A Conceptual Framework for Understanding Latent Demand: Accounting for Unrealized Activities and Travel

Kelly Clifton
Portland State University, kclifton@pdx.edu

Follow this and additional works at: https://pdxscholar.library.pdx.edu/trec_seminar

Recommended Citation
https://pdxscholar.library.pdx.edu/trec_seminar/118

This Book is brought to you for free and open access. It has been accepted for inclusion in TREC Friday Seminar Series by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: pdxscholar@pdx.edu.
CONCEPTUAL FRAMEWORK FOR UNDERSTANDING LATENT DEMAND

Accounting for Unrealized Activities & Travel

Kelly J. Clifton
“Build it and they will come” argues that there is a “pent up” demand that will be activated by transportation improvements.

Most studies of latent & induced demand focus on traveler responses to changes in travel costs.

There has been little discussion of the underlying behavioral foundations of latent demand

A better definition of latent demand can aid in better forecasting, understand the consequences of unrealized travel, and identify where unmet demand is central to transportation policy.
Demand for transportation

Transport demand is about the movement of people and goods.

It is considered a **derived demand**, which refers to demand for one good or service in one sector occurring as a result of demand from another.

Users of transport are primarily consuming the service because they wish to satisfy their needs (e.g. work, shopping, recreation) – or in the case of freight, the demand for goods.
Latent (or Induced) Demand for Travel

Latent demand represents currently desired demand that is not realized because of a wide variety of constraints.

Redistributed demand represents a rearrangement in space, time, destination, frequency and/or mode of the previously observed demand due to the relative changes in travel costs.

This represents our current approach to forecasting future travel needs – evaluating current demand based upon future predictions of the various explanatory factors.

Generative demand, are previously suppressed trips that can now be realized, presumably due to changes in the transportation system but perhaps due to exogenous social, economic, cultural and technological drivers.
Demand models are estimated using data on observed trips.

What about unmade trips?

| Place 1: Where were you at 4:00 AM on your assigned travel day? Provide place name and address/intersection: |
| Home |

| Place 2: Where did you go next? Provide place name and address/intersection: |
| Work — Arbor Law Firm 990 Central Ave, Chicago, IL 60639 |

| Place 3: Where did you go next? Provide place name and address/intersection: |
| Gustoio's Pizza 1800 Kerry Lane, Chicago, IL 60639 |

| Place 4: Where did you go next? Provide place name and address/intersection: |
| Work — Arbor Law Firm 990 Central Ave, Chicago, IL 60639 |

| Place 5: Where did you go next? Provide place name and address/intersection: |
| Fairview Elementary 7590 North Rd, Chicago, IL 60639 |

| Place 6: Where did you go next? Provide place name and address/intersection: |

<table>
<thead>
<tr>
<th>START HERE</th>
<th>How did you get there?</th>
<th>What time did you arrive at this place?</th>
<th>How many people went with you to this place?</th>
<th>What time did you leave this place?</th>
<th>What did you do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>x AM</td>
<td>7 5 4</td>
<td>Дrove my car</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>X PM</td>
<td></td>
<td>Did not leave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>AM</td>
<td>Platform</td>
<td>1 2 5 8</td>
<td>Walked</td>
<td>2</td>
</tr>
<tr>
<td>□</td>
<td>PM</td>
<td></td>
<td>Did not leave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>AM</td>
<td>Platform</td>
<td>2 0 2</td>
<td>Walked</td>
<td>2</td>
</tr>
<tr>
<td>□</td>
<td>PM</td>
<td></td>
<td>Did not leave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>AM</td>
<td>Platform</td>
<td>5 0 8</td>
<td>Дrove my car</td>
<td>0</td>
</tr>
<tr>
<td>□</td>
<td>PM</td>
<td></td>
<td>Did not leave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□</td>
<td>AM</td>
<td>Platform</td>
<td>5 5 5</td>
<td>Дrove my car</td>
<td>0</td>
</tr>
<tr>
<td>□</td>
<td>PM</td>
<td></td>
<td>Did not leave</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Next Travel Day Planned

1. Home
2. Work
3. Supermarket
4. Cinema
5. Home
6. Home
Rationale for this work

What?
Explore the idea of latent demand through the lens of unmet activities and ultimately travel

Why?
A better definition and quantification of this idea can help to:
• better predict the impact of transportation investments,
• Anticipate response to social, technological, cultural and economic change
• help identify inequities,
• understand the consequences of these unmet demands and
• determine to what degree this unmet demand is a matter for transportation policy.

