Using new mobilities for post-COVID transit recovery strategies

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WCTR SIG F1 & AUM Webinar
Impact of COVID-19 on transport and spatial development: an international perspective

February 25, 2021
Agenda

• Background
• Pre-COVID trends
• COVID-induced impacts
• Challenges for post-COVID transit
• How can we move forward?
Background
The world we live in today

- ~112 million COVID cases
  - > 28 million in the US (25%)
- ~2.5 million COVID deaths
  - ~500,000 in the US (20%)
- ~20.5 million (13% of workforce) individuals in the US claiming unemployment benefits
  - Evictions, food security, mental health, ...
Pre-COVID trends
Metro Boston at a glance

• **Highly auto-dependent**
  - > 91% of households own at least one vehicle
  - > 90% of car commutes are made with single-occupancy vehicles

• Ranked the **most congested city in the US** by INRIX twice in a row
  - Drivers lose $2,205/year stuck in traffic
  - Lost hours cost Boston’s economy $4.1 billion

• Average speed during the last mile of a car trip: 12 mph
Private vehicle ownership on the rise

![Graph showing the number of households in Boston with or without cars from 2005 to 2018. The number of households with at least one car has been increasing, while the number of households without cars has remained relatively stable.](image-url)
Transit ridership on the decline

- Quarterly moving average

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>% ridership change from January 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter Rail</td>
<td>2002-2020</td>
<td>-10% to +40%</td>
</tr>
<tr>
<td>Heavy Rail</td>
<td>2002-2020</td>
<td>-50% to +60%</td>
</tr>
<tr>
<td>Light Rail</td>
<td>2002-2020</td>
<td>-20% to +10%</td>
</tr>
<tr>
<td>Bus</td>
<td>2002-2020</td>
<td>-10% to +5%</td>
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</table>
COVID-induced impacts
Effect of COVID-19 on transit ridership

Post-COVID transit recovery - Basu & Ferreira
Perceptions of mobility options

Car commuters (N = 1,270)

- Using a private car can reduce COVID transmission risk: 9% strongly disagree, 13% disagree, 42% neutral, 45% agree, 77% strongly agree
- Using a car is convenient now due to less congestion: 9% strongly disagree, 20% disagree, 25% neutral, 39% agree, 72% strongly agree
- Public transit is currently unsafe: 13% strongly disagree, 15% disagree, 39% neutral, 45% agree, 72% strongly agree
- Taxis and TNCs can increase COVID transmission risk: 10% strongly disagree, 19% disagree, 42% neutral, 40% agree, 60% strongly agree
- People will go back to using public transit: 15% strongly disagree, 25% disagree, 42% neutral, 40% agree, 60% strongly agree
- Vehicle prices will go down: 15% strongly disagree, 39% disagree, 42% neutral, 40% agree, 37% strongly agree
- Private car ownership will increase: 16% strongly disagree, 42% disagree, 40% neutral, 40% agree, 37% strongly agree

Non-car commuters (N = 460)

- Using a private car can reduce COVID transmission risk: 10% strongly disagree, 22% disagree, 22% neutral, 28% agree, 69% strongly agree
- Using a car is convenient now due to less congestion: 12% strongly disagree, 28% disagree, 26% neutral, 28% agree, 60% strongly agree
- Public transit is currently unsafe: 12% strongly disagree, 26% disagree, 26% neutral, 26% agree, 61% strongly agree
- Taxis and TNCs can increase COVID transmission risk: 8% strongly disagree, 24% disagree, 24% neutral, 24% agree, 65% strongly agree
- People will go back to using public transit: 16% strongly disagree, 24% disagree, 24% neutral, 24% agree, 60% strongly agree
- Vehicle prices will go down: 15% strongly disagree, 50% disagree, 46% neutral, 46% agree, 34% strongly agree
- Private car ownership will increase: 16% strongly disagree, 46% disagree, 46% neutral, 46% agree, 37% strongly agree
Car purchase intentions

Has COVID-19 enhanced your intention to purchase a car?

Zero-car households (N = 500)

<table>
<thead>
<tr>
<th>Category</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>All households (N = 500)</td>
<td>37%</td>
<td>45%</td>
<td>18%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-income households (N = 323)</td>
<td>35%</td>
<td>48%</td>
<td></td>
<td></td>
<td>17%</td>
</tr>
<tr>
<td>Transit commuters (N = 165)</td>
<td>39%</td>
<td>40%</td>
<td></td>
<td></td>
<td>21%</td>
</tr>
<tr>
<td>Active transport commuters (N = 50)</td>
<td>30%</td>
<td>52%</td>
<td></td>
<td></td>
<td>18%</td>
</tr>
<tr>
<td>Taxi/TNC commuters (N = 22)</td>
<td>41%</td>
<td>45%</td>
<td></td>
<td></td>
<td>14%</td>
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</table>

Weighted sample share (%)
Car purchase intentions

How soon do you intend to purchase a car?

Zero-car households with enhanced car purchase intention (N = 315)

Timeline

- Within 6 months
- 6 months to 1 year
- 1 to 2 years
- 2 to 3 years

All households (N = 315)
- 13
- 13
- 40
- 33

Low-income households (N = 209)
- 17
- 11
- 36
- 36

Transit commuters (N = 100)
- 13
- 12
- 46
- 29

Active transport commuters (N = 35)
- 14
- 14
- 49
- 23

Taxi/TNC commuters (N = 13)
- 23
- 8
- 31
- 38
Challenges for post-COVID transit
Primary challenges

• Crowding risk on public transit
• Perceptions of mobility options
• Car purchase intentions of zero-car households
• Substitution effect of ride-hailing services
How can we move forward?
Transit service improvements

• Near-term strategies
  • Real-time crowding information
  • Safety measures, e.g. sanitation, mask requirements

• Longer-term strategies
  • Flexible scheduling
  • Bus transit priority
Bikesharing feeders to transit

Impact on auto ownership

Impact on auto use
MaaS for mass transit

Experimental Design → Outreach → Outcomes

- Integrated mobility platform with packages and subsidies
- Randomized control trial in target communities
- Flexible and ‘mass’ transit
- Affordable multi-modal packages for low-income communities

NSF CIVIC Planning Grant
Flexible Mobility-as-a-Service to Improve Post-Pandemic Regional Sustainability

Post-COVID transit recovery - Basu & Ferreira
References

• **Post-COVID sustainable mobility**

• **Impact of bikesharing on auto ownership, use, and GHG emissions**
Thank you! Questions?

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