Recent Changes and Future Directions In Travel Behavior

Novel Modes Workshop
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Travel Behavior Analyst
Outline of this discussion:

• Context of travel behavior (e.g. travel as derived demand—but not exclusively!)

• Recent changes indicate an unprecedented shift: people are traveling less for daily activities

• Look at the layered effect of demographic, social, economic, and technological changes

• Some thoughts on future directions
People travel to engage in activities:

- Mandatory travel (work, school) have little flexibility in schedule or location
- Maintenance travel (shopping, errands) have more flexibility in time and/or location
- Discretionary activities (social visit, recreation) have the most flexibility in time and location
Mandatory activities are dominated by work:

Here I’m using work tours which include work trips chained with incidental stops for other purposes.
Three-quarters of travel for maintenance activities includes shopping, errands, and meals...
Discretionary is the most diverse:

Proportion of Daily Trips by Activity Type

- Mandatory
- Discretionary
- Maintenance

- Visit friends and rels
- Other
- Social/Rec
- Go to religious activity
- Coffee/ice cream/snacks
- Go out to entertainment/sports event/bar
- other uncoded
- Other uncoded
- Other

Go to gym/exercise/sports
Family and personal

www.travelbehavior.us
Young age groups have changed the most--their decline in driving has garnered some interest. This graph compares changes in driving rates by age group:

Percent Change in VMT per Capita
Comparing people in these age groups between 1995 and 2009

Source: McGuckin’s analysis of NHTS Data Series, comparing VMT per capita from the NHTS data series, 1995-2009
The younger age group (millenials) are a big cohort, at least as numerous as the baby-boom:

In 2030, Millenials will outnumber Baby-Boomers by 22 million:

Source: McGuckin’s analysis of Census historic tables 1900 to 2010, and 2030 forecast
As a result of big changes in a big population group, overall national trends show an unprecedented change:

Source: McGuckin’s analysis of Census Population (Jul 1) and HPMS Historic VM-1 Tables including all VMT and Census Population Estimates
Summary

• The shifts in travel are strongest in younger age groups—Millenials—especially young men.

• Baby Boomers are driving much more than people of the same age two decades ago, but even their travel is slowing as the exit the workforce and age past driving.

• The same phenomenon (declines in travel) occurs throughout the western world.

Why have travel rates changed?

- Economic Necessity
- Information-Communication Technology
- Social Value of Travel
Economic necessity: **Mandatory** travel has declined the least

- Work trips per worker about the same, BUT fewer workers and fewer workers commuting to work (as baby boomers started to retire)

- More people working at home →

- On-line higher education (in part or in whole)
Technological replacement: Maintenance travel declined the most. On-Line activity is literally changing urban landscapes.

![Number of US Stores Closed, 2009-2014](chart.png)

Defunct

Nancy McGuckin’s analysis, sources: Business Insider, Wikipedia, USA Today
Social Value of Travel: 

**Discretionary** travel stayed about the same:  

**Local discretionary** travel stayed about the same.  

**Long-distance** travel increased slightly  

(This graph shows the increase in air travel (red line) while vehicle travel flattened (the blue line))

Source: McGuckin’s analysis of HPMS and BTS data
How do these changes affect choice of travel modes?

- Social impacts: New attitudes toward vehicle ownership
- Economic impacts: Shift to transit during gas price spikes
- Situational: Walk and bike when possible for exercise and pleasure
- Environmental: Hybrid/alternative fuel vehicles
Social impacts on mode: 
Attitudes may be changing about auto ownership

“For Millennials, cars are not status symbols; they are perceived as unnecessary luxuries that are:

- Expensive
- Harmful to the environment
- Antisocial

They would rather own a great smartphone or laptop instead. (Real-time, portable technology helps to confer the sense of “freedom” that owning a car does not)”

Latitudes Report on Phase 1 findings for TCRP “Millenials and Mobility”

Source: McGuckin’s analysis of NHTS Data Series
Economic impacts on mode: Rising gas prices do effect choice of mode

Walk and Bike to Work And Monthly Avg. Gas Cost, 2008

- Average Monthly Gas Cost all Formulations all Grades
- Walk/Bike To Work

Source: McGuckin’s analysis of 2009 NHTS, Gas Cost from EIA.GOV
Demographic impacts on mode: Although there has been a lot of new interest in cycling, cyclists are getting older (and fewer children are cycling):

*Baby Boomers continue to cycle and the average adult cyclist is over ten years older than he(she) was just two decades ago.*

Aging of this group impacts infrastructure design for cyclists in many of the same ways it does for pedestrians and drivers.

Source: McGuckin’s analysis of NHTS Data Series
Vehicle technology impact on mode: Where is the hybrid market going?

Currently, the largest segment of hybrid car owners is the Baby Boomers; however Gen Y will make up about forty percent of car buyers within 10 years.

