Making the “L” more Sustainable

How the CTA can increase “L” ridership and reduce the number of cars driven

Executive Summary: Original hypothesis of rider satisfaction related to station performance is rejected. Station performance is not related to rider satisfaction. Lower travel times are the only meaningful statistically significant variable in increasing rider satisfaction. Recommendations are made to enable CTA to lower travel times on the “L.”

Motivation and Goal: “L” operations save incredible amounts of energy and CO₂ emissions daily. Yet, despite its inherent benefits (lower cost, no driving hassles etc.), people often prefer alternatives to the “L.” The goal was therefore to identify and recommend potential solutions to the factors pushing people away from the “L.”

Hypothesis: Rider satisfaction is positively related to station performance. Station performance can be improved through suitable application of profitable real-estate financial models. This can increase rider satisfaction and lead people to choose the “L.”

Methodology: The demographics studied were people who travel to Chicago by car or METRA. Information on their preferences and views was obtained by conducting a survey of 300 randomly selected volunteers. This information was used to test the hypothesis and derive other insights using regression models (results in Appendix A). Recommendations were made based on regression results.

Regression Results: Station performance, in the form of appearance, amenities, availability of goods and services etc., is not statistically significant in predicting rider satisfaction on the “L.” However excessive length of travel times is the only statistically significant variable that lowers rider satisfaction. The following comment recorded during the survey sums up what riders seek from the “L.”

*Riders want it [the “L”] to be reasonably clean, safe, and to be on time, higher frequency, and not break down every other day.*

It was rationalized that riders have accepted the dire financial position of CTA’s and all they seek is a basic, clean, well-functioning system. Therefore, real-estate models to improve stations are unsuitable as stations can be cleaned up with effective management of CTA’s existing operations. Consequently the focus of the recommendations was to reduce travel times.

Recommendations: In order to reduce travel time, it is important to note that in most cases CTA is unable to offer express services (like the New York Subway) due to limitations in the number of tracks that prevents one train passing the other. With this in mind the following recommendations are made:

1) Merge Red & Purple line services and offer continuous express service on merged red line from Howard into downtown.
2) Continue and speed up work to remove slow zones.
3) Close minor “L” stations and re-route nearby buses to go from closed stations to active stations.
4) Develop joint METRA and “L” services to encourage usage of combined services.
5) Build a 4-track Circle line with a stop at Ogilvie Transportation Center (OTC).

Potential impact: With 305K worktrips/day into downtown, if drivers switch to using the “L,” the sustainability impact can be approximately 5555 tones of CO₂ and 16.8 GWH of energy saved daily.

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1 A ballpark figure is 19.5GWH of energy & 6456 tones of CO₂ daily. This is based on “L” 650K trips/day of average distance of 25 miles/direction & a 60% car replacement rate. According to the Sightline Institute, CO₂ emissions of a car = 1.1lb/mile. University of Washington had energy at 1 KWH/mile in a car
2 If a persons satisfaction from riding the “L” exceeds driving or using he METRA, they will eventually switch to using the “L”
3 This is assuming 25 miles are driven direction per automobile driven on average
Appendix A: Regression Results

Regression Analysis: How satisfied versus Predictors

The regression equation is
(How satisfied are you with the L) = 8.66 - 0.0828 (The stations look bad) + 0.0181 (Are the stations safe?) + 0.0179 (Boring) - 0.222 (It takes too long) - 0.0862 (Not get what I’m paying for) - 0.0908 (Other)

327 cases used, 9 cases contain missing values

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coef</th>
<th>SE Coef</th>
<th>T</th>
<th>P</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>8.6592</td>
<td>0.4765</td>
<td>18.17</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>The stations look bad.</td>
<td>-0.08277</td>
<td>0.05414</td>
<td>-1.53</td>
<td>0.127</td>
<td>1.570</td>
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<tr>
<td>Are the stations safe?</td>
<td>0.01807</td>
<td>0.05539</td>
<td>0.33</td>
<td>0.744</td>
<td>1.538</td>
</tr>
<tr>
<td>Boring</td>
<td>0.01790</td>
<td>0.04982</td>
<td>0.36</td>
<td>0.720</td>
<td>1.118</td>
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<tr>
<td>It takes too long.</td>
<td><strong>-0.22243</strong></td>
<td><strong>0.04546</strong></td>
<td><strong>-4.89</strong></td>
<td><strong>0.000</strong></td>
<td>1.245</td>
</tr>
<tr>
<td>Not getting what</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I’m paying for</td>
<td>-0.08624</td>
<td>0.04380</td>
<td>-1.97</td>
<td>0.050</td>
<td>1.322</td>
</tr>
<tr>
<td>Other</td>
<td>-0.09084</td>
<td>0.03625</td>
<td>-2.51</td>
<td>0.013</td>
<td>1.074</td>
</tr>
</tbody>
</table>

Analysis

By Considering the Coefficients, Standard Error Coefficients, P-values and VIF’s, it is clear that the “L” taking too long is the only meaningful statistically significant factor in predicting rider satisfaction. In addition, its negative sign indicates that it lowers rider satisfaction. Both “Not getting what I am paying for” and “Other” are significant at (and above) the 0.05 level and they have the expected negative signs. While both these factors indicate that something is missing from the “L” experience, neither points to any concrete factor. Consequently, even though they provide valuable insights, these factors are not considered in recommendation making.