Chapter IV Summary

Public Bikesharing in North America: Early Operator and User Understanding

Chapter IV of Public Bikesharing in North America: Early Operator and User Understanding analyzes the results of membership surveys completed with four early public bikesharing programs in North America: BIXI Montreal, BIXI Toronto, Nice Ride Minnesota in the Twin Cities of Minneapolis, and Capital Bikeshare in Washington, D.C. Between November 2011 and January 2012, UC Berkeley researchers surveyed members in collaboration with the four programs and analyzed the data from 10,661 respondents (a 15% overall response rate). Participants were asked about their trip purposes, trip making, user perceptions, helmet usage, modal shifts, commute patterns and demographic background. While the results reflect the behavior of early adopters and are not generalizable across all 19 existing IT-based programs, they provide an early understanding that can inform the industry and its stakeholders.

The survey results showed that public bikesharing has had a notable impact on public transit usage based on the urban environment. While public bikesharing facilitated some people to use public transit more, it also facilitated others to make quicker, more direct trips on bicycles, allowing users to reach their destinations sooner than they would with bus or rail. In the larger cities of Washington, D.C., Montreal and Toronto, more users appeared to apply bikesharing as a substitute for public transit and walking, while in the Twin Cities, more users appeared to increase their walking and use of light rail, with a slight net decline in bus use. Public bikesharing was also found to have a small but notable effect on vehicle ownership, as 2% (82 participants) of the survey sample considered public bikesharing to be “somewhat” to “very important” in their decision to sell a vehicle or postpone a vehicle purchase. A majority of those who were considering a vehicle reduction lived in larger, more densely populated cities.

Traveling to school or work was the most common trip purpose in all four cities. The second and third most common trip purposes were social trips and errands. Public bikesharing members were found to have shorter commutes than the general populations in their respective cities. A similar result was found for carsharing members in a previous study. Thus, emerging evidence is beginning to suggest that commute length could influence the adoption of shared-use vehicle systems.

The results also suggest that participants took more one-way trips than round trips. All of the operators included the first 30 minutes of each trip as free, and this may have played some role in the predominance of one-way trips. The sample population was younger, more affluent, and more educated than the general population. Nearly 60% of the respondents were under the age of 34, nearly 80% were Caucasian, and 83% were non-student. More than 85% had a Bachelor’s degree or higher, exceeding the general population. However, carsharing users have similarly high education levels. The income distribution of the sample population was also more elevated than the general population but typical of highly educated urban populations.

Members of the four programs felt they reduced their driving as a result of public bikesharing (40% overall). At the same time, 69% of respondents biked more since joining bikesharing, while only 5% biked less. Commensurately, 64% of respondents exercised more since joining
public bikesharing. Most respondents “never” use helmets, while between 20% to 38% reported wearing helmets with relatively high frequency while using public bikesharing.

In general, bikesharing was perceived as a positive enhancement to the transportation system. Over 95% of respondents felt the bikesharing system enhanced the public transit services in their city and nearly 80% of respondents stated public bikesharing improved the connectivity of the public transit system. Thus, the survey broadly found that public bikesharing improved the mobility of users, increased their physical activity, reduced their driving, and augmented the public transit system by both substituting short trips and serving as medium for connectivity to public transit.
Organizations Participating in the Survey

<table>
<thead>
<tr>
<th>Program</th>
<th>Users</th>
<th>Bicycles</th>
<th>Stations</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Bikeshare (D.C.)</td>
<td>18,000</td>
<td>1,200</td>
<td>130</td>
<td>5,248</td>
</tr>
<tr>
<td>Nice Ride Minnesota (Twin Cities)</td>
<td>3,630</td>
<td>1,200</td>
<td>116</td>
<td>1,238</td>
</tr>
<tr>
<td>BIXI-Montreal</td>
<td>40,000</td>
<td>5,120</td>
<td>411</td>
<td>3,322</td>
</tr>
<tr>
<td>BIXI-Toronto</td>
<td>4,000</td>
<td>1,000</td>
<td>80</td>
<td>853</td>
</tr>
</tbody>
</table>


