Impacts of replacing a fixed transit line by a Demand Responsive Transit system

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Contribution to the optimal mix?
Objectives

• What’s in it for passenger and society?

• Wider impacts : 5xE
Understanding and learning of DRT impacts

Understanding -> Predicting - > Improving

Supply and demand perspective
(Potential) user perspective

LC 1: MaaS-ready individuals
LC 2: Mobility neutrals
LC 3: Technological car lovers
LC 4: Multimodal PT supporters
LC 5: Anti new-mobility individuals

Alonso-Gonzalez et al. (2019)
Bronsvoort et al. (2020)
DRT pilot Amsterdam: Mokumflex

- Gemeente Amsterdam
  - Regulates AOV
  - Operates AOV and Mokumflex

- Vervoerregio Amsterdam
  - Regulates transit
  - Operates VOV

RMC
- Operates AOV and Mokumflex

Mokumflex

Smart Public Transport

TU Delft
Mokumflex

Fixed line

30: 2 vans
31: 1 van

2 cars or vans

30/31: 6:00 - 24:00, Mo-Fr
6:00 - 24:00, Mo-Mo

30/31: 60min headway
N/A

30/31: 43 stops
301: 45 stops

0,155 €/km
Free

60 min prior booking
15 min +- pick up
Impacts
Ridership and (estimated) costs

<table>
<thead>
<tr>
<th></th>
<th>Fixed, 30 + 31 Sprinter</th>
<th>DRT Combi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage (vehicular km/month)</td>
<td>27.561</td>
<td>4.098</td>
</tr>
<tr>
<td>Ridership (passengers/month)</td>
<td>1.718</td>
<td>478</td>
</tr>
<tr>
<td>Vehicles</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Operational costs (€/month)</td>
<td>$44.288</td>
<td>$9.551</td>
</tr>
<tr>
<td>% vs Fixed line</td>
<td>100%</td>
<td>22%</td>
</tr>
<tr>
<td>Veh km/passenger</td>
<td>16.0</td>
<td>8.6</td>
</tr>
</tbody>
</table>
0.01
0.08
0.71
0.88
1.59
1.62

Veh*km/ pass * km

Mokumflex
UBER
Population’s and user perception

On time, 301

Not on time, 301

Very satisfied | Satisfied | Reasonable | Dissatisfied | Very dissatisfied
79% | 14% | 2% | 2% | 3%
Other impacts