Survey Team

Sara Khoeini
Ram Pendyala
Denise Capasso da Silva
Deborah Salon
Michael Maness
Nikhil Menon
Felipe Dias
Shuqing Kang
Chandra Bhat
Giovanni Circella
Yongsung Lee
Patricia Mokhtarian

TOMNET Transportation Center
Teaching Old Models New Tricks

The University of Texas at Austin
Georgia Tech
University of South Florida
Arizona State University

2
TOMNET Transformative Transportation Technologies (T4) Survey

- Phoenix, Atlanta, Austin, and Tampa metro areas
- Summer and Fall 2019 (pre-pandemic)
- Random address-based sample with online instrument
- Inclusion of rich attitudinal data, robust stated preference questions, and extensive coverage of perceptions and choices of Mobility-on-Demand and Autonomous Vehicles

<table>
<thead>
<tr>
<th></th>
<th>Phoenix, AZ</th>
<th>Atlanta, GA</th>
<th>Austin, TX</th>
<th>Tampa, FL</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
<td>1,027</td>
<td>944</td>
<td>1,127</td>
<td>260</td>
<td>3,358</td>
</tr>
<tr>
<td>%</td>
<td>30.6%</td>
<td>28.1%</td>
<td>33.6%</td>
<td>7.8%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Survey Instrument

- Attitudes and Preferences
- Vehicles You Have and Where You Live
- Current Travel Patterns
- Mobility on Demand and Shared Mobility Services
- Autonomous Vehicles
- Background Information
Question 1

Respondents Willingness to Ride and Buy AVs
Riding in an AV (N=3,356)

- Would ride: 50%
- Neutral: 30%
- Never ride: 20%
Riding in an AV: Comparisons

- 50% Would not ride in an AV (Pew, US)
- 56% Would not want to ride in an AV (Pew, US)
- 63% Afraid to ride in an AV (AAA, US)
- 71% Afraid to ride in an AV (AAA, US)
- 42% Would not want to ride in an AV (JD Power and NAMIC, US)
- 19% Afraid to ride in an AV (AAA, US)
- 48% Would never ride in an AV taxi or ride-share vehicle (PAVE, US)
- 19% Would never ride in an AV (T4 survey, Southern US)
Buying an AV \( (N=3,356) \)

- Eventually buy: 57%
- One of the first to buy: 5%
- Never buy: 38%
Buying an AV: First Adopters

- Will adopt the highest level of AV as soon as available (Bansal and Kockelman, Texas) - 14%
- Would be among the first users (Fleming and Singer, US) - 10%
- Will join a waiting list for the first AV (PAVE, US) - 18%
- Will be one of the first to buy an AV (T4 Survey, Southern US) - 5%
AV: Safety Concerns

I am concerned about the potential failure of AV sensors, equipment, technology, or programs. (N=3331)

- Strongly disagree: 6%
- Somewhat disagree: 8%
- Neutral: 17%
- Somewhat agree: 35%
- Strongly agree: 33%

I want the ability to take control of the AV at any time during the ride. (N=3331)

- Strongly disagree: 6%
- Somewhat disagree: 18%
- Neutral: 33%
- Somewhat agree: 40%
- Strongly agree: 0%
AV Technology: Concern of Equipment Failure

- 50% (Bansal and Kockelman, Texas)
- 61% (Bansal and Kockelman, Texas)
- 67% (Nazari, Washington State)
- 68% (T4 Survey, Southern US)
- 71% (JD Power, US)

Data sources:
- Bansal and Kockelman, Texas
- Nazari, Washington State
- JD Power, US
- T4 Survey, Southern US
Message 1

Public is still skeptical about AVs, especially technology reliability. Lots more work to be done in public education and awareness domains to enhance public trust in AV technology.

