TTP220
Transportation Policy and Planning

Susan Handy
3/28/16
What’s it all about?

What is the goal we’re trying to achieve?
Meeting transportation needs, given constraints, while minimizing negative impacts.
Why do people travel?
% of Trips by Purpose

- 23.7% Everything Else
- 22.5% Family/Personal Business
- 19.8% Shopping
- 18.4% Other Social/Recreational
- 14.9% To/From Work

source: NHTS 2001
abogo.cnt.org
Key Concepts: re. Travel Demand

- Derived demand
- Accessibility vs. mobility
Derived Demand

Demand for travel is derived from demand for participating in activities...
Travel as the means to the end

“Disutility of travel”
But not entirely...

<table>
<thead>
<tr>
<th>How frequently do you go driving with no particular destination in mind?</th>
<th>At least once per month</th>
<th>43.7%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At least once per week</td>
<td>24.7%</td>
</tr>
</tbody>
</table>

Travel as an **end** in and of itself

“**Positive utility of travel**”

Source: Cao, et al., 2008.
Why Would Travel be Intrinsically Desirable?

- Escape
- Exercise, physical/mental therapy
- Curiosity, variety-, adventure-seeking; conquest
- Sensation of speed or even just movement
- Exposure to the environment, information
- Enjoyment of a route, not just a destination
- Ability to control movement skillfully
- Symbolic value (status, independence)
- Buffer between activities, synergy with multiple activities

Credit: Pat Mokhtarian
Derived demand.....intrinsic demand... why does it matter?

<table>
<thead>
<tr>
<th>Necessary travel (driving)</th>
<th>People would like to minimize (but not eliminate) this</th>
<th>Accommodate it Make it possible to do less of it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optional travel (driving)</td>
<td>People do not want to minimize or eliminate this</td>
<td>Accommodate it? Discourage it?</td>
</tr>
</tbody>
</table>
Mobility vs. Accessibility

- Mobility is the potential for movement
- Accessibility is the potential for interaction

Huh?
Good Mobility

- Ability to move around
Poor Mobility

• Inability to move around
Good Accessibility

• Ability to get what you need
  – Choice of destinations
  – Choice of modes
Poor Accessibility

• Inability to get what you need
  – No destination choices
  – No mode choices
Accessibility vs. Mobility

• Good mobility usually contributes to good accessibility, BUT...
  – You can have good accessibility with poor mobility
  – You can have poor accessibility with good mobility
Key Concepts: re. Travel Demand

- Derived demand
- Accessibility vs. mobility
- Travel time budgets
Travel Time Budget

Travel Time vs. Distance

Travel time budget + Faster speeds = Greater travel distances
Travel times from London in 1914

https://transporthistory.wordpress.com/2015/12/01/a-great-isochronic-map/
Key Concepts: re. Travel Demand

- Derived demand
- Accessibility vs. mobility
- Travel time budgets
- Volume vs. demand
- Latent demand and induced travel
Latent Demand – Induced Travel

- **Cost of driving i.e. time**

  - **D**

  - **S**

  - **S’**

  - **Increased capacity means lower time cost**

  - **Latent Demand**

    *If the price were lower, people would consume more*

  - **Induced Travel**

    *Increase in volume from lower cost*
Key Concepts: re. Travel Demand

- Derived demand
- Accessibility vs. mobility
- Travel time budgets
- Volume vs. demand
- Latent demand
- Need vs. desire
### By Choice vs. Necessity

<table>
<thead>
<tr>
<th>Do you drive more than you want to?</th>
<th>Do you drive more than you need to?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>33% by choice not happy about it</td>
</tr>
<tr>
<td></td>
<td>47% by necessity not happy about it</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>12% by choice OK with it</td>
</tr>
<tr>
<td></td>
<td>9% by necessity OK with it</td>
</tr>
</tbody>
</table>

Source: Handy, et al., 2002.
Maslow’s Hierarchy of Needs

Physiological Needs
- Air, food, water, shelter, clothing, sleep

Safety and Security Needs
- Health, employment, property, family, stability

Love and Belongingness Needs
- Friendship, family, intimacy, connections

Self-Esteem Needs
- Confidence, achievements, respect of others, connections, need for individuality

Self-Actualisation
- Morality, creativity, spontaneity, acceptance, experience purpose, meaning and inner potential
The travel demand we’ll be talking about...

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who/what?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Why?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The travel demand we’ll be talking about...

