Impacts of Ridesourcing: Opportunities and Risks with MaaS

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Ridesourcing or TNC

RIDESOURCING ≠ RIDESHARING

Associated Press

**Uber** Ride-hailing services such as Uber and Lyft let people use smartphone apps to book and pay for a private car service or in some cases, a taxi. They may also be called *ride-booking services*. Do not use *ride-sharing*. 
Ridesourcing or TNC

Sourcing of rides from a ‘for-fare’ driver pool accessible through an app-based platform.

Other names:
“A rich city IS NOT a city where people own cars. A rich city is a city where people DON’T HAVE TO own cars”
BIG DATA!

- Where is the Data?
- Quantity of Data? Or Quality of Data?
- What RQ are you trying to answer?

Autonomous Vehicles (AVs)
Background

Zimride
Logan Green and John Zimmer (Lyft Co-founders) started Zimride, a true rideshare platform.

Lyft
Green and Zimmer launched Lyft in June 2012.

Zimride Sold
Green and Zimmer sold Zimride to Enterprise Holdings.

Uber
Uber started as a black-car limousine (UberCab) in San Francisco.

UberX
Uber launched UberX in July 2012.

LyftLine & UberPool
Lyftline & Uberpool in Denver.

LyftLine & Uberpool
LyftLine & UberPool in Denver.
Lyft and Uber Won’t Release Data to Shed Light on How They Affect Traffic

By Aaron Bialick Jun 30, 2015

As ride-hail services like Lyft and Uber have boomed in San Francisco and other cities, proponents claim they help reduce demand for parking and road space by making it easier for people to own fewer cars. But very little data has been released by the ride-hail companies that would allow experts to assess their impact on streets and traffic.

In a panel discussion yesterday, Lyft’s Curtis Rogers emphasized that reducing car ownership is “our end goal that we think we share with the city.”

But when Thea Selby of the SF Transit Riders Union pressed Rogers for data to show whether Lyft might be substituting for transit trips more than car trips, he said he couldn’t provide it. Rogers insisted, however, that Lyft doesn’t want to compete with Muni, walking, or bicycling. “We think we’re just one more piece to the puzzle.”

“We celebrate Muni getting better,” said Rogers. “We’re well aware that if we pulled everyone off of Muni and put them in Lyfts, we’d all be going two miles per hour on the road. That’s not a good outcome.”
Research Needs

➢ DATA
➢ DRIVER SIDE
  • Efficiency
  • Earnings
➢ VMT IMPACTS
➢ PARKING IMPACTS
➢ TRAVEL BEHAVIOR

RIDE SOURCING

RESEARCH

Disrupting Mobility
Impacts of Sharing Economy and Innovative Transportation on Cities

Editors: Gereon Meyer, Susan Shaheen
Lyft and Uber Driver Profiles

Smartphone Apps
“Hi rider,
I’m a grad student doing research on transportation. Would you help me by doing a short survey (~6 minutes) about this ride?

You can use my tablet or go to this link: www.ride-survey.com.

Thank you!”
Data

RIDE SOURCING DATA

**DRIVER DATASET**
- Travel Attributes:
  - Travel Times
  - Travel Distances
  - Earnings

**PASSENGER DATASET**
- Survey Questions:
  - Specific Trip (Q1-Q10)
  - General Use (Q11-Q25)
  - Demographics (Q26-Q37)

416 Rides
- 198 Lyft
- 164 UberX
- 39 LyftLine
- 15 UberPool

311 Passenger Surveys

SURVEY RESPONSE RATE: 87.5%
Mileage and Times

- Cruising/Waiting for a ride (A-B)
- En-Route to passenger (B-C)
- Waiting for Passenger (C)
- With-passenger (WP ride) (C-D)

GPS Tracking of a Lyft/Uber ride
Results: Deadheading

- Overall efficiency rate, based on distance, is 59.2%.
- Drivers have to travel 69 extra miles in deadheading for every 100 miles with a passenger.
Deadheading

The Story Behind Shareece Wright's 540-Mile-Plus Uber Ride —
https://theringer.com/shareece-wright-uber-driver-chicago-buffalo-758a0ae0feb8
Deadheading

The Story Behind Shareece Wright's 540-Mile-Plus Uber Ride —
https://theringer.com/shareece-wright-uber-driver-chicago-buffalo-758a0ae0feb8
The gross earnings is $15.69/hour.