Need more pilots!
Question 2

Importance of Attitudes in AV Adoption
Role of Age and Gender

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Ride AV</th>
<th>Neutral</th>
<th>Never ride an AV</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-30 years</td>
<td>55%</td>
<td>33%</td>
<td>12%</td>
</tr>
<tr>
<td>31-40 years</td>
<td>57%</td>
<td>23%</td>
<td>20%</td>
</tr>
<tr>
<td>41-50 years</td>
<td>56%</td>
<td>29%</td>
<td>15%</td>
</tr>
<tr>
<td>51-60 years</td>
<td>40%</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>61-70 years</td>
<td>40%</td>
<td>39%</td>
<td>21%</td>
</tr>
<tr>
<td>71+ years</td>
<td>42%</td>
<td>25%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Male (N=1619) Female (N=1712)
Role of Education

- Completed graduate degree(s): 36% Not Familiar, 64% Familiar
- Bachelor's degree(s) or some graduate school: 44% Not Familiar, 56% Familiar
- Some college or technical school: 49% Not Familiar, 51% Familiar
- Completed high school or GED: 61% Not Familiar, 39% Familiar
- Some grade/high school: 79% Not Familiar, 21% Familiar
Role of Attitudes: Tech-Savviness

Use of Private Ridehailing

- Tech-savvy (N=2046)
  - Not familiar: 7%
  - Familiar but not an user: 31%
  - Use it rarely: 44%
  - Use it monthly: 12%
  - Use it weekly: 7%

- Not tech-savvy (N=1305)
  - Not familiar: 18%
  - Familiar but not an user: 40%
  - Use it rarely: 31%
  - Use it monthly: 10%
  - Use it weekly: 2%

Willingness to Buy AV

- Tech-savvy (N=2019)
  - Never buy: 28%
  - Eventually buy: 65%
  - One of the first to buy: 7%

- Not tech-savvy (N=1259)
  - Never buy: 53%
  - Eventually buy: 45%

“Learning how to use new technologies is frustrating”: Disagree = Tech-savvy, Neutral or agree= Not tech-savvy
Role of Attitudes: Concern about Privacy

Use of Private Ridehailing

- Concerned (N=2238)
  - Not familiar: 13%
  - Familiar but not an user: 37%
  - Use it rarely: 36%
  - Use it monthly: 9%
  - Use it weekly: 4%

- Not Concerned (N=1041)
  - Not familiar: 7%
  - Familiar but not an user: 28%
  - Use it rarely: 45%
  - Use it monthly: 14%
  - Use it weekly: 6%

Willingness to Buy AV

- Concerned (N=2238)
  - Never buy, 42%
  - Eventually buy, 53%

- Not Concerned (N=1041)
  - Never buy, 27%
  - Eventually buy, 67%

“Sharing my personal information or location via internet-enabled devices concerns me a lot”: Disagree or Neutral = Not concerned, Agree= Concerned

One of the first to buy, 4%
### Familiarity and Use of Private Ridehailing (e.g., Uber, Lyft)

<table>
<thead>
<tr>
<th>Familiarity and Use</th>
<th>Eventually Buy</th>
<th>Early Adopter</th>
<th>Never Buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not familiar (N=339)</td>
<td>45%</td>
<td>3%</td>
<td>53%</td>
</tr>
<tr>
<td>Familiar but not an user (N=1139)</td>
<td>50%</td>
<td>3%</td>
<td>47%</td>
</tr>
<tr>
<td>Infrequent user (N=1287)</td>
<td>62%</td>
<td>6%</td>
<td>32%</td>
</tr>
<tr>
<td>Frequent user (N=519)</td>
<td>70%</td>
<td>8%</td>
<td>21%</td>
</tr>
</tbody>
</table>
Message 2

**Attitudes** have a key role in shaping adoption pathways.

Insufficient attention has been paid to **attitudes** in **forecasting** models.

We must proactively work to influence and shape **attitudes and perceptions**.

Need more pilots!
Question 3

To what extent will people travel more?
AV Future: Additional Commute Time (N=2,221)

How much longer would you be willing to commute in an AV, compared to your current commute?

