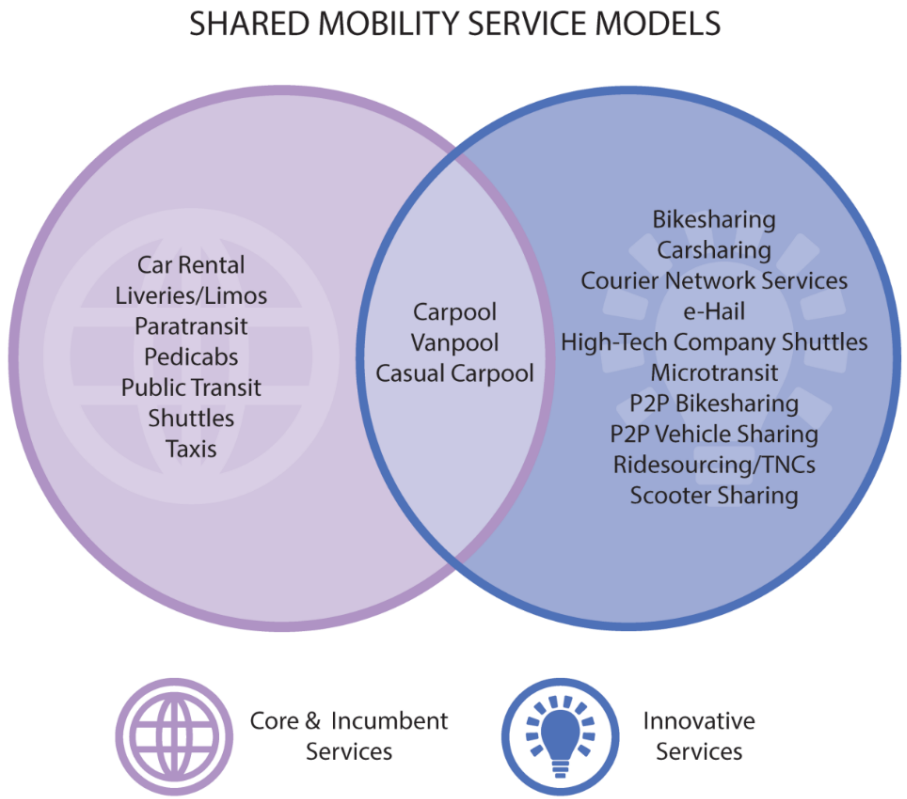
- Disintermediation – Using digital marketplaces to cut out the middle man
- Disaggregation – Breaking up large purchase (e.g., vehicles, real estate, etc.) and repackaging as services
- Dematerialization – Turning the physical world into the virtual (virtual reality, 3D printing, etc.)



Public or Private?

Shared Mobility Services

The **shared use of a motor vehicle, aircraft, drone, delivery vehicle, bicycle, scooter, or other mode** - is an innovative transportation solution that enables users to gain **short-term access to transportation or goods on an "as-needed" basis**



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Shared Mobility Services

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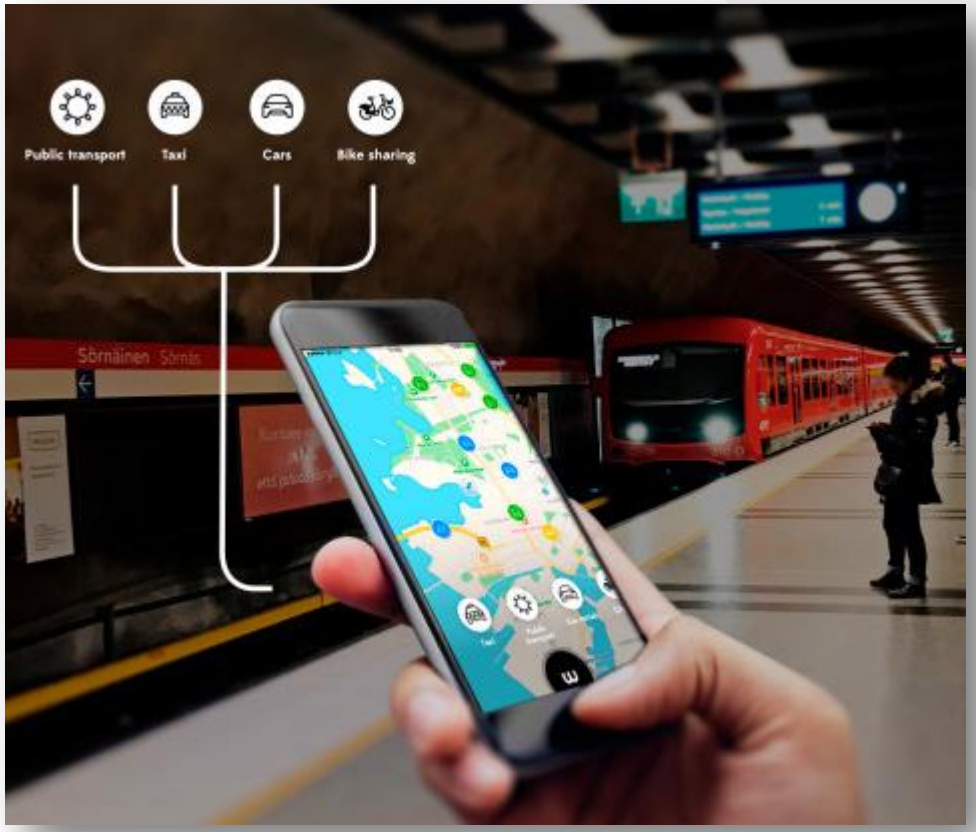
A Shifting Transportation Landscape

Changing Attitudes Toward Technology

- Millennials have embraced apps and other technologies
- More travelers are substituting physical trips with virtual trips
- Impact of telecommuting and e-commerce on vehicle ownership and use is less clear
- Emerging technologies are reducing need for brick-and-mortar retail consumption and workers to be physically present in an office



A Shifting Transportation Landscape

Innovative partnerships and emerging technologies are changing how consumers travel

- The public sector is leveraging shared mobility to address service gaps
- Integrated multimodal traveler information apps improving to include a variety of public and private options
- Auto manufacturers and technology companies are rebranding as mobility companies, acquiring start-ups, and pursuing self-driving vehicles
- Mobility on Demand (MOD) piloting in the U.S.
- Mobility as a Service (MaaS) piloting in Europe (e.g., Finland, Sweden, Netherlands)

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Current Issues

Evolving Public Agencies

- Agencies are faced with a rapidly-evolving landscape for providing mobility choices to travelers
- How do we plan and adapt public rights-of-way? (both street and curb space management)
- How do we prepare for an electric and automated vehicle future?

