Adoption of New Technologies and Their Environmental Impacts

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About 10% of U.S. residents (aged 16+) used ridehailing services in the past 30 days.
Adoption of Ridehailing: 2015-2018

Source: California Mobility Panel Study, 2015-2018 data
Investigating Differences Across Groups of Users

Latent-class adoption model to investigate differences in the use of ridehailing:

**Adoption Rate: 47%**
- Higher-educated independent millennials who live in more central areas and in households without kids
- The adoption rate significantly increases as the rates of technology adoption and frequency of long-distance leisure travel by plane increase.

**Adoption Rate: 27%**
- Most affluent individuals, predominantly dependent millennials or older Gen Xers, who live with their families.
- Technology adoption rate, household income, and frequency of non-car business long-distance trips affect the adoption.

**Adoption Rate: 5%**
- Least affluent and less educated individuals, who live in rural neighborhoods and do not work nor study.
- Adoption rate is affected by the characteristics of the built environment, including transit accessibility and land-use mix.

Source: California Mobility Panel Study, 2015 data

For more details:
• Research Question:
How does the use of ridehailing affect the use of other modes?
Investigating Differences Across Groups of Users

Latent-class analysis to investigate the impacts of ridehailing on other travel modes:

**Urban Travelers**
- Urban dwellers
- Walkable neighborhoods with good transit access
- Cost and time sensitive
- Least affluent
- Younger/independent Millennials
- Frequent commuters
- Multimodal travelers
- Most frequent users of Uber/Lyft

**Class 1 (size=53%)**

**Car Users**
- Suburban Dwellers
- Car-oriented neighborhoods with poor transit access
- High number of vehicles per household drivers
- Frequent commuters
- Monomodal with high VMT
- Pro-suburban
- Materialistic/must own car
- Frequent air travelers
- Medium Uber/Lyft frequency

**Class 2 (size=37%)**

**Transit and TNC**
- Suburban Dwellers
- Low transit and walk accessibility
- Not cost and time sensitive
- Older Gen Xers
- Want to come back to urban area
- Non-frequent commuters
- Multimodal when possible
- Like biking
- Pro-environment
- Low frequency users

**Class 3 (size=10%)**

**Source:** California Mobility Panel Study, 2015 data

What Would You Have Done if Ridehailing Was Not Available?

- Drive alone: 29.7% (Ridehailing 28.5%)
- Carpool: 16.1% (Ridehailing 15.6%)
- Public bus: 7.8% (Ridehailing 12.9%)
- Light rail/tram/subway: 3.9% (Ridehailing 8.6%)
- Commuter rail: 0.5% (Ridehailing 0.5%)
- Bike or walk: 4.5% (Ridehailing 8.6%)
- Taxi: 15.1% (Ridehailing 25.8%)
- Other: 4.2% (Ridehailing 3.8%)
- I would not have made this trip: 7.5% (Ridehailing 6.5%)

Source: California Mobility Panel Study, 2018 online data, N=1,260
• Research Question:
When (and where) ridehailing trips are made, and how do they affect congestion?
Temporal-Spatial Patterns of Taxi/Ridehailing Trips

Temporal distribution of taxi/ridehailing trips vs. auto trips:

Source: Hongwei Dong, using 2017 NHTS data
Temporal-Spatial Patterns of Taxi/Ridehailing Trips

- Spatial distribution of taxi/ridehailing trips vs. auto trips:

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Spatial distribution of taxi/ridehailing trips vs. auto trips:

Source: Hongwei Dong, using 2017 NHTS data
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"People won’t have as many vehicles because they’ll share one and own one."

Jim Hackett, Ford CEO
Need for better investigate evolving patterns in urban mobility

2. ANNUAL INVESTIGATION OF NATIONWIDE MOBILITY TRENDS: “THE PULSE OF THE NATION” ON 3R

We plan to launch an annual data collection in selected regions of the US, to investigate the rapid changes in the adoption and frequency of use of shared mobility services, including ridehailing, carsharing, bikesharing, e-scooter sharing and their impacts on the use of other means of transportation, in various parts of the US and among different groups of users. The survey will also include a stated preference component to investigate respondents' preferences towards various subscription plans and the factors affecting individuals' multimodality and the adoption of Mobility as a Service solution, i.e. under what conditions/circumstances individuals are more likely to ditch their own private vehicles and use a combination of non-motorized and motorized modes for various trip purposes. We plan to continuously monitor the changes in attitudes and preferences toward the use of AVs among various population groups, as we get closer to the actual deployment of this transportation technology. This study will shed light on various topics, including the evolving impacts of new shared mobility services on various components of travel behavior and vehicle ownership, the factors affecting the propensity to use MaaS solution packages (i.e. combination of travel modes) instead of driving a private vehicle, and the changes in attitudes toward autonomous vehicles and the use of shared vs. privately-owned AVs.
WHAT IS MAAS?

MOBILITY OPERATOR

- Car Share
- Bicycle Sharing System
- Person-to-Person Car Rental
- Fleet & Ride Sharing
- Autonomous Transport System
- Multi-modal Transportation Services
- Personal Travel Planner
- Incentives
- Smart Payment System
- Smart Parking
- Road User Charging
- Connected Vehicles
- E-Car

- Telecommuting
- E-Health
- E-Learning
- E-Government
- Real-Time Traffic Management
- Connected Traveler

CUSTOMER
• **Research Question – 1:** Which groups of travelers might be more inclined to rely on MaaS and not own a vehicle?

• **Research Question – 2:** What factors can encourage travelers to share rides with strangers?
March 2018 Report:

Travel Behavior and Society (2018) Paper:
https://doi.org/10.1016/j.tbs.2018.06.002

https://doi.org/10.1016/j.jocm.2018.08.003

Book Chapter (2018):
https://doi.org/10.1016/bs.atpp.2018.08.001

January 2019 Report:
https://escholarship.org/uc/item/35x894mg

Additional references: