Impacts of the Sharing Economy in Transportation

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Georgia Tech
All I really need to know I learned in Kindergarten

1. Share everything.
2. Play fair.
3. Don't hit people.
4. Put things back where you found them.
5. CLEAN UP YOUR OWN MESS.
6. Don't take things that aren't yours.
7. Say you're SORRY when you HURT somebody.
8. Wash your hands before you eat.
10. Warm cookies and cold milk are good for you.
11. Live a balanced life - learn some and drink some and draw some and paint some and sing and dance and play and work everyday some.
12. Take a nap every afternoon.
13. When you go out into the world, watch out for traffic, hold hands, and stick together.
14. Be aware of wonder. Remember the little seed in the Styrofoam cup: The roots go down and the plant goes up and nobody really knows how or why, but we are all like that.
15. Goldfish and hamster and white mice and even the little seed in the Styrofoam cup - they all die. So do we.
16. And then remember the Dick-and-Jane books and the first word you learned - the biggest word of all – LOOK.
Sharing Economy

The **sharing economy** refers to economic and social systems that enable shared access to goods, services, data and talent.

These systems take a variety of forms but all leverage *information technology* to empower individuals, corporations, non-profits and government with information that enables distribution, sharing and reuse of *excess capacity* in goods and services.

-Wikipedia
Robin Chase

- Zipcar
- Buzzcar
- Peers incorporated

→ Bedsharing

Source: CNN Money
<table>
<thead>
<tr>
<th>AGE</th>
<th>ROOMS</th>
<th>HOTELS</th>
<th>COUNTRIES</th>
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<td>8</td>
<td>1,500,000</td>
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<td>5</td>
<td>600,000</td>
<td>192</td>
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<tr>
<td>60</td>
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<td>3800</td>
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<tr>
<td>44</td>
<td>530,000</td>
<td>4452</td>
<td>92</td>
</tr>
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</table>

Source: Robin Chase
<table>
<thead>
<tr>
<th>Company</th>
<th>Age</th>
<th>Rooms</th>
<th>Hotels</th>
<th>Countries</th>
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<td>Couchsurfing</td>
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<td>Airbnb</td>
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</table>

Source: Robin Chase
My Research

• Overcome barriers to transit and cycling with better information

• Need a good source of data
  – Open data
  – Crowdsourced data

• A way to get the information to people
  – Usable apps
  – Multiple means of access
Shared transportation

ONEBUSAWAY
Why Shared Transportation?
Where is your bus?
Let’s find out. We provide easy access to real-time transit information for the Atlanta region and beyond.

Our Goal
We want to make it easier to use public transit by providing easy access to schedule and real-time arrival information for the buses you ride every day.

We provide:
- Real-time arrival information for MARTA and other agencies.
- Arrival info for every bus stop.
- Easy access to information across a variety of devices.

Why? We’re riders just like you and we don’t like waiting for the bus any more than we have to.

Tools
Our tools are available across a number of interfaces:
- Web
- Mobile
- Android
- iPhone
- Windows 8

See our instructions for downloading and configuring the iPhone app.

Research
OneBusAway was started by students at the University of Washington, and it has been deployed in Atlanta by Georgia Tech. Check out our research page for more information.

Our work is all open-source software, so that others may reuse and build upon our efforts. As a result, OneBusAway software has been deployed to many other communities as well.
### NW Market St & 17th Ave NW

**Stop # 29214 - E bound**

<table>
<thead>
<tr>
<th>route</th>
<th>destination</th>
<th>minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>44</td>
<td>Downtown via University District</td>
<td>NOW</td>
</tr>
<tr>
<td>44</td>
<td>Downtown via University District</td>
<td>15</td>
</tr>
<tr>
<td>44</td>
<td>Downtown via University District</td>
<td>29</td>
</tr>
</tbody>
</table>

Last Update: 10:31 PM

Nearby stops:
- NW Market St & 17th Ave NW - W bound

See the full schedule for this stop (# 29214)