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Current Issues

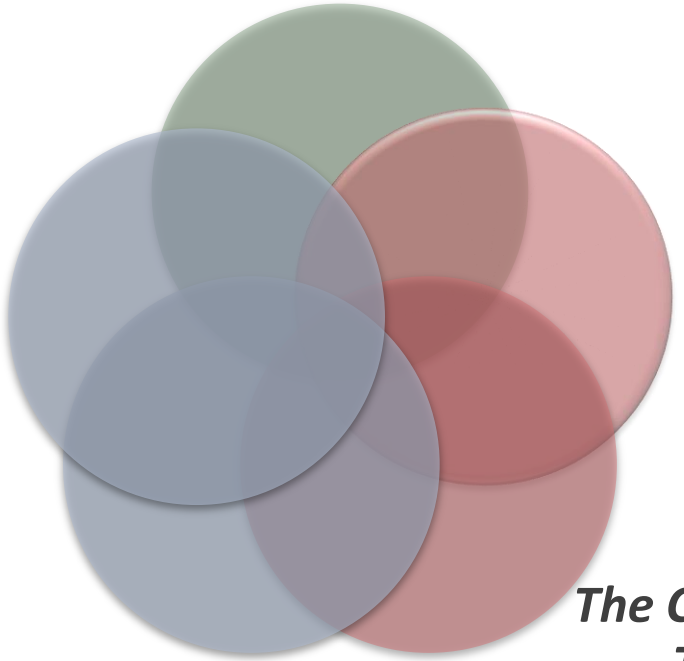
Changing Consumer Expectations

- Shared mobility can provide a suite of strategies for providing travelers effective choices to enhance accessibility and improve travel reliability
- Travelers use more and different forms of transportation than ever before
- Travelers increasingly expect to have real-time, dynamic, actionable information before and during their tripmaking

Five Converging Mobility Innovations

Shared Mobility, Shared Micromobility, and Last-Mile Delivery

Electrification



Digital Information & Fare Payment Integration

Automation

The Commodification of Transportation

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Shared Mobility
Growth and Industry Benchmarks

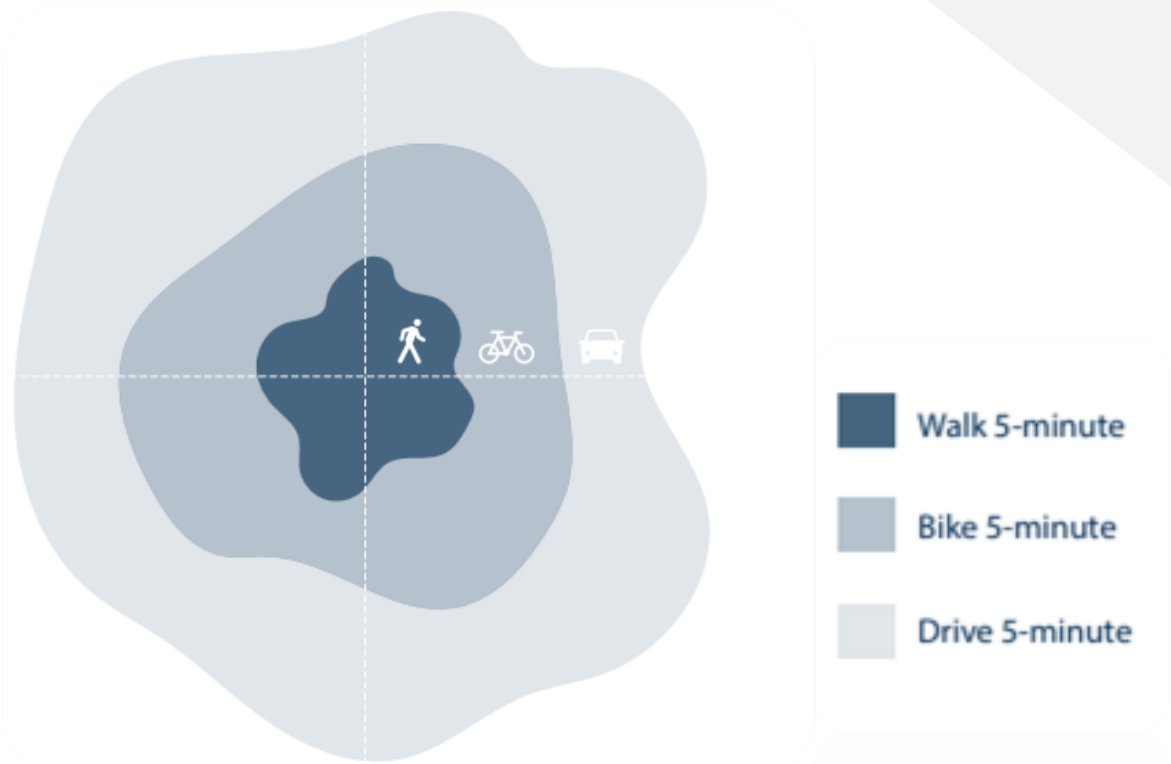
Growth of Shared Micromobility

Station-based Bikesharing

Dockless Bikesharing

Standing Electric Scooter Sharing

Moped-style Scooter Sharing



Key Global Shared Micromobility Benchmarks

As of May 2018 - 1,600 information technology-based public bikesharing systems worldwide with over **18.17 million bicycles**

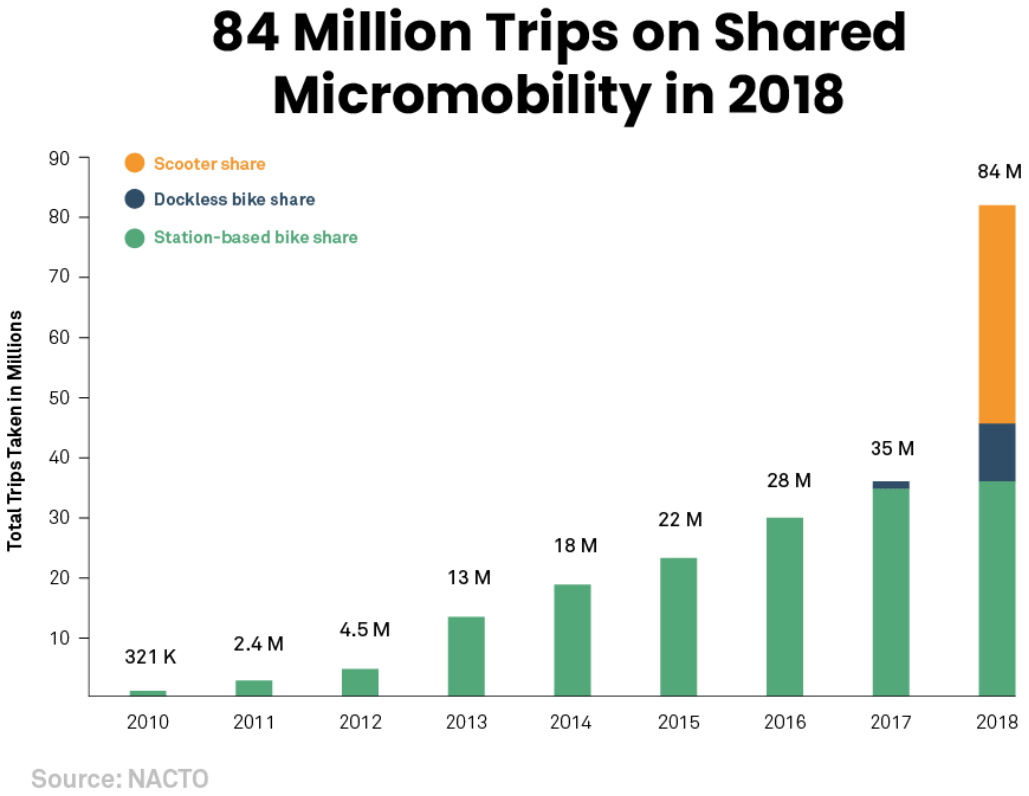
U.S.

