The Future of Travel Demand

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Presentation given at the USC Sol Price School of Public Policy
September 16, 2015
Soaring Global Demand for Vehicles

Source: Sperling and Gordon (2009), based on DOE, JAMA, other
Why worry about this?

Transportation accounts for 2/3 of oil in US and ½ in world

Transportation accounts for ¼ of CO₂ emissions in world

Source: EIA, 2006
Why worry about this?

Pollution

Resiliency

Congestion

Equity

Sprawl

Safety
What to do about it?
Reduce the impact of driving

Vehicle and fuel technology
Infrastructure design
AND get people to do something other than drive...
Annual VMT per Capita in U.S.

Source: Bureau of Transportation Statistics, U.S. Census
Peak in VMT per capita by state

Source: Garceau et. al., 2014
Commuting by car


Registered vehicles per capita

Source: Bureau of Transportation Statistics, National Transportation Statistics, Tables 4-11 and 4-12
Why?
Will it last?
It’s the economy, right?

Source: Garceau et. al., 2014
Or other factors?

- Income
- Fuel prices
- Traffic congestion
- Aging population
- Regional migration
- Back-to-the city
- Smartphones
- Others
Another way to look at it...

How do we as individuals and households make choices about travel?

How and why are these choices changing?
Nested choices

Long-term Choices
- Lifestyle
- Residential Location

Mid-term Choices
- Driver’s license
- Auto ownership

Short-term Choices
- Trip frequency
- Trip destination
- Mode choice
Choice process

- Set of choices available:
  - Drive alone
  - Shared ride
  - Bus
  - Rail
  - Bicycle
  - Walk
  - Skateboard

- Qualities of choices available:
  - Cost
  - Time
  - Comfort
  - Safety

- Value placed on different qualities:
  - Cost vs.
  - Time vs.
  - Comfort vs.
  - Safety

Knowledge, perceptions

Needs, Constraints
Changes in all cells

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Expanding Traveler Choice

NEW MOBILITY OPTIONS

Dynamic Ridesharing

Smart Paratransit

Carsharing

NEVs

Bike Sharing
Bike sharing
45 operations in the U.S. as of Jan 2015

Transit complement or substitute?
Equity of access?
Micro-transit on demand
 e.g Bridj, Chariot, Leap

Competing with public transit?
Getting people out of their cars?

http://www.bizjournals.com/sanfrancisco/blog/2015/03/leap-transit-commuter-bus-san-francisco-loup.html
Car access without ownership
Car-sharing – Transportation Network Companies

Owners getting rid of cars?
Non-owners driving when they otherwise wouldn’t?
Car access without ownership
Ride-sharing – Transportation Network Companies

Sequential sharing – one at a time?
Concurrent rides – shared rides?
Individually owned cars?
Shared cars individually used?
Shared cars with shared rides?
Changes in all cells

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Are the “Millennials” different?

Example 1: Allison

Example 2: Hannah
Driver’s License Trends
Difference in licensing between 1995 and 2011 by age

Source: Steve Polzin, presentation for “Shifts in Travel Behavior: Where are We Going and How Do we Know? Tenth Annual Travel Data User Forum” Transportation Research Board, 2015.
Driver’s License by Generation
Got license within 1 year of eligible age

Source: Thigpen and Handy, Driver’s Licensing Delay: A Retrospective Study to Explain Intergenerational Differences, submitted to the Transportation Research Board, 2015.
Driving License: Role of Attitudes
“Driving was the coolest way to get to school”

Source: Thigpen and Handy, Driver’s Licensing Delay: A Retrospective Study to Explain Intergenerational Differences, submitted to the Transportation Research Board, 2015.
Driver’s License: Role of Parents

“My parents were happy to drive me places”

Source: Thigpen and Handy, Driver’s Licensing Delay: A Retrospective Study to Explain Intergenerational Differences, submitted to the Transportation Research Board, 2015.
Driver’s License
Effect of age after controlling for other factors

Source: Thigpen and Handy, Driver’s Licensing Delay: A Retrospective Study to Explain Intergenerational Differences, submitted to the Transportation Research Board, 2015.
Driver’s License for HS students
Odds of getting license on time

-100%  -50%  0%  50%  100%  150%  200%

Like riding the bus  Can rely on parents to drive  Driving is coolest way  Lots of stuff to carry  After school activities  Own a smartphone

Source: Brown and Handy, Factors Associated with High School Students’ Delayed Acquisition of Driver’s License: Insights from Three Northern California Schools, Transportation Research Record, forthcoming.
What else do we know...

The Decline in Marriage Among the Young

% married at age 18 to 32, by generation

<table>
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<th>Generation</th>
<th>% Married</th>
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<tr>
<td>Millennial (2013)</td>
<td>26</td>
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<tr>
<td>Gen X (1997)</td>
<td>36</td>
</tr>
<tr>
<td>Boomers (1980)</td>
<td>48</td>
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<tr>
<td>Silent (1960)</td>
<td>65</td>
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Generations, Facebook and Friends
Median number of friends

- Millennial: 250
- Gen X: 200
- Younger Boomer: 98
- Older Boomers/Silent: 50

Note: Based on Facebook users, n=960. In 2013, “Younger Boomers” were ages 49 to 57, “Older Boomers” were ages 58 to 67 and “Silents” were ages 68 to 85.