Public Transit and Population Statistics of Participating Cities

<table>
<thead>
<tr>
<th>Transit Facts</th>
<th>Washington, D.C.</th>
<th>Toronto</th>
<th>Montreal</th>
<th>Minneapolis-St.Paul</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilometers of Rail Track</td>
<td>341</td>
<td>373</td>
<td>122</td>
<td>40</td>
</tr>
<tr>
<td>Number of Buses</td>
<td>1,495</td>
<td>1,811</td>
<td>1,600</td>
<td>885</td>
</tr>
<tr>
<td>Number of Rail (or Metro) Cars</td>
<td>1,106</td>
<td>951</td>
<td>759</td>
<td>27</td>
</tr>
<tr>
<td>Unlinked trips</td>
<td>418,125,650</td>
<td>477,357,000</td>
<td>388,600,000</td>
<td>78,048,647</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Density</td>
<td>601,723</td>
<td>2,503,281</td>
<td>1,620,693</td>
<td>667,646</td>
</tr>
<tr>
<td>Area (km²)</td>
<td>177</td>
<td>630</td>
<td>365</td>
<td>288</td>
</tr>
<tr>
<td>Population Density (pop/km²)</td>
<td>3,400</td>
<td>3,972</td>
<td>4,439</td>
<td>2,317</td>
</tr>
<tr>
<td>Year of Data</td>
<td>2010</td>
<td>2010 (transit)</td>
<td>2006 (population)</td>
<td>2010</td>
</tr>
</tbody>
</table>


Demographics of Survey Respondents

<table>
<thead>
<tr>
<th>Age/Status</th>
<th>Respondents</th>
<th>Education</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 – 17 years old</td>
<td>11 (0%)</td>
<td>Less than high school</td>
<td>14 (0%)</td>
</tr>
<tr>
<td>18 - 24</td>
<td>1140 (11%)</td>
<td>High school</td>
<td>179 (2%)</td>
</tr>
<tr>
<td>25 - 34</td>
<td>5041 (48%)</td>
<td>Technical school/Cegep</td>
<td>901 (9%)</td>
</tr>
<tr>
<td>35 - 44</td>
<td>2193 (21%)</td>
<td>Bachelor's degree</td>
<td>4445 (42%)</td>
</tr>
<tr>
<td>45 - 54</td>
<td>1063 (10%)</td>
<td>Advanced degree (Masters, Doctoral)</td>
<td>4773 (46%)</td>
</tr>
<tr>
<td>55 - 64</td>
<td>892 (8%)</td>
<td>Prefer not to answer</td>
<td>103 (1%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>119 (1%)</td>
<td>Total</td>
<td>10475</td>
</tr>
<tr>
<td>65 years or older</td>
<td>119 (1%)</td>
<td>Total</td>
<td>10509</td>
</tr>
<tr>
<td>Total</td>
<td>10637</td>
<td>Income</td>
<td>385 (4%)</td>
</tr>
<tr>
<td>Race (all that apply)</td>
<td>598 (6%)</td>
<td>$10,000 to $14,999</td>
<td>214 (2%)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>243 (2%)</td>
<td>$15,000 to $24,999</td>
<td>400 (4%)</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>289 (2%)</td>
<td>$25,000 to $34,999</td>
<td>555 (5%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>8290 (79%)</td>
<td>$35,000 to $49,999</td>
<td>1285 (13%)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>391 (4%)</td>
<td>$50,000 to $74,999</td>
<td>1312 (13%)</td>
</tr>
<tr>
<td>Other</td>
<td>577 (5%)</td>
<td>$75,000 to $99,999</td>
<td>1478 (14%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>417 (4%)</td>
<td>$100,000 to $149,999</td>
<td>3433 (34%)</td>
</tr>
<tr>
<td>Total</td>
<td>10516</td>
<td>$150,000 to $199,999</td>
<td>1222 (12%)</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>741 (7%)</td>
<td>Total</td>
<td>10661</td>
</tr>
</tbody>
</table>