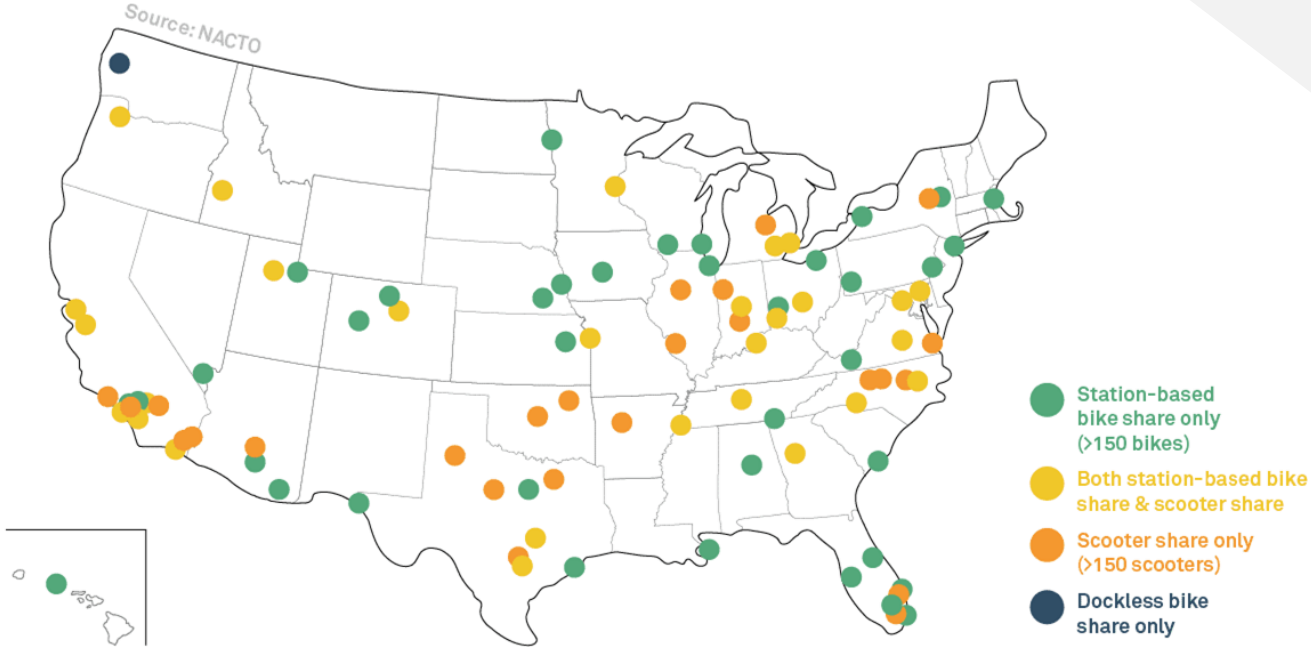
- Between 2010 to 2018, 207 million shared micromobility trips have been completed in the U.S.
- In 2018, 36.5 million trips were completed using station-based bikesharing, 9 million trips on dockless bikesharing, and 38.5 million trips on shared e-scooters.

China

- As of May 2018, there were 6.1 million bicycles shared by more than 640 bikesharing programs in China

Shared Micromobility in the U.S.





Key Global Carsharing Benchmarks

As of October 2016, carsharing was operating in **46 countries** and **six continents**, with an estimated **2,095 cities** and approximately **15 million members sharing over 157,000 vehicles**.

Region	Members	Vehicles	Member-to-Vehicle Ratio
Asia	8,722,138	67,239	129.5
Europe	4,371,151	57,857	75.6
North America	1,837,854	26,691	68.9
Other	119,049	5,629	21.1
Global	15,050,192	157,416	95.6