Discounting expenses is less than minimum wage, with an average of $7.94/hr (tips included).
Results: Mode Replacement

Q: For this trip, how would you have traveled if Uber/Lyft wasn't an option?
Results: Mode Replacement

➢ Ridesourcing provides more mobility:
  • 12.2% of passengers “wouldn’t have traveled”

➢ Mixed of modes replacement

➢ Replaced SOV but also replaced more sustainable modes – transit, biking, walking –
# Results: Efficiency, VMT Impact

<table>
<thead>
<tr>
<th>Mode Replaced</th>
<th>n</th>
<th>PMT Total (Σd)</th>
<th>Mean</th>
<th>VMT Replaced (VMT&lt;sub&gt;BEFORE&lt;/sub&gt;) Total (Σd)</th>
<th>Mean</th>
<th>Ridesourcing VMT (VMT&lt;sub&gt;AFTER&lt;/sub&gt;) Total (Σd)</th>
<th>Mean</th>
<th>VMT&lt;sub&gt;AFTER&lt;/sub&gt; / VMT&lt;sub&gt;BEFORE&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public transportation</td>
<td>69</td>
<td>419.6</td>
<td>6.1</td>
<td>27.2</td>
<td>0.4</td>
<td>768.9</td>
<td>11.1</td>
<td>2826.7%</td>
</tr>
<tr>
<td>Drive alone</td>
<td>59</td>
<td>661.3</td>
<td>11.2</td>
<td>661.2</td>
<td>11.2</td>
<td>935.5</td>
<td>15.9</td>
<td>141.5%</td>
</tr>
<tr>
<td>Wouldn't have traveled</td>
<td>38</td>
<td>194.0</td>
<td>5.1</td>
<td>0.0</td>
<td>0.0</td>
<td>370.2</td>
<td>9.7</td>
<td>∞</td>
</tr>
<tr>
<td>Bike or Walk</td>
<td>37</td>
<td>74.3</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>195.9</td>
<td>5.3</td>
<td>∞</td>
</tr>
<tr>
<td>Taxi</td>
<td>30</td>
<td>364.2</td>
<td>12.1</td>
<td>639.5</td>
<td>21.3</td>
<td>568.3</td>
<td>18.9</td>
<td>88.9%</td>
</tr>
<tr>
<td>Carpool (ride)</td>
<td>19</td>
<td>132.1</td>
<td>7.0</td>
<td>82.2</td>
<td>4.3</td>
<td>227.7</td>
<td>12.0</td>
<td>277.1%</td>
</tr>
<tr>
<td>Other ridesourcing</td>
<td>17</td>
<td>52.8</td>
<td>3.1</td>
<td>143.3</td>
<td>8.4</td>
<td>143.3</td>
<td>8.4</td>
<td>100.0%</td>
</tr>
<tr>
<td>Get a ride</td>
<td>14</td>
<td>132.6</td>
<td>9.5</td>
<td>265.3</td>
<td>18.9</td>
<td>140.5</td>
<td>10.0</td>
<td>53.0%</td>
</tr>
<tr>
<td>Car rental</td>
<td>13</td>
<td>54.6</td>
<td>4.2</td>
<td>54.6</td>
<td>4.2</td>
<td>119.7</td>
<td>9.2</td>
<td>219.1%</td>
</tr>
<tr>
<td>Carpool (drive)</td>
<td>10</td>
<td>77.1</td>
<td>7.7</td>
<td>77.1</td>
<td>7.7</td>
<td>93.6</td>
<td>9.4</td>
<td>121.5%</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>37.5</td>
<td>7.5</td>
<td>9.2</td>
<td>1.8</td>
<td>54.1</td>
<td>10.8</td>
<td>589.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>311</td>
<td>2200.0</td>
<td>7.1</td>
<td>1959.6</td>
<td>6.3</td>
<td>3617.7</td>
<td>11.6</td>
<td>184.6%</td>
</tr>
</tbody>
</table>

