Changes in Travel Behavior Affecting Transit

TRB Executive Committee
Wednesday, January 10, 2018

Steven E. Polzin, PhD.
Outline

- What is going on with travel
- What factors are influencing transit use
- Critical Issues going forward
## U.S. Context and Travel Trends

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>U.S. Population</td>
<td>0.8%</td>
<td>0.5%</td>
<td><strong>0.7%</strong></td>
<td>-</td>
<td>Census</td>
</tr>
<tr>
<td>Total Employment</td>
<td>1.7%</td>
<td>1.7%</td>
<td><strong>1.2%</strong></td>
<td>11</td>
<td>BLS</td>
</tr>
<tr>
<td>Real GDP</td>
<td>2.9%</td>
<td>1.5%</td>
<td><strong>2.2%</strong></td>
<td>9</td>
<td>BEA (3rd estimate)</td>
</tr>
<tr>
<td>Gas Price</td>
<td>-29.3%</td>
<td>-14.8%</td>
<td><strong>15.0%</strong></td>
<td>11</td>
<td>EIA</td>
</tr>
<tr>
<td>Registered Cars and Light Trucks</td>
<td>2.1%</td>
<td>1.5%</td>
<td><strong>3.0%</strong></td>
<td>12 proj.</td>
<td>Hedges Co.</td>
</tr>
<tr>
<td>Light Vehicle Sales</td>
<td>5.8%</td>
<td>0.1%</td>
<td><strong>-1.5%</strong></td>
<td>11</td>
<td>BEA</td>
</tr>
<tr>
<td>VMT</td>
<td>3.5%</td>
<td>2.8%</td>
<td><strong>1.3%</strong></td>
<td>10</td>
<td>FHWA</td>
</tr>
<tr>
<td>Public Transit Ridership</td>
<td>-1.0% to -2.2%</td>
<td>-2.3% to -1.6%</td>
<td><strong>-3.1%</strong></td>
<td>9</td>
<td>APTA and NTD</td>
</tr>
<tr>
<td>Amtrak Ridership (FY)</td>
<td>-0.3%</td>
<td>1.9%</td>
<td><strong>2.3%</strong></td>
<td>8</td>
<td>Amtrak</td>
</tr>
<tr>
<td>Airline Passengers</td>
<td>5.3%</td>
<td>3.9%</td>
<td><strong>3.2%</strong></td>
<td>9</td>
<td>USDOT, BTS</td>
</tr>
</tbody>
</table>
National VMT and VMT per Capita Trend, Moving 12-Month Total, 1990–2016

Vehicle-Distance Traveled (Billion Miles)

Annual Vehicle-Distance Traveled (Billion Miles)

VMT per Capita

8 year reprieve
U.S. Transit Ridership and Ridership per Capita

![Graph showing U.S. transit ridership and ridership per capita from 1918 to 2016. The graph displays the annual ridership in billions and the annual trips per capita. The ridership trend peaks around 1946 and then declines, while the trips per capita show a steady increase over the years.](image-url)
Top 40 UZAs by 2016 Transit Ridership, Change 2014-2016 (Millions)

Top 40 urban areas make up 83.9% of U.S. ridership decline from 2014-2016.

Source: NTD Monthly Raw Database
Declining Carpooling and Growing Work-at-Home Dominate Trends

Mode Share, Usual Commute

- Car, truck, or van -- carpoled
- Public transportation
- Walked
- Bicycle
- Other means
- Worked at home
Where are We Headed?

2012-2014

Transit ridership near 60 year high
Millennials are different
We passed peak VMT
We are urbanizing and CBD’s are thriving
Developers embrace transit
Strong Referendum success
TNC’s address first-mile/last-mile issue

2015-2017

Transit ridership loss accelerates in 3rd year of decline
Millennials buy cars and move to suburbs
VMT and VMT/Capita continue growth
Growth and migration resume historic patterns
System conditions, reliability, health care costs, etc. plague transit operators
How much will that subway cost? When will Hawaii’s rail system open? How is that new streetcar doing?
TNC’s can cannibalize transit ridership

2018

Why do we need transit with CAV?
Framework for Understanding Changes in Transit Ridership

1. Demographics and Land-Use

2. Transit Service Quality

3. Competition

How much of ridership change is explained by these factors?
Framework for Understanding Changes in Transit Ridership