How?
Develop a theoretical framework & approach to data collection
Other Definitions of Latent Demand

Induced demand, or latent demand, is the phenomenon that after supply increases, more of a good is consumed. –Wikipedia

Demand for a product or service that a consumer cannot satisfy because they do not have enough money, because the product or service is not available, or because they do not know that it is available. – Cambridge Dictionary

Latent demand is basically the desire for a product that a consumer is unable to satisfy because he is himself unable to point it out or doesn’t realize what is missing until pointed out. –MBASkool

“In contrast to definitions of expressed demand based upon observable buying behavior, the concept of latent demand pertains to those with an interest in participation or “purchase”; who have not translated that interest into action.” Richardson & Crompton
Awareness

transport system capabilities

I

II

III

IV
I
• Activities are desired
• Transport system cannot accommodate

II

III

IV

transport system capabilities
I. Examples

- Spatial or temporal gaps in transit service
- Travel times lead to time poverty
- No access to automobiles
- No internet access
- Food deserts
- No sidewalk infrastructure
- Lack of bicycle network connectivity

II. Examples

- Poverty
- Activity schedule leads to time poverty (too busy)
- Scheduling conflicts
- Social exclusion
- Cultural barriers
- Lack of work experience or education
- Discrimination
- Housing costs limit choices
I
• Activities are desired
• Transport system cannot accommodate

II
• Activities are desired
• Transport system can accommodate
• Other barriers exist

III
• Activities are not desired
• Transport system can accommodate

IV

transport system capabilities

Awareness
III. Examples

• Mode exists but unaware of how to use it or where it goes

• Not (currently) motivated to engage in an activity

• Yet untried activity: Who knew I would love Stand Up Paddle Boarding?

• Unaware of new restaurant opening

• Surprise visit from a friend taking you to lunch
I
• Activities are desired
• Transport system cannot accommodate

II
• Activities are desired
• Transport system can accommodate
• Other barriers exist

IV
• Activities are not desired
• Transport system cannot accommodate

III
• Activities are not desired
• Transport system can accommodate
IV. Examples

Future modes:
• Driverless vehicles
• Teleportation
• Hovercraft
• SpaceX Hyperloop
• Drone delivery
• 3-D Printing
• Etc.

Previously (say in 1980):
• Online shopping
• Uber
• Smart phones
• Etc.
I
• Activities are desired
• Transport system cannot accommodate

II
• Activities are desired
• Transport system can accommodate
• Other barriers exist

IV
• Activities are not desired
• Transport system cannot accommodate

III
• Activities are not desired
• Transport system can accommodate
How might we capture these various types of latent demand?
I
• Activities are desired
• Transport system cannot accommodate

II
• Activities are desired
• Transport system can accommodate
• Other barriers exist

III

IV

transport system capabilities

Awareness
Activity, travel, attitudes, & preferences (multi-day)

1. Where did you go?
   - Place 1: Where were you at 6:00 AM on your assigned travel day?
     - Work – US Post Office
     - School – School
   - Place 2: How did you get there?
     - Work – Commute
     - School – Walk
   - Place 3: What did you do?
     - Work – Start work
     - School – Attend class

2. How did you get there?
   - How many people went with you to this place?
     - Work – 1
     - School – 2
   - Did not leave

3. What did you do?
   - What time did you leave this place?
     - Work – 8:00 AM
     - School – 9:00 AM
   - What did you do at this place?
     - Work – Attend class
     - School – Attend class
   - Did not leave

Use the Activity List below:
01. Ask breakfast and get ready for work
02. Work
03. Work
04. Buy and eat lunch
05. Pick up daughter from school
06. Ask dinner
Activity, travel, attitudes, & satisfaction (multi-day)

But not enough for unmade trips & unrealized activities
Activity Scheduling Process

Work in the early 2000s
Computer aided survey
Collect information on the planning process:

- What you plan to do?
- When you plan to do it?
- What you actually did?
- How did it work out for you?

Large respondent burden
Could be revisited with smart phone technology

McNally, MG and Lee, MS (2002). Putting Behavior in Household Travel Behavior Data: An Interactive GIS-based Survey Via the Internet, Final Report to the University of California Transportation Center, Berkeley, CA.
I

II

III

IV

- Activities are not desired
- Transport system cannot accommodate

- Activities are not desired
- Transport system can accommodate

transport system capabilities

Awareness
• Activities are not desired
• Transport system cannot accommodate

• Activities are not desired
• Transport system can accommodate
Behavioral change

If the public is not aware of existing options or not motivated to use them, programs can work to address the gaps.

Drawing upon research in health disciplines:

- Education/Awareness
- Information
- Motivation
- Support

Public campaigns to reduce driving, learn how to use transit, ride a bike, encourage walking.
Awareness

• Activities are not desired
• Transport system cannot accommodate

transport system capabilities

• Activities are not desired
• Transport system can accommodate
Stated Preference Surveys

Option A
Cost: $2.50
Travel time: 30 minutes
Share ride with others

Option B
Cost: $12
Travel time: 20 minutes
Have vehicle to yourself
What are the drivers of the demand for activities & travel?

- What motivates us?
- Psychology & other behavioral disciplines have a lot to offer
- Might be important to understand how we might respond to new opportunities in the future
- Marketing discipline has made use of this research
- They induce demand for products
- What can we learn here?

Conclusions

Our current theories, data collection, and methods are inadequate.

We need a more theoretically-sound definition of demand.

Theoretical exploration of the origins of activity demand from multiple disciplines could enrich and improve our efforts to plan for the future.

Understand unmet needs and how transportation policies, other programs and innovations may address demand.
QUESTIONS?

Kelly J. Clifton
kclifton@pdx.edu