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who/what?</td>
<td>People</td>
<td>Freight, information</td>
</tr>
<tr>
<td>Why?</td>
<td>Daily, work, nonwork</td>
<td>Occasional, vacation</td>
</tr>
<tr>
<td>Where?</td>
<td>Intra-regional</td>
<td>Inter-regional</td>
</tr>
<tr>
<td>When?</td>
<td>Peak, off-peak</td>
<td></td>
</tr>
<tr>
<td>How?</td>
<td>Auto, transit, NMT</td>
<td>Air, ferries</td>
</tr>
<tr>
<td></td>
<td>Freeways, arterials, streets</td>
<td></td>
</tr>
</tbody>
</table>
Constraints?
Constraints

• Financial
• Physical
• Temporal
• Political
• Behavioral
• Technological
• Geographical
On-Going Issue: Financing the transportation system

- Federal revenues for the Highway Trust Fund from 2010 to 2015: $234 billion
- Estimated needs for highways and transit from 2010 to 2015: $450 billion
- “Where is this money to come from? No one has yet found an answer.” – Innovation NewsBriefs
  
  - Gas tax? "It’s easy for people who are not elected to talk about raising the gas tax. They don’t have to face the voters.“ – US DOT Secretary LaHood

Now: $34 billion in revenues vs. $50 billion in projects annually
“Traffic is getting worse and worse, pavement is getting worse, and state and federal funds are not going to fix it for us,” said Celia McAdam, head of the Placer County Transportation Planning Network.
Negative impacts?
Negative Impacts

- Economy
- Environment
- Equity
- Safety
- Health

What is the primary source of these negative impacts...?
Annual VMT per Capita in U.S.
(VMT = vehicle miles traveled)

Have we reached peak driving?

Source: Bureau of Transportation Statistics, U.S. Census
California Emission Sources (2008)

- Transport, 37%
- Utilities, 34%
- Industrial, 20%
- Other, 6%
- High GWP gases, 3%

Source: CARB, California GHG Inventory for 2000-2008; Scoping Plan, 2020 Emissions Forecast
Current issue: AB32 and SB375

• AB32: The California Global Warming Solutions Act of 2006
  – Sets goal of 80% reduction of 1990 levels by 2050
  – Potential ballot initiative to stop implementation

• SB375: Redesigning Communities to Reduce Greenhouse Gases
  – Targets for GHG emissions reduction from cars and trucks for metropolitan areas, by reducing VMT
  – Improvements in forecasting models for regional transportation planning
Key concept: Externalities

• Spillover of an economic transaction on others not involved in the transaction:
  – Negative: My action has a negative impact on you, but I don’t compensate you for it.
    • Transportation example?
  – Positive: My action has a positive impact on you, but you don’t compensate me for it.
    • Transportation example?
So what’s it all about?
• DOT Secretary LaHood said, “Creating livable communities will result in improved quality of life for all Americans and create a more efficient and more accessible transportation network that serves the needs of individual communities. Fostering the concept of livability in transportation projects and programs will help America’s neighborhoods become safer, healthier and more vibrant.”
Livability Principles

1. **Provide more transportation choices.**
   Develop safe, reliable and economical transportation choices to decrease household transportation costs, reduce our nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions and promote public health.

2. **Promote equitable, affordable housing.**
   Expand location- and energy-efficient housing choices for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.

3. **Enhance economic competitiveness.**
   Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers as well as expanded business access to markets.
Livability Principles

4. Support existing communities.
Target federal funding toward existing communities – through such strategies as transit-oriented, mixed-use development and land recycling – to increase community revitalization, improve the efficiency of public works investments, and safeguard rural landscapes.

5. Coordinate policies and leverage investment.
Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.

Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods – rural, urban or suburban.
Sustainable Communities
US DOT – HUD – EPA

“The Partnership for Sustainable Communities works to coordinate federal housing, transportation, water, and other infrastructure investments to make neighborhoods more prosperous, allow people to live closer to jobs, save households time and money, and reduce pollution. The partnership agencies incorporate six principles of livability into federal funding programs, policies, and future legislative proposals.”

2009
US DOT’s Sustainability Efforts

“DOT has incorporated sustainable practices into the Department’s mission and operations. DOT will continue to pursue opportunities for the national system which:

- Promote energy and natural resource conservation,
- Decrease emissions of greenhouse gases (GHGs) and other pollutants,
- Enhance our operations by minimizing use of hazardous materials and chemicals,
- Advance our national interest in increasing energy efficiency,
- Reduce our dependence on fossil fuels,
- Ensure transportation infrastructure resiliency and
- Build livable communities.”
Sustainability and the Transportation System

Advancing high-performance rail

Maritime Green Initiatives

Increasing Corporate Average Fuel Economy

The Next Generation of Air Travel

Every Day Counts

Fostering Livable Communities

Adapting to Climate Change

Grant Programs

Sustainable Highways

How do we achieve it?