1. Demographics and Land-Use
   - Age
   - Geographic Distribution across Metros
   - Geographic Distribution within Metros (within proximity of service?/gentrification)
   - Income
   - Licensure Levels
   - Auto Ownership
   - Poverty Levels (SNAP enrollment)
   - Unemployment
   - Reduced College Student Ridership (APTA report)
   - Core Values
Aging Population has a Negative Impact on Ridership

- **Graphs**
  - **Top Graph:**
    - Y-axis: Trips per person per day
    - X-axis: Age group
    - Data points for age groups 5-14 to 85+ show a peak in the 45-54 age group at around 4.2 trips per person per day, decreasing to 2.0 trips per person for the 85+ age group.
  - **Middle Graph:**
    - Y-axis: Share of trips taken via transit
    - X-axis: Age group
    - Data shows an increase in the share of trips taken via transit for the 5-14 age group and a decrease in the 85+ age group.
  - **Bottom Graph:**
    - Y-axis: Persons (Millions)
    - X-axis: Age group
    - Data trends illustrate a decrease in the number of persons for age groups 5-14 to 85+ from 2015 to 1980.

- **Key Points**
  - The aging population has a negative impact on ridership, as indicated by the decrease in trips per person and the share of trips taken via transit for older age groups.
  - The data suggests a decline in ridership for the older age groups due to decreased mobility and transportation needs.
### Migration and Growth are Higher in Low Transit Use Areas

#### Top 10 Largest-Gaining Counties (Numeric Change): July 1, 2015 to July 1, 2016

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Numeric Change</th>
<th>Percent Change</th>
<th>Transit Commute Share 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maricopa County, Arizona</td>
<td>4,242,997</td>
<td>81,360</td>
<td>1.95</td>
<td>2.3%</td>
</tr>
<tr>
<td>Harris County, Texas</td>
<td>4,589,928</td>
<td>56,587</td>
<td>1.25</td>
<td>2.8%</td>
</tr>
<tr>
<td>Clark County, Nevada</td>
<td>2,155,664</td>
<td>46,375</td>
<td>2.2</td>
<td>4.2%</td>
</tr>
<tr>
<td>King County, Washington</td>
<td>2,149,970</td>
<td>35,714</td>
<td>1.69</td>
<td>12.6%</td>
</tr>
<tr>
<td>Tarrant County, Texas</td>
<td>2,016,872</td>
<td>35,462</td>
<td>1.79</td>
<td>0.6%</td>
</tr>
<tr>
<td>Riverside County, California</td>
<td>2,387,741</td>
<td>34,849</td>
<td>1.48</td>
<td>1.4%</td>
</tr>
<tr>
<td>Bexar County, Texas</td>
<td>1,928,680</td>
<td>33,198</td>
<td>1.75</td>
<td>2.6%</td>
</tr>
<tr>
<td>Orange County, Florida</td>
<td>1,314,367</td>
<td>29,503</td>
<td>2.3</td>
<td>3.2%</td>
</tr>
<tr>
<td>Dallas County, Texas</td>
<td>2,574,984</td>
<td>29,209</td>
<td>1.15</td>
<td>2.9%</td>
</tr>
<tr>
<td>Hillsborough County, Florida</td>
<td>1,376,238</td>
<td>29,161</td>
<td>2.16</td>
<td>1.7%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>3.4%</td>
<td></td>
</tr>
</tbody>
</table>