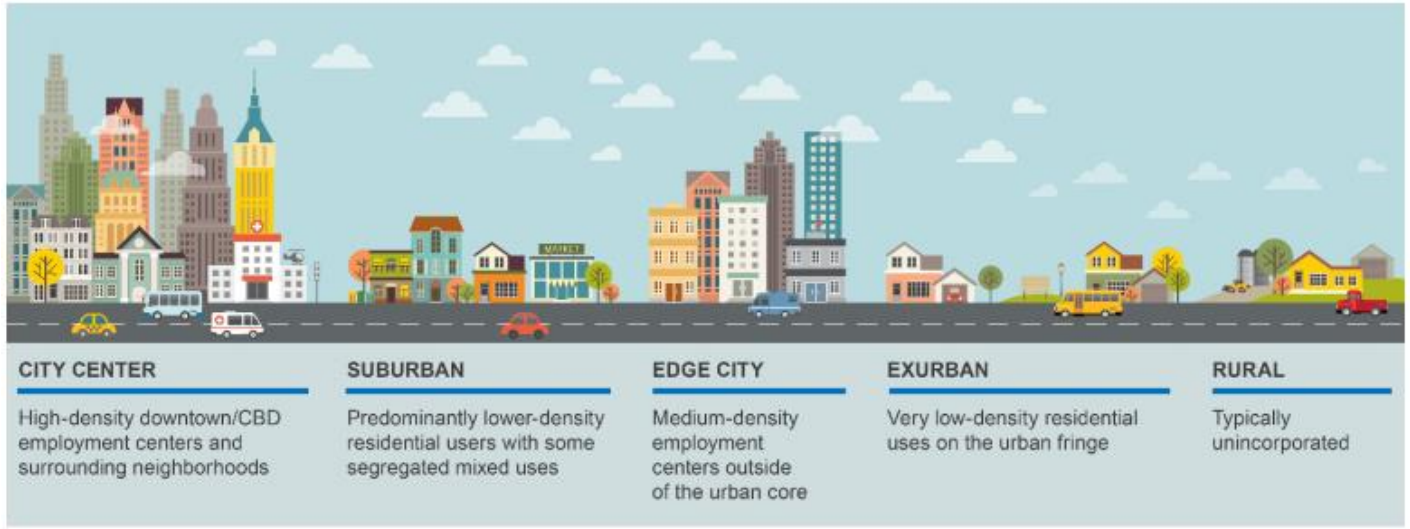
Key Global TNC/VTC Benchmarks

	Uber	Lyft	Grab	DiDi
Area of operation	600 cities in 65 countries worldwide	300 US cities, 2 Canadian	Southeast Asia	400 Chinese cities, Brazil, Japan, Mexico, Australia, Hong Kong, Taiwan
Launched	March 2009	June 2012	June 2012	June 2012
Headquarters	San Francisco, US	San Francisco, US	Singapore	Beijing, China
Users	75 million	23 million	36 million	550 million
Drivers	3.9 million	1.4 million	2.6 million (all time)	21 million
Rides per Day	14 million	1 million	4 million	30 million
Total Trips	10 billion	1 billion	2.5 billion	7.4 billion in 2017

Source: Business of Apps

Shared Mobility and Public Transportation

The Role of the Built Environment



- Context in the built environment matters
- One size does not fit all
- Solutions must be tailored to meet a diverse array of needs, use cases, and urban contexts

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The Role of the Built Environment

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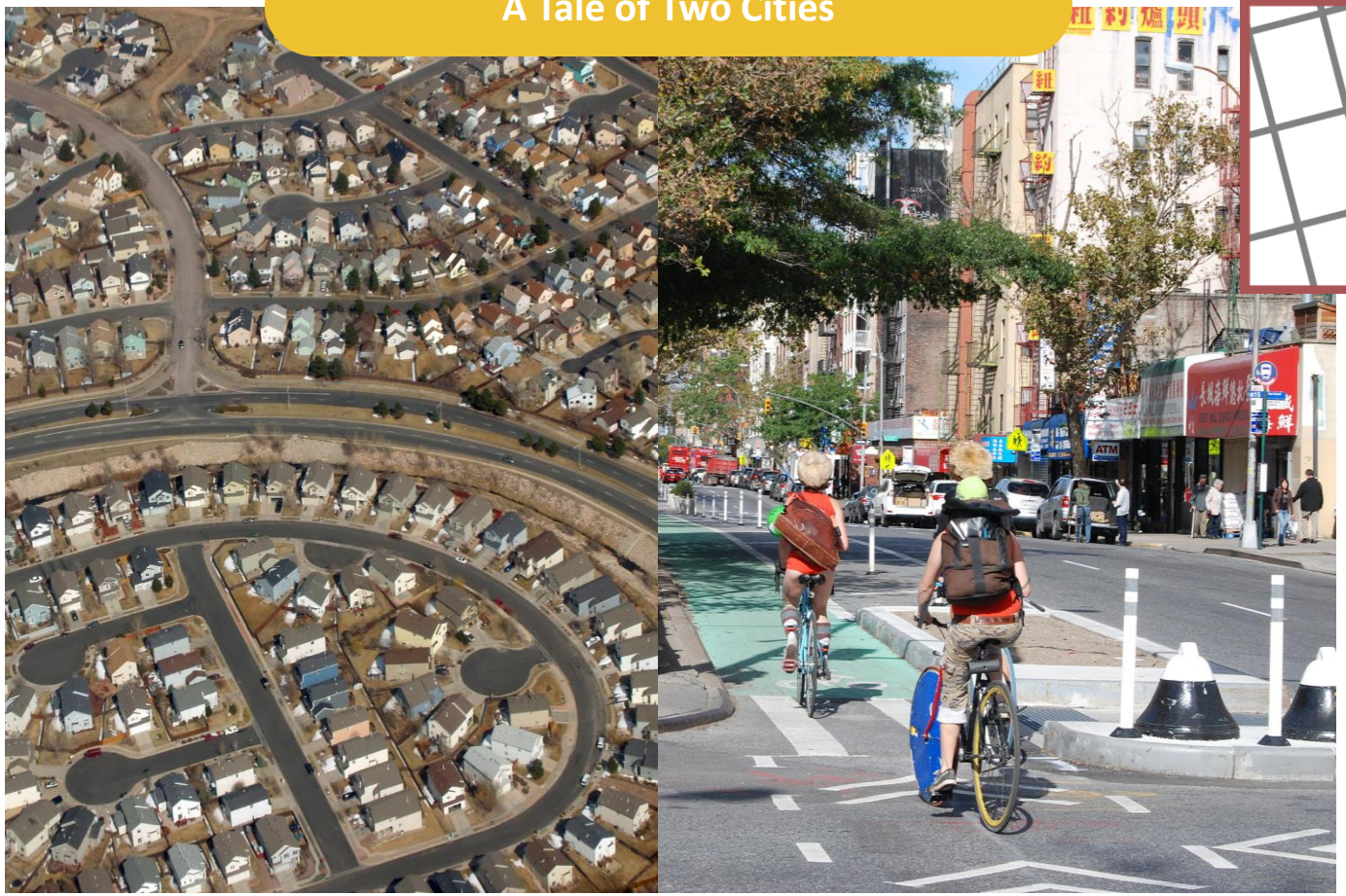
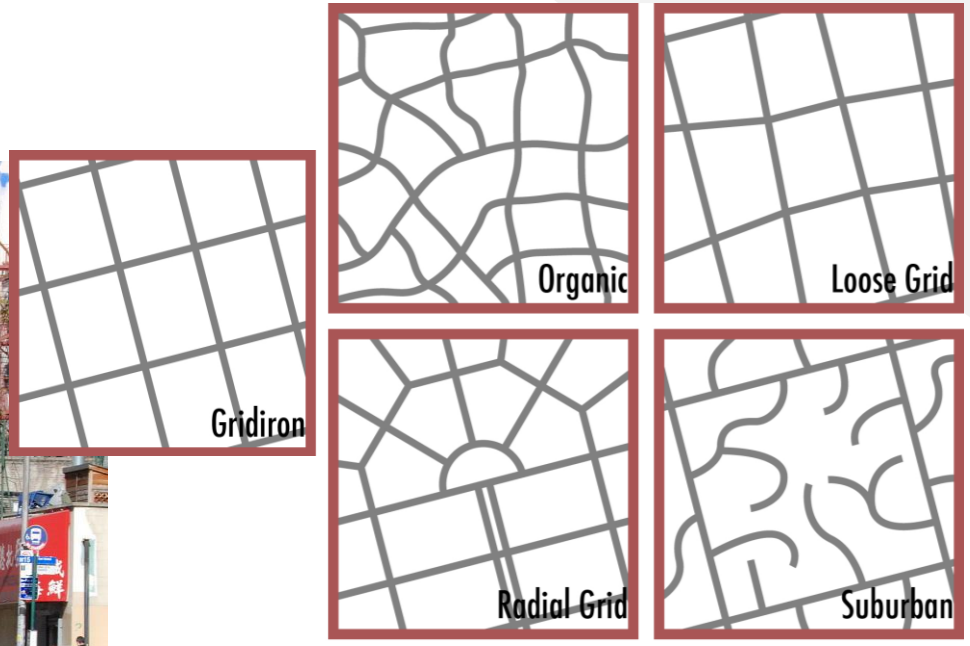
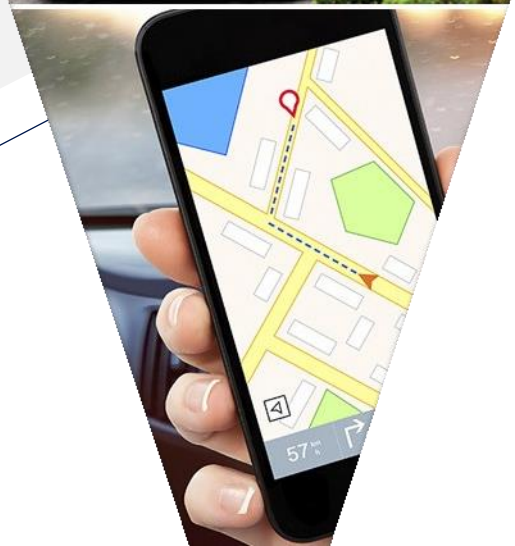
A Tale of Two Cities