### Summary of Trip Information from Operational Data in 2011

<table>
<thead>
<tr>
<th>System</th>
<th>Data Type</th>
<th>1st Quarter (limited data)</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Bikeshare (Washington, D.C.)</td>
<td>Total Trips</td>
<td>10,976†</td>
<td>374,203</td>
<td>405,450</td>
<td>313,001</td>
<td>1,103,630†</td>
</tr>
<tr>
<td></td>
<td>Single-Station Round-Trips</td>
<td>584</td>
<td>24,240</td>
<td>23,643</td>
<td>13,553</td>
<td>62,020</td>
</tr>
<tr>
<td></td>
<td>% of Single-Station Round-Trips</td>
<td>5.3%</td>
<td>6.5%</td>
<td>5.8%</td>
<td>4.3%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Nice Ride Minnesota (Minneapolis-Saint Paul)</td>
<td>Total Trips</td>
<td>NA</td>
<td>60,785</td>
<td>117,219</td>
<td>39,526</td>
<td>217,530</td>
</tr>
<tr>
<td></td>
<td>Single-Station Round-Trips</td>
<td>NA</td>
<td>5,840</td>
<td>11,237</td>
<td>2,827</td>
<td>19,904</td>
</tr>
<tr>
<td></td>
<td>% of Single-Station Round-Trips</td>
<td>NA</td>
<td>9.6%</td>
<td>9.6%</td>
<td>7.2%</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

† 1st Quarter 2011 Capital Bikeshare data released was a subset (7%) of total trips during the quarter.

One-Way and Round-Trip Travel

Montreal
- One-way, from station to station, N = 3227
- Round-Trip, back to the same station, N = 3204

Toronto
- One-way, from station to station, N = 824
- Round-Trip, back to the same station, N = 806

Minneapolis-Saint Paul
- One-way, from station to station, N = 1189
- Round-Trip, back to the same station, N = 1174

Distribution of Station-to-Station Trip Duration in 2011

Capital Bikeshare
Washington, DC
N = 1,103,598 Trips in 2011

Nice Ride Minnesota
Minneapolis-Saint Paul
N = 227,530 Trips in 2011

Usage Frequency of All Nice Ride Minnesota Users in 2011

Perceptions of Bikesharing as an Enhancement to Public Transportation

I think of BIXI as an enhancement to the Montreal public transportation system.

I think of BIXI as an enhancement to the Toronto public transportation system.

I think of Nice Ride Minnesota as an enhancement to the Twin Cities public transportation system.

Perceptions of Bikesharing as an Improvement in Public Transit System Connectivity

**BIXI has improved the connectivity of the Montreal public transit system.**

- Strongly agree: 45%
- Agree: 34%
- Neutral (no opinion): 16%
- Disagree: 4%
- Strongly disagree: 1%

**BIXI has improved the connectivity of the Toronto public transit system.**

- Strongly agree: 27%
- Agree: 40%
- Neutral (no opinion): 24%
- Disagree: 7%
- Strongly disagree: 2%

**Nice Ride Minnesota has improved the connectivity of the Twin Cities public transit system.**

- Strongly agree: 33%
- Agree: 48%
- Neutral (no opinion): 16%
- Disagree: 3%
- Strongly disagree: 1%

Use of Public Transit and Bikesharing Trips Instead of Automobile Travel

**Since joining BIXI, I have made trips with public transit and bikesharing (together) that I would have previously done with a car. [Montreal]**

- Strongly agree: 20%
- Agree: 21%
- Neutral (no opinion): 19%
- Disagree: 21%
- Strongly disagree: 18%

**Since joining BIXI, I have made trips with public transit and bikesharing (together) that I would have previously done with a car. [Toronto]**

- Strongly agree: 9%
- Agree: 19%
- Neutral (no opinion): 22%
- Disagree: 30%
- Strongly disagree: 20%

**Since joining Nice Ride Minnesota I have made trips with public transit and bikesharing (together) that I would have previously done with a car.**

- Strongly agree: 19%
- Agree: 31%
- Neutral (no opinion): 21%
- Disagree: 23%
- Strongly disagree: 6%
Impact of Bikesharing on Exercise

I get more exercise now that I am a member of BIXI. [Montreal]

N = 955

34% Strongly agree
39% Agree
18% Neutral (no opinion)
7% Disagree
1% Strongly disagree

I get more exercise now that I am a member of BIXI. [Toronto]

N = 841

19% Strongly agree
39% Agree
26% Neutral (no opinion)
13% Disagree
3% Strongly disagree

I get more exercise now that I am a member of Nice Ride Minnesota.

N = 1229

21% Strongly agree
41% Agree
26% Neutral (no opinion)
10% Disagree
3% Strongly disagree

Helmet Use with Public Bikesharing

Montreal

Question: How often do you wear a helmet when using BIXI bikes?

N = 3291

Always: 8%
Most of the time: 12%
Sometimes: 8%
Rarely: 10%
Never: 62%

Toronto

Question: How often do you wear a helmet when using BIXI bikes?

N = 842

Always: 11%
Most of the time: 18%
Sometimes: 11%
Rarely: 15%
Never: 45%

Minneapolis-St Paul

Question: How often do you wear a helmet while using Nice Ride?

N = 1232

Always: 16%
Most of the time: 20%
Sometimes: 14%
Rarely: 50%
Never: 2%

Washington, D.C.

Question: How often do you wear a helmet when you use Capital Bikeshare?

N = 5248

Always: 17%
Most of the time: 19%
Some of the time: 21%
Never: 43%

Reported Change in Bus Use Caused by Public Bikesharing in Four Early North American Programs

As a result of my use of [public bikesharing], I use the bus...

[A]
- All respondents
  - N = 10558
  - Much more often: 1%
  - More often: 6%
  - Less often: 28%
  - Much less often: 10%
  - No Change as a Result: 56%

[B]
- Twin Cities
  - N = 1219
  - Much more often: 1%
  - More often: 13%
  - Less often: 14%
  - Much less often: 3%
  - No Change as a Result: 69%

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Change in Urban Rail Use Caused by Public Bikesharing

As a result of my use of [public bikesharing], I use [urban rail]...

[A]
- All respondents
  - N = 10552
  - Much more often: 1%
  - More often: 8%
  - Less often: 32%
  - Much less often: 11%
  - No Change as a Result: 48%

[B]
- Twin Cities
  - N = 1221
  - Much more often: 2%
  - More often: 13%
  - Less often: 3%
  - Much less often: 0%
  - No Change as a Result: 83%

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Reported Change in Public Transportation Use as a Result of Bikesharing

As a result of my use of [public bikesharing], I use public transportation:

[A] All respondents
N = 5360

[B] Twin Cities
N = 1228

Minneapolis
Montreal
Washington, D.C.

Toronto (above)


Change in Amount of Walking Resulting from Public Bikesharing

As a result of my use of [public bikesharing], I walk...

<table>
<thead>
<tr>
<th>Change in Behavior</th>
<th>All respondents (N = 10523)</th>
<th>Twin Cities (N = 1221)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much more often</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>More often</td>
<td>19%</td>
<td>31%</td>
</tr>
<tr>
<td>Less often</td>
<td>31%</td>
<td>22%</td>
</tr>
<tr>
<td>Much less often</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>No Change</td>
<td>43%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Change in Bicycling Due to Public Bikesharing

As a result of my use of [public bikesharing], I ride a bicycle (any bicycle)...

<table>
<thead>
<tr>
<th>Change in Behavior</th>
<th>All respondents (N = 10543)</th>
<th>Twin Cities (N = 1218)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much more often</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>More often</td>
<td>39%</td>
<td>45%</td>
</tr>
<tr>
<td>Less often</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Much less often</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>No Change</td>
<td>22%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Changes in Taxi Use Due to Public Bikesharing

As a result of my use of public bikesharing, I use taxis...

[A] All respondents
N = 10545

[B] Twin Cities
N = 1222

Changes in Personal Driving as a Result of Public Bikesharing

As a result of my use of public bikesharing, I drive a car...

[A] All respondents
N = 10607

[B] Twin Cities
N = 1230

Since you joined [public bikesharing], have you sold, donated or otherwise gotten rid of a personal household vehicle or considered selling a personal vehicle?

How important has your membership with [public bikesharing] been in your decision to sell or consider selling a personal vehicle?

Distribution of Work Travel Times in Washington, D.C., and the Twin Cities

Distribution of Work Travel Distances in Montreal and Toronto

Montreal, QC

Toronto, ON

Distribution of Respondent Distance to Work, by Change in Rail and Bus Usage

Distance to Work by Change in Rail Usage

Distance to Work by Change in Bus Usage