#### Largest-Declining Counties or County Equivalents (Numeric Change): July 1, 2015 to July 1, 2016

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Numeric Change</th>
<th>Percent Change</th>
<th>Transit Commute Share 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook County, Illinois</td>
<td>5,203,499</td>
<td>-21,324</td>
<td>-0.41</td>
<td>18.8%</td>
</tr>
<tr>
<td>Wayne County, Michigan</td>
<td>1,749,366</td>
<td>-7,696</td>
<td>-0.44</td>
<td>2.5%</td>
</tr>
<tr>
<td>Baltimore city, Maryland</td>
<td>614,664</td>
<td>-6,738</td>
<td>-1.08</td>
<td>19.6%</td>
</tr>
<tr>
<td>Cuyahoga County, Ohio</td>
<td>1,249,352</td>
<td>-5,673</td>
<td>-0.45</td>
<td>5.1%</td>
</tr>
<tr>
<td>Suffolk County, New York</td>
<td>1,492,583</td>
<td>-5,320</td>
<td>-0.36</td>
<td>6.8%</td>
</tr>
<tr>
<td>Milwaukee County, Wisconsin</td>
<td>951,448</td>
<td>-4,866</td>
<td>-0.51</td>
<td>6.2%</td>
</tr>
<tr>
<td>Allegheny County, Pennsylvania</td>
<td>1,225,365</td>
<td>-3,933</td>
<td>-0.32</td>
<td>9.1%</td>
</tr>
<tr>
<td>San Juan County, New Mexico</td>
<td>115,079</td>
<td>-3,622</td>
<td>-3.05</td>
<td>0.3%</td>
</tr>
<tr>
<td>St. Louis City, Missouri</td>
<td>311,404</td>
<td>-3,471</td>
<td>-1.1</td>
<td>9.7%</td>
</tr>
<tr>
<td>Jefferson County, New York</td>
<td>114,006</td>
<td>-3,254</td>
<td>-2.78</td>
<td>0.0%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>7.8%</td>
<td></td>
</tr>
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</table>
Improving Vehicle Availability Coincides with Declining Transit Ridership

1.3 million fewer persons lived in zero vehicle households in 2016 than in 2014.
Transit Use Correlates with Need-Based Program Participation

Percent Change U.S. Transit Ridership and SNAP Enrollment

- Ridership Percent Change from 2002
- SNAP Users Percent Change from 2002

Graph showing the percent change in U.S. transit ridership and SNAP enrollment from 2002 to 2016.
Are Core Values that Impact Travel Changing?

- Do we value autonomy, privacy, flexibility, convenience, etc. more than in the past?
Framework for Understanding Changes in Transit Ridership

2. Transit Service Quality

- Fares (levels, convenience, ease of use)
- Level of Service (coverage, frequency, hours of operation)
- Speed (access, wait, in vehicle, transfer, egress) (tolerance for waiting in our immediate gratification culture)
- Reliability
- Safety/Security
  - Accident Safety, In-Vehicle/Facility Crime
- Image
  - Cleanliness
  - Interpersonal Compatibility - Increased homeless/mental ill ridership (APTA report)
  - Status/Persona
- Environmental Impacts
- Awareness/Marketing (trip planning, real time information, digital fare payment, etc.)
- Amenities (Wi-Fi, shelter, convenience retail, etc.)
Average Fare Revenue per Passenger Trip and Passenger Mile (2017 Dollars)

Pre 2014 data from APTA Fact Book, Post 2014 data from NTD
12-Month Rolling Average of U.S. Transit Ridership and Service, Fixed Route

Hundreds of Millions (Trips and VRM)

Ridership
Service
3. **Competition**

- Communication Substitution for Travel
- Trip making levels (telecommuting, e-commerce, distant learning, online banking etc.)
- TNC availability/LOS/price
- Bike/Bikeshare
- Auto Cost
  - Fuel Cost
  - Purchase/Lease/Finance Cost
  - Parking Cost/Other Auto Costs
- Roadway Congestion/Speed
Gas Prices and Transit Ridership, 1994-2016

Key Issues – Travel Behavior

- Ridership trends are context specific and vary significantly across geography/property.
- The reasons for soft ridership differ across contexts with telecommuting, TNC’s, service reliability, auto ownership trends, fares, and other factors having different impacts in different markets.
- Transit has historically had the lowest mode loyalty (mode of last resort in many contexts).
- If declining fare revenues and/or dampened public willingness to increase subsidies result from soft ridership, the downward spiral of transit ridership may continue.
Strong employment growth and growing real income could continue to undermine transit dependency and jeopardize ridership.

Urban civility may influence future ridership trends.

Demographic trends in proximity to transit services (TOD) will influence future ridership.

Increasing roadway congestion could favor premium transit services but undermine mixed traffic transit operations.

System condition and quality of industry execution may influence ridership.
Is there an **inflection point** where service becomes more attractive to choice travelers?
The disconnect between the beneficiaries of transit services and the sources of funding for transit may impede the future financial sustainability of transit.
Key Issues – Strategic

- Key transportation goals
  1. Mobility
  2. Economic competitiveness
  3. Resource efficiency

May be best addressed with multiple
  - Technologies and services
  - Mixes of public and private providers
  - Different pricing and funding strategies

Today’s modal silos will disappear – we won’t worry about the future of transit or transit ridership but instead worry about mobility.
Thank You!