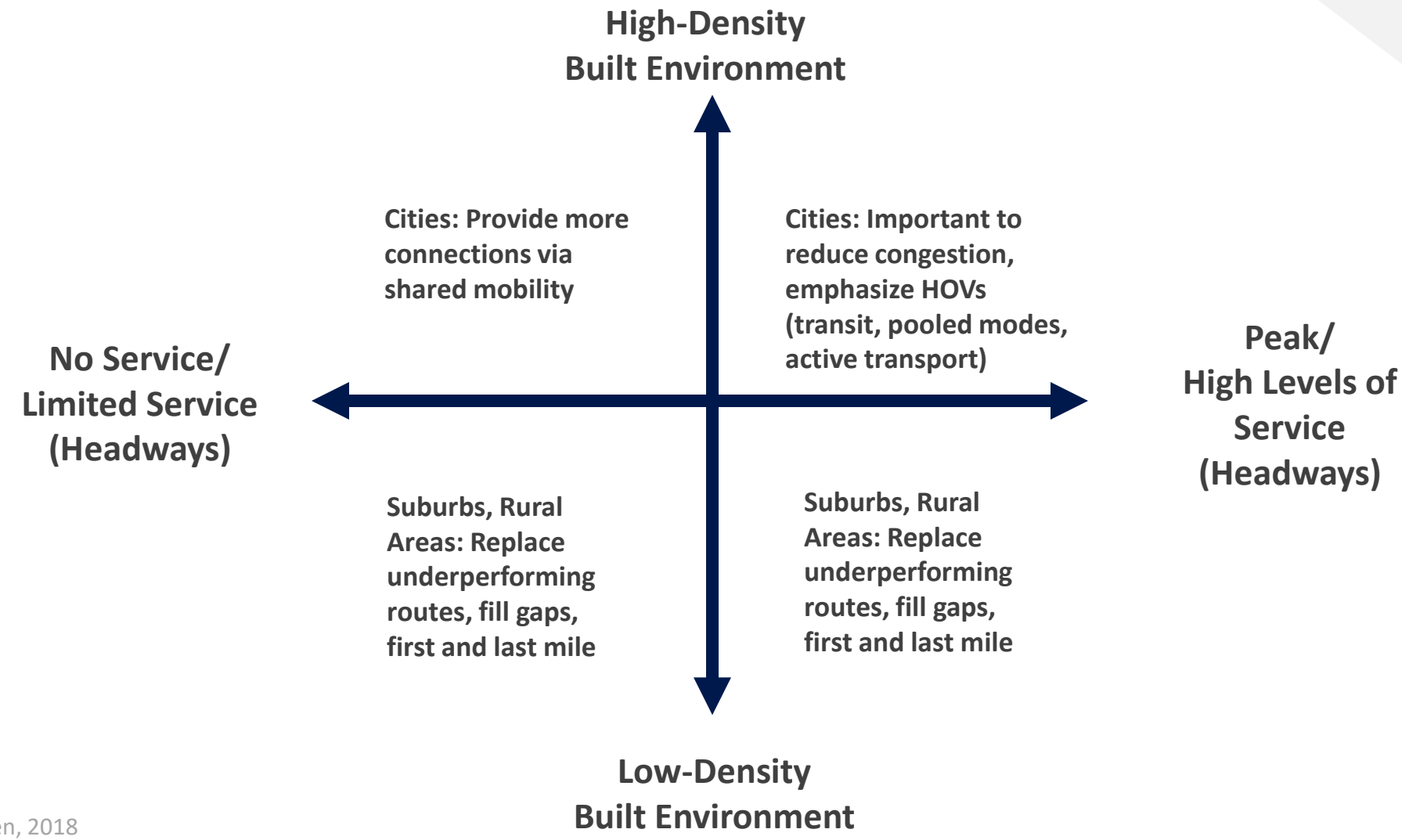
- Street layout and density may be the most important factors influencing the types of adoption of new transportation technologies
- Walkability, bikeability, and transit accessibility, are also key



The Relationship Between Shared Mobility & Public Transit

- First-and-Last Mile Connections
- Public Transit Replacement
- Low Density Service
- Late Night Transportation
- Paratransit
- Others …