Source: McGuckin’s analysis of 2009 NHTS
People who drive Hybrid/alt fuel vehicles are richer, older, live further from work and drive more miles overall:

<table>
<thead>
<tr>
<th>NHTS 2009 Var Name:</th>
<th>Label</th>
<th>Drives a Hybrid</th>
<th>Drives another Passenger Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>Household Income</td>
<td>$82,777</td>
<td>$76,135</td>
</tr>
<tr>
<td>R_AGE</td>
<td>Respondent Age</td>
<td>48.09</td>
<td>46.62</td>
</tr>
<tr>
<td>VEHMILES</td>
<td>Miles vehicle driven last 12 months</td>
<td>14,260</td>
<td>11,258</td>
</tr>
<tr>
<td>VEHAGE</td>
<td>Vehicle Age</td>
<td>3.6 years</td>
<td>9.0 years</td>
</tr>
<tr>
<td>DISTTOWK</td>
<td>Distance to Work in Miles</td>
<td>18.2 miles</td>
<td>14.4 miles</td>
</tr>
</tbody>
</table>
For people with many choices available, Mode use can be situational (rather than habitual):

<table>
<thead>
<tr>
<th>Optimal Situations</th>
<th>Walking</th>
<th>Driving</th>
<th>Bus/Rail</th>
<th>Bicycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nice Outside</td>
<td>Nice Outside</td>
<td>Getting There</td>
<td>To or From Work</td>
<td>Nice Outside</td>
</tr>
<tr>
<td>Need Exercise</td>
<td>Need Exercise</td>
<td>ASAP</td>
<td>Work Alone</td>
<td>Need Exercise</td>
</tr>
<tr>
<td>Bad Weather</td>
<td>Bad Weather</td>
<td>Shopping</td>
<td>Pay-per-Use/Affordable</td>
<td>Better for Environment</td>
</tr>
<tr>
<td>Shopping</td>
<td>Shopping</td>
<td>More Personal Space</td>
<td>Better for Environment</td>
<td>Affordable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flexible</td>
<td>Connected to Community</td>
<td>Connected to Community</td>
</tr>
</tbody>
</table>

**Pereived benefits**

- Better for Environment
- Affordable
- Connected to Community
- More Personal Space
- Flexible
- Pay-per-Use/Affordable
- Better for Environment
- Affordable
- Connected to Community
- Slow
- Not Child Friendly
- Not Compatible with Other Modes

**Top Barriers**

- Slow
- Too Expensive
- Lack of Personal Space
- Not Compatible with Other Modes

Source: TCRP Study of Millennials and Mobility, Latitudes Phase 2 Findings, page 15
Transportation Trends: ENVIRONMENTAL CONSIDERATIONS

Millennials are thinking about the environment more than generations before them. San Franciscans & those living with roommates are the most likely to cite environmental considerations as a motivating factor in their transportation decisions.

<table>
<thead>
<tr>
<th>% Say 'I care about the environment' as a motivation for their transportation routine overall (Q31, n varies by sample group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
</tr>
<tr>
<td>Boston, MA</td>
</tr>
<tr>
<td>Chicago, IL</td>
</tr>
<tr>
<td><strong>San Francisco, CA</strong></td>
</tr>
<tr>
<td>Seattle, WA</td>
</tr>
<tr>
<td>Portland, OR</td>
</tr>
<tr>
<td>Washington, DC</td>
</tr>
<tr>
<td>Living w/ spouse or partner</td>
</tr>
<tr>
<td>Living w/ parents or other family</td>
</tr>
<tr>
<td><strong>Living with roommates</strong></td>
</tr>
<tr>
<td>Living alone</td>
</tr>
<tr>
<td>No children (aged 18 or under living in HH)</td>
</tr>
<tr>
<td>Parents (of children 18 or under living in HH)</td>
</tr>
</tbody>
</table>

37% total say they are increasingly feeling a bit better about their “carbon footprint” (Q34)

Source: TCRP Study of Millenials and Mobility, Latitudes Phase 2 Findings, page 16
It seems millennials in the cities studied balance competing factors in their transport choices:

- Convenience
- Exercise
- Save Money
- Environmentally Friendly
- Enjoyable ("Great down time")

Source: TCRP Study of Millennials and Mobility, Latitudes Phase 2 Findings, page 16
Some thoughts on where are we heading

- Widespread adoption of new technology
- Some evidence for substitution effects for social and shopping
- System-wide changes in the brick-and-mortar and delivery for goods and services
- “A Million Markets of One”
People are responding to changes in information technology the way people do:

- Incrementally
- Via Peer Culture
- Economically
- Hard-to-quantify
System-wide changes are taking place all around us: (and faster than I can make a new slide!)

<table>
<thead>
<tr>
<th>Old School</th>
<th>New School</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bookstores</td>
<td>• Amazon /Kindle</td>
</tr>
<tr>
<td>• Travel Agent</td>
<td>• On-line booking</td>
</tr>
<tr>
<td>• Blockbuster</td>
<td>• Streaming Video</td>
</tr>
<tr>
<td>• Avis/Hertz</td>
<td>• Zipcar</td>
</tr>
<tr>
<td>• Greyhound</td>
<td>• Megabus</td>
</tr>
<tr>
<td>• Taxi</td>
<td>• Uber/Lyft</td>
</tr>
<tr>
<td>• Priceline</td>
<td>• Hotel Tonight</td>
</tr>
<tr>
<td>• Facebook/Myspace</td>
<td>• IM/Skype/Vine</td>
</tr>
<tr>
<td>• Big Data</td>
<td>• Bigger Data</td>
</tr>
<tr>
<td>• The Internet</td>
<td>• The Internet of Things</td>
</tr>
</tbody>
</table>
Increase in small commercial vehicle travel may be related to internet deliveries...

Source: USPS HDS Data, 2008 from NHTS
And urban goods delivery will continue to grow:

The E-Deliver

Source: McGuckins analysis and projection of HPMS VM-1 data, re-creating the US PIRG graphic Fig 1 in “New Directions’
Technology enables “a million markets of one”—individually based on context

New mobility apps:

- Digital maps and navigation
- Location-based services
- Multi-modal journey planners
- Multi-modal traveler information services

Smart Transactions (infrastructure use, insurance, parking, etc):

- Pay as you driver/insure as you drive
- Credit card smart phone ticketing
Thank you!
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www.travelbehavior.us