Source: Pew Research Center’s Internet Project survey, Aug. 7-Sep. 16, 2013

PEW RESEARCH CENTER

http://www.pewsocialtrends.org/2014/03/07/millennials-in-adulthood/
Millennials: the Generation that Walks the Talk

Walking More, Driving Less

83% of Millennials like walking, but only 71% like driving. This 12 point gap is a wider margin than any other generation. The gap for Baby Boomers is 2 points.

50% of Millennials prefer living within an easy walk of other places (compared to 43% of Gen X, 38% Baby Boomer and 30% Silent Generation)

51% of Millennials prefer living in attached housing (townhouse, condo) where they can walk to shops and have a shorter commute (compared to 44% of Gen X, 43% Baby Boomer and 41% Silent Generation)
THE HIERARCHY OF NEEDS
The must-haves for previous generations aren’t as important for Millennials. They’re putting off major purchases—or avoiding them entirely.

- **15%** Extremely Important
- **30%** I do not intend to purchase one in near future
- **25%** I might purchase one if I really need it, but indifferent otherwise
- **30%**
- **5%** I do not feel strongly about it
- **25%** Important, but not a big priority

"How important is it for you to own the following?"

Source: Goldman Sachs Fortnightly Thoughts intern survey, 2013
Ride Sharing
Has used Über, Lyft, or other service

Source: Alemi, Pike, Palm, and Handy, forthcoming analysis of 2014 San Francisco Voter Survey
Bicycling culture

Riding away from a bar crawl

In Sickness and in Health, Long After the Bike Is Due Back

The New York Times
Percent Biking Last Week vs. “I like riding a bike”

Source: Xing, Buehler, and Handy, 2008; see other UC Davis bicycling studies
E-Bikes and Parents

“I love my bike. It’s my car!”

Smartphones and travel

Flexibility in activities

Flexibility in travel

Productive travel time
Millennials Survey launching this week?

Section A: Your Opinions on Various Topics

To begin, we’d like to learn more about your opinions on various issues related to transportation, residential location and lifestyles. This will help us understand your answers to later questions. We want your honest opinion on each statement in the next three tables (or your best guess, for topics you are not very familiar with) – there are no “right” or “wrong” answers in this survey!

Please choose the response that most closely fits your reaction to each of the following statements.

<table>
<thead>
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<th>(1 of 3) Your opinions and preferences about personal lifestyles and residential location</th>
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<td>I prefer to live close to transit, even if it means I’ll have a smaller home and live in a more crowded area.</td>
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<td>Getting regular exercise is very important to me.</td>
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<td>I like sticking to a routine.</td>
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<td>I prefer to live in a spacious home, even if it is farther from public transportation and many places I go to.</td>
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<td>Individuals should generally put the needs of the group ahead of their own.</td>
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<td>It’s best to finish one project before starting another.</td>
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<td>I like the idea of having different types of businesses (such as stores, offices, restaurants, banks, library) mixed in with the homes in my neighborhood.</td>
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<td>The importance of exercise is overrated.</td>
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<td>It’s pretty hard for my friends to get me to change my mind.</td>
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<td>Having a family means you have to move to the suburbs.</td>
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<td>Social media (e.g. Facebook) makes my life more interesting.</td>
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<td>Background music/radio/TV is too distracting for me.</td>
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<td>I avoid doing things that I know my friends would not approve.</td>
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Driver’s License Trends
Difference in licensing between 1995 and 2011 by age

Source: Steve Polzin, presentation for “Shifts in Travel Behavior: Where are We Going and How Do we Know? Tenth Annual Travel Data User Forum” Transportation Research Board, 2015.
### Choice Sets vs. Choice Qualities vs. Quality Value

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**Implications for VMT?**
How do choices stack-up?
What substitutes for what?

Need a ride? Get a Lyft.
Will new options generate new travel?
VMT in the future?

“The aggregate trends discussed do not allow us to forecast with any certainty the car use that we can expect in the future.”
– Goodwin and Van Dender, 2013
Things we can influence

- Set of choices available
- Qualities of choices available
- Value placed on different qualities
By the tens of thousands, Portlanders preview their new car-free bridge
8/9/15

“With walkers and in strollers, on hopalongs and (in the case of quite a few happily panting dogs) on leashes, Portlanders packed a series of previews Sunday of Tilikum Crossing, the first bridge in the United States to carry buses, bikes, trains, streetcars and people walking but no private cars.”

Turns onto Market Street by private cars barred starting Tuesday

8/10/15

“Anyone hoping to cruise San Francisco’s motley main drag of Market Street, whether driving through or simply gawking, will likely have to do it aboard Muni, in a taxi, on a bicycle or on foot.”
L.A. will add bike and bus lanes, cut car lanes in sweeping policy shift

8/11/15

“City leaders say the plan reflects a newfound view that simply widening streets is no longer feasible or, in many cases, desirable. They contend that if even a small share of motorists change their travel behavior, choosing alternatives to the car, the city can make a big dent in the overall number of miles traveled.”

Tipping the balance

If the options are good enough...
If driving is bad enough...
Challenge: US resistance to driving impediments

Pricing

Restrictions
Not all vehicle trips are “high value”!

The goal is accessibility!
What it will ultimately take
A Paradigm Shift in Transport Planning

The Old Way:
Make it easier to drive

Focus on “level of service”
Planning for mobility

The New Way:
Make is easier to NOT drive

Focus on “livability”
Planning for accessibility
Transforming Transportation

Harder

Hard + Infrastructure

Fuels

Vehicles

Travel Demand

Hard

Harder

Hardest!
Transforming Transportation

Hard

Harder

Hardest!