The Relationship Between Shared Mobility & Public Transit



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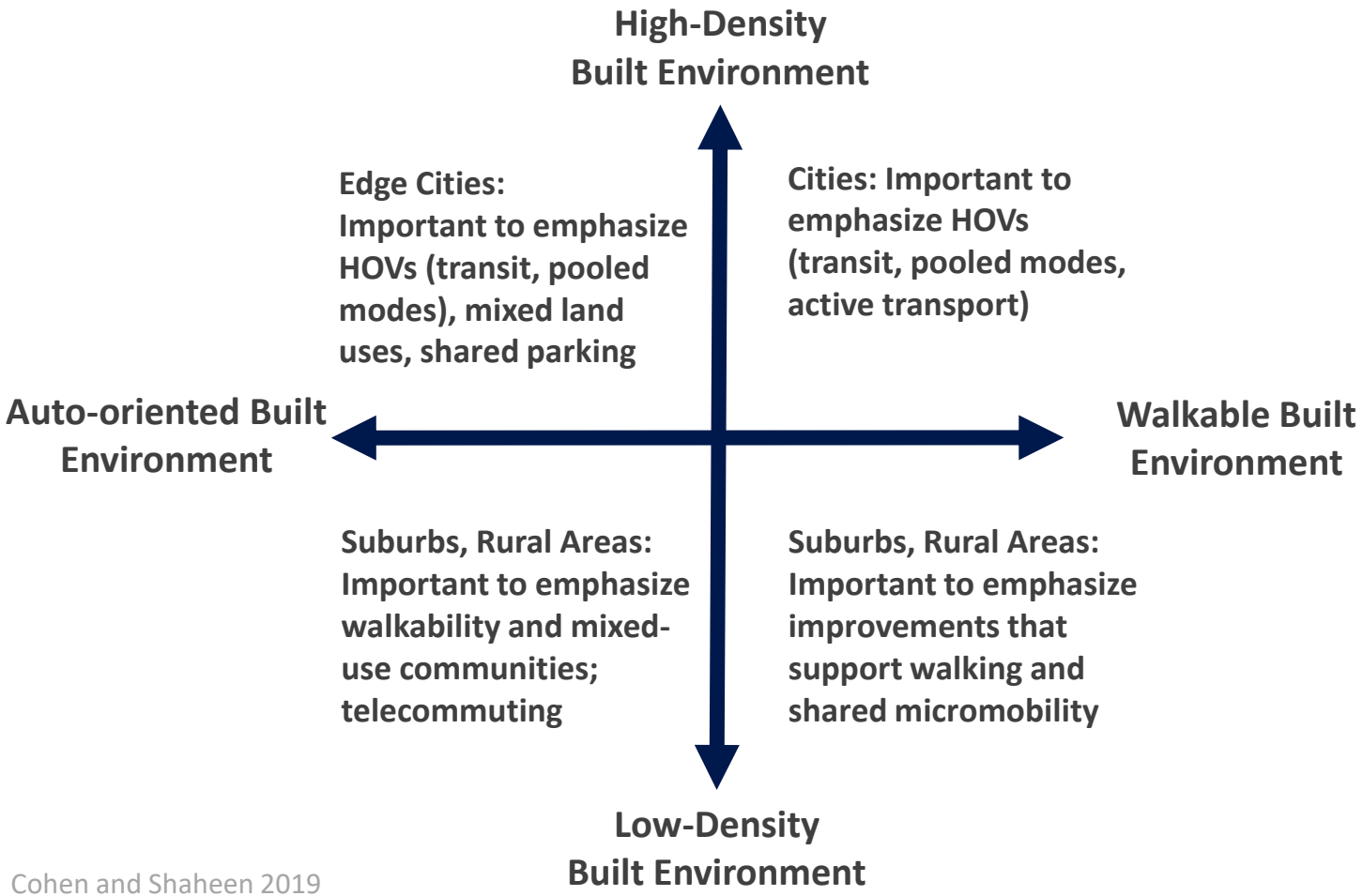
The Relationship Between the Built Environment, Shared Mobility, and Motorized Vehicles



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Summary of Shared Mobility Impacts on Public Transportation

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Mode	Decrease/Increase	Public Transit Impacts
Roundtrip Carsharing (N. America)	Net decrease (-)	For every 5 members that use rail less, 4 ride it more; For every 10 members that use the bus less, 9 ride it more.
One-Way Carsharing (N. America)	Net decrease, although an exception in Seattle (- / +)	In Seattle, where a small percentage of respondents increase their use exceeding the smaller percentage of respondents decreasing their rail use. Across the other four cities, more people report a decrease in their frequency of urban rail and bus use than an increase.
P2P Carsharing (N. America)	Net decrease (-)	Those increasing and decreasing their bus and rail use were closely balanced in number, with 9% increasing bus and 10% decreasing use. Similar effects were found with rail, as 7% reported increasing rail use, while 8% reported decreasing it.
Station-Based (Docked) Bikesharing (N. America Multi-City Studies)	Net increases in bus/rail in small- and medium-sized cities Small net decreases in bus/rail in larger cities (+ / -)	-Small net increases in bus and rail use in small- and medium-size cities (e.g., Minneapolis) -Small net decreases in bus and rail use in larger cities (e.g., Mexico City)
Pooling (Casual Carpooling in Bay Area)	Net decrease (-)	Majority of casual carpoolers were public transit users. In the Bay Area, 75% were casual carpoolers.
Ridesourcing/TNCs (SF Bay Area)	Net decrease (-)	33% competition with public transit, 4% first mile and last mile (destination or origin is public transit stop)

Shaheen et al. 2018

Early Understanding of Shifts to Scooter Sharing from Other Modes

Study Authors Location Survey Year Mode	PBOT (Residents) Portland, OR 2018	PBOT (Visitors) Portland, OR 2018	6t Paris, FR 2019
Drive (%)	19	16	3 1 (carsharing)
Public Transit (%)	10	4	49
Taxi or TNC/VTC (%)	16	34	10
Bike (%)	9	4	14
Walk (%)	37	35	6
Would not have made trip (%)	8	5	0.5
Other / Other TNC (%)	1	1	1

Note: Mode replacement findings of these studies employ various methodologies, depending on survey instrument used and analysis methods chosen. Different methodologies can have a notable impact on findings.

A Few Notes About Portland

- Average trip length was 1.15 miles (1.85 km)
- 29% of respondents used scooters for recreational purposes

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Shifts to TNCs/VTCs Predominantly from Driving, Public Transit, and Taxis

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Mode / Study Authors, Location, Survey Year	Rayle et al. San Francisco, CA 2014	Henao Denver and Boulder, CO 2016	Gehrke et al. Boston, MA 2017	Clewlow and Mishra Seven U.S. Cities Two Phases, 2014 – 2016	Feigon and Murphy Seven U.S. Cities 2016	Hampshire et al. Austin, TX 2016
Drive (%)	7	33	18	39	34	45
Public Transit (%)	30	22	42	15	14	3
Taxi (%)	36	10	23	1	8	2
Bike or Walk (%)	9	12	12	23	17	2
Would not have made trip (%)	8	12	5	22	1	-
Carsharing / Car Rental (%)	-	4	-	-	24	4
Other / Other TNC (%)	10	7	-	-	-	42 (another TNC) 2 (other)

Shaheen et al. 2018

Note: Mode replacement findings of these studies employ various methodologies, depending on survey instrument used and analysis methods chosen. Different methodologies can have a notable impact on findings.

Barriers to Behavioral Change

- Density and Built environment
  - Walkability, bikeability, public transit accessibility
- Habitual Experience
  - Change is difficult
- Convenience
- Cost
  - Sunk cost of driving (high up-front costs)
  - Inexpensive driving costs (free parking, low-cost fuel)
- Lifecycle Factors
  - Younger drivers (a new feeling of freedom)
  - Families (vehicle ownership is convenient and/or necessary with children)
  - Older adults (don't want to give up freedom)
- Equity/Access Factors
  - No smartphone and/or debit/credit card access
  - Accessibility for people with disabilities

Shaheen and Cohen, 2018

Current Impacts: Understanding and Challenges

- Positive and negative impacts of shared mobility
- Impacts vary depending on mode, metrics measured, and methodology
- Impacts differ based on time of day, location, built environment, transit accessibility, and urban context
- Data challenges (privacy, competition, duopoly)
- Challenging to show and confirm causality
- Our research indicates land-use/built environment and socio-demographics differ by city
- Hard data to obtain including: % at peak/% at off-peak, driver VMT impacts when using two or more apps, occupancy rates, impacts of pricing and AVs

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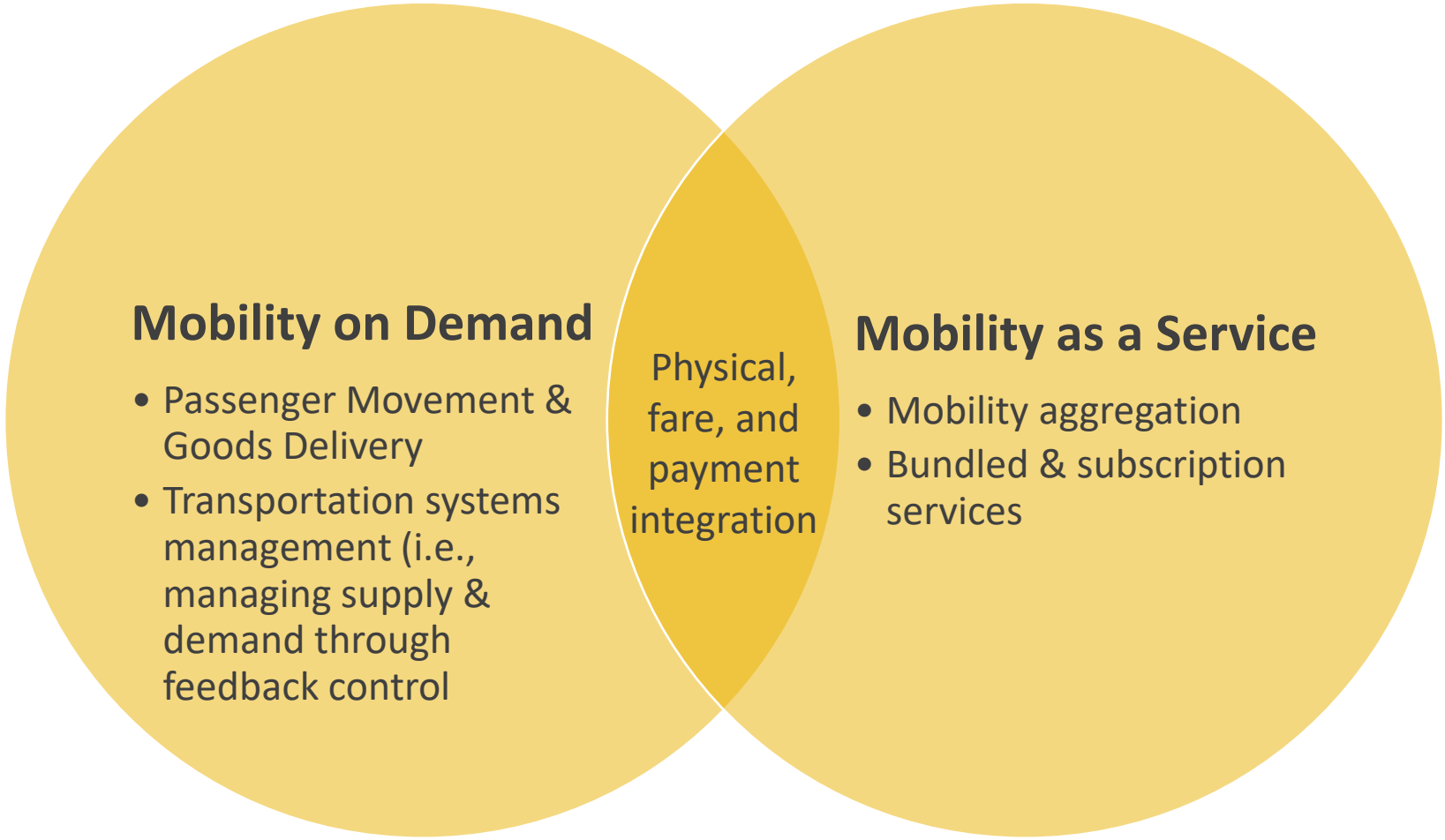
Integrated Mobility and Emerging Technologies