- Up to 5 additional minutes: 21%
- 5 to 15 additional minutes: 28%
- 15 to 30 additional minutes: 14%
- More than 30 additional minutes: 6%
- Not accept a longer commute: 31%

Average: ~ 9 min
AV Future: Zero-occupant VMTs 
(N=3,356)

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would feel comfortable having an AV pick-up/drop-off children without adult supervision.</td>
<td>62%</td>
<td>21%</td>
<td>18%</td>
</tr>
<tr>
<td>I would send an AV to pick-up groceries/laundry/food orders by itself.</td>
<td>28%</td>
<td>23%</td>
<td>49%</td>
</tr>
<tr>
<td>AVs would save me time and money for parking by dropping me off and parking themselves.</td>
<td>16%</td>
<td>31%</td>
<td>53%</td>
</tr>
</tbody>
</table>

Photo: Brian Tietz for Transdev
Photo: Ross D. Franklin, STF / Associated Press
## AV: Travel Impacts
(N=3,358)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Very likely</th>
<th>Somewhat likely</th>
<th>Neutral</th>
<th>Somewhat unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making additional trips that are not made now</td>
<td>8%</td>
<td>19%</td>
<td>26%</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>Moving to a better location or home</td>
<td>7%</td>
<td>12%</td>
<td>30%</td>
<td>18%</td>
<td>33%</td>
</tr>
<tr>
<td>Making more long-distance road trips</td>
<td>14%</td>
<td>25%</td>
<td>22%</td>
<td>16%</td>
<td>21%</td>
</tr>
<tr>
<td>Traveling more in peak hours (due to multitasking)</td>
<td>13%</td>
<td>25%</td>
<td>25%</td>
<td>17%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Replacing Other Modes (N=1,219)

What alternative mode would you have used on your last ridehailing trip?

- Drive alone: 18%
- Drive with passengers: 14%
- Ride with others: 12%
- Bus: 11%
- Taxi: 21%
- I would not have made the trip: 10%
- Other: 6%
- Light rail: 2%
- Walk: 4%

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Arizona State University
Message 3

AVs may **not** cause significant increase in **commute** VMT.

AVs can lead to **increase in VMT** due to **zero-occupant miles**, **extra discretionary travel**, and **more long-distance trips**.

AVs will likely **replace** some active modes, carpool, and transit trips.
Question 4

To what extent will people share rides in an automated future?
Commute Mode Shares in the US
## Ridehailing: Ride-Sharing

<table>
<thead>
<tr>
<th></th>
<th>Last trip using ridehailing in Atlanta and Austin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Private service or shared service alone</td>
</tr>
<tr>
<td>Sample size</td>
<td>1093 (89%)</td>
</tr>
<tr>
<td>Age (Average)</td>
<td>41.4 years</td>
</tr>
<tr>
<td>Gender (%Female)</td>
<td>49%</td>
</tr>
<tr>
<td>Median income</td>
<td>$50,000 to $99,999</td>
</tr>
<tr>
<td>Trip duration (Average)</td>
<td>22.2 minutes</td>
</tr>
</tbody>
</table>
## AV Future: Willingness to Share

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neutral</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will use AV ridehailing services alone or with coworkers, friends, or family. (N=3358)</td>
<td>19%</td>
<td>10%</td>
<td>25%</td>
<td>32%</td>
</tr>
<tr>
<td>I will use AV ridehailing services with other passengers I don't know. (N=3358)</td>
<td>29%</td>
<td>23%</td>
<td>27%</td>
<td>15%</td>
</tr>
</tbody>
</table>
Message 4

We cannot count on AV-service ridesharing to happen on any significant scale.

And pricing ownership and solo-driving/riding could be problematic and regressive.

Will a sustainable AV future prove elusive?
POST-COVID Behaviors (N= 8723 across US)  
www.covidfuture.org

Work-from-home  
25% of workers expect to increase their WFH frequency

Personal Air Travel  
13% expect to increase*  
36% expect to decrease*

Business Air Travel  
12% expect to increase**  
40% expect to decrease**

Online Shopping  
21% expect to increase online non-grocery shopping  
16% expect to increase online groceries for delivery

*who used to travel at least once a year  
**workers who used to travel for business at least once a year
Concluding Thoughts

T4 Survey paints a challenging picture:

- Low adoption/trust
- No (very low) true sharing
- More non-commute VMT

Complex interrelationship between technology and pandemic impacts not well understood

Need a stronger dialogue between the automation and travel behavior communities

Integrate travel behavior data to proactively design a sustainable and efficient AV future
Thank you!

Sara Khoeini, sara.khoeini@asu.edu