Legend: Worst VMT, Better VMT, Overall
Results: Efficiency, VMT Impact

Vehicles Miles Traveled (VMT)
Passenger Miles Traveled (PMT)

➢ PMT/VMT efficiency goes from **112.3%** to **60.8%**

➢ Ridesourcing VMT for the study was estimated at **185%** what would have been before, which has significant implications for our cities in terms of congestion and environmental concerns.
Results: Efficiency, VMT Impact

Based on Lyft/Uber current rate of 1 billion rides per year in the U.S. and assuming the results hold true for the country:

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lyft and Uber rides per year in the U.S.</td>
<td>1,000,000,000.00</td>
</tr>
<tr>
<td>$t_{\text{mean}} = (\Sigma d)/\text{ride}$ (Table IV.1)</td>
<td>11.90</td>
</tr>
<tr>
<td>VMT\text{AFTER} = Rides per year * 11.90</td>
<td>11,900,707,268.24</td>
</tr>
<tr>
<td>VMT\text{AFTER}/VMT\text{BEFORE} (Table V.3)</td>
<td>1.85</td>
</tr>
<tr>
<td>VMT\text{BEFORE} = VMT\text{AFTER} / 1.85</td>
<td>6,446,228,741.23</td>
</tr>
<tr>
<td>VMT\text{EXTRA} = VMT\text{AFTER} - VMT\text{BEFORE}</td>
<td>5,454,478,527.02</td>
</tr>
</tbody>
</table>

Estimated VMT impact from Lyft/Uber is around 5.5 billion extra miles per year in the U.S.
High potential to decrease car dependency

- Ridesourcing is replacing driving modes, reducing the need for parking
- Parking difficulty/expense is one of the main reasons for passengers to use ridesourcing instead of driving.
Results: Travel Behavior

- Three common groups of ridesourcing:
  1. Drivers
  2. Multimodals
  3. Non-drivers
     - Drivers become bi-modal based on trip purpose

- For typical drivers, ridesourcing is mostly replacing social trips (e.g. go out), to/from airport, and when out of town

- For typical non-drivers, it’s replacing work/school trips
Limitations & Importance

➢ Research Limitations, Scalable
➢ Hunger for Data
➢ MaaS, AVs

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The Downside of Ride-Hailing: More New York City Gridlock
Uber and other ride-hailing apps are transforming transportation in New York City, and challenging the city’s financial dependency on it.

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Current Projects

➢ National TNC Data Landscape
  – Scalability of Research
  – Geographical Components

➢ Guide to Cities:
  – Type of Data
  – Research Questions

➢ TNC & Impacts:
  – Vehicle Ownership
  – Mode Share Changes
  – Infrastructure Changes
Autonomous Vehicles (AVs)

- Deadheading
- ZOV
- Parking
- Travel Behavior

Analogy TNC & AVs
Opportunities and Risks (TNC, AVs, MaaS)

HELL or HEAVEN?

➢ Mode Replacement
➢ Mobility & Equity
➢ VMT, PMT, Efficiency
➢ Parking and Land Use
space required to transport 60 people

car  bus  bicycle
space required to transport 60 people

car
uber
autonomous car
Pre-Uber/Lyft, Pre-AVs

PMT: 22

PMT: 90
Post-Uber/Lyft, Pre-AVs
Post-Uber/Lyft, Post-AVs

PMT: 13

PMT: 90
Wake-up Call (TNC, AVs, MaaS)

HELL or HEAVEN?

- Policy & Regulation (e.g. ZOV Congestion Charge)
- Data Collection from Day 1 (Research Impacts)
- Better inputs for AV Modeling
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