MOD & MaaS
Similarities and Differences



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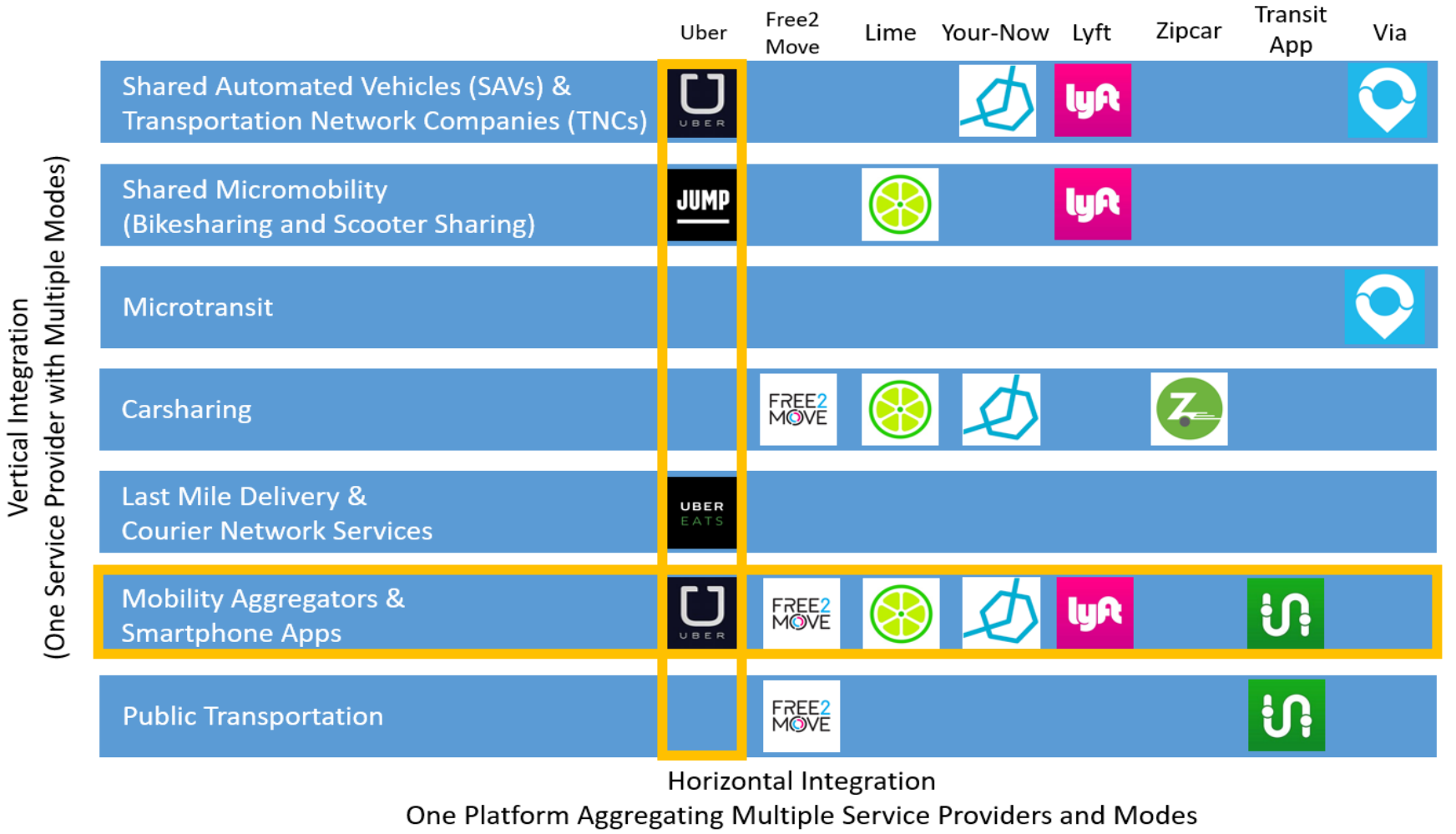
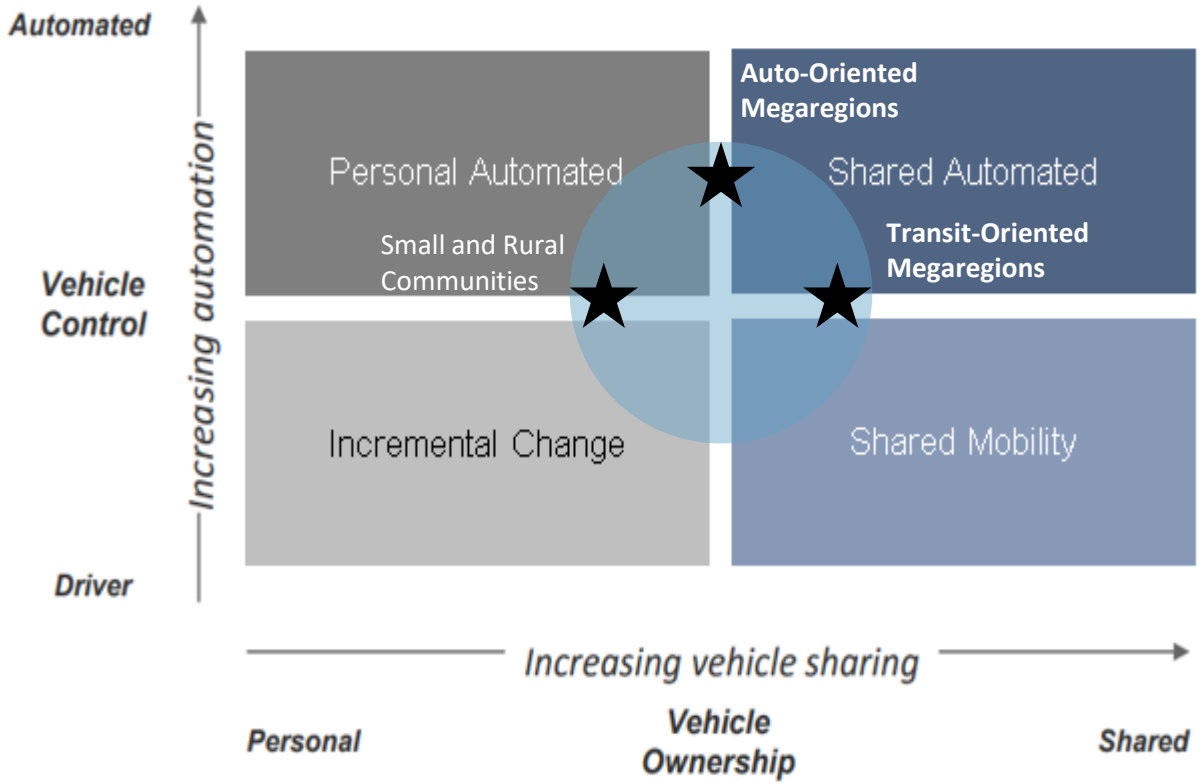
Vertical vs. Horizontal Integration



Shared Automated Vehicles (SAVs)

- Automation could change public transit by altering the built environment, costs, commute patterns, and modal choice
- SAVs could reduce parking needs, creating opportunities for infill development to non-vehicular modes
- AVs could reduce the operating costs for transit that could be passed onto riders in lower fares, more routes, and/or more frequent service
- AVs and telecommuting could also make longer commutes more practical and contribute to sprawl



Source: Adapted from Deloitte

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Urban Air Mobility

Passenger Mobility and Goods Delivery

- The safe and efficient system for air passenger and cargo transportation within an urban area, inclusive of small package delivery and other urban Unmanned Aerial Systems (UAS) services, which supports a mix of onboard/ground-piloted and increasingly autonomous operations
- Notable investments are being made around the globe in electric and autonomous urban aviation

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Concluding Thoughts

Key Questions Asked by Public Agencies

- How do public agencies prepare and plan for mobility innovations?
- When does shared mobility complement public transit and when does it compete?
  - How does it vary by mode & context?
- What factors influence complementarity vs. competition?
- How can shared mobility be used to enhance accessibility to areas without transit service?
- How can shared mobility be used to improve efficiency and/or reduce service inefficiencies?
- How should public transportation respond to short, mid, and long-term changes? (e.g., shared mobility, AVs, SAVs, and other innovations)

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Policy Implications and Recommendations

- What policies make sense not just for shared mobility providers but all transportation modes moving forward (level playing field)
- Emphasis needed for mobility hub planning that includes public transit, shared mobility, last mile delivery, and aviation services (where available)
- Stakeholders are beginning to discuss usage-based pricing mechanisms in some cities, which could possible include:
  - Trip-based fees;
  - Mileage-based pricing;
  - Spatio-temporal pricing (cordon pricing, express lanes, curb pricing);
  - Mode or occupancy-based fees;
  - Access to high occupancy vehicle lanes or express lanes;
  - Others…?

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Additional Resources

- Shared mobility resource library available on http://innovativemobility.org/?page_id=2762

Thank You.

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