Search for another stop
Change in Satisfaction

“I no longer sit with pitted stomach wondering where is the bus. It's less stressful simply knowing it's nine minutes away, or whatever the case.”
Perception of Safety

- Perception of Safety
  - 79% no change
  - 18% somewhat safer
  - 3% much safer
- Safety correlated with gender
  - $\chi^2=19.458$
  - p-value=0.001
Perceived and Actual Wait Time

- Without real time, perceived wait > actual wait
- With real time, perceived wait = actual wait
- Value of real time >> more frequent service

<table>
<thead>
<tr>
<th>Group</th>
<th>Real Time</th>
<th>Schedule</th>
<th>Difference</th>
<th>T-stat (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Typical Wait</td>
<td>7.54</td>
<td>9.86</td>
<td>2.32</td>
<td>5.50 (0.00)</td>
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<tr>
<td>Aggravation Level</td>
<td>3.35</td>
<td>3.29</td>
<td>-0.05</td>
<td>-0.24 (0.81)</td>
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<tr>
<td>Actual Wait Time</td>
<td>9.23</td>
<td>11.21</td>
<td>1.98</td>
<td>2.17 (0.03)</td>
</tr>
</tbody>
</table>
Ongoing Work

• OneBusAway Seattle
  – Continued deployment
  – Home of open source code

• OneBusAway Tampa
  – Spring 2013 Pilot Program
  – Pre-test Post-test control group design

• BusTime New York City
  – Borough by borough release of real-time information
  – Panel regression to control for external factors

• OneBusAway Atlanta
  – Recent deployment
  – Disaggregate analysis using smart card data
How does Open Data help?

Agency produces data and opens it once.

Anyone can access data.

Small subset of riders find this specific tool useful.

Many riders access a diverse market of tools powered by GTFS.
Using crowdsourced data to improve cycling

CYCLE ATLANTA
Records your bike trips
You build a community map of bike lanes and problems.

Pavement issue

Public restrooms

Bike shops

Bike parking

Park them here and remember to secure your bike well! Please only include racks or other objects intended for bikes.
The combined map shows routes cyclists ride.
Without data, crowdsourcing

• City wanted to know where cyclists were riding

• Very little data about cyclists at all

• Went to the people to ask them

• Record trips is one level, assets and issues is another

• Easier to cycle if you know the route
Improved Transportation Info

• People can make better choices with better data
• Need reliable, relevant information
  – When is the next bus actually coming?
  – What route should I take to bike?
  – How do I navigate this new world?

• Need open data from agencies
• Without it, crowdsource our own
FUTURE IMPACTS OF THE SHARING ECONOMY
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-Wikipedia
## Autonomous Vehicles

**Great Mileage**
Some Benefits of the Driverless Car

<table>
<thead>
<tr>
<th>Google’s Aspiration</th>
<th>Potential Annual Benefits (US only)</th>
</tr>
</thead>
</table>
| 90% reduction in accidents | • 4.95 million fewer accidents  
• 30,000 fewer deaths  
• 2 million fewer injuries  
• $400 billion in accident-related cost savings |
| 90% reduction wasted commuting | • 4.8 billion fewer commuting hours  
• 1.9 billion gallons in fuel savings  
• $101 billion saved in lost productivity and fuel costs |
| 90% reduction in cars | • Reduce cost per trip-mile by 80% or more  
• Increase car utilization from 5-10% to 75% or more  
• Better land use |

Sources: Google, US NHTSA, AAA,  
Texas A&M Transportation Institute,  
Columbia University Earth Institute  
and Devil’s Advocate Group’s analysis
Summary

• Sharing economy impacts to date
  – Shared vehicles, shared ride
  – Collective transportation
  – Data sharing
  – Crowdsourcing

• Sharing + Autonomous
  = Vastly Different Transport System
Thank You!

Urban Transportation Information Lab
http://util.gatech.edu
Civil & Environmental Engineering
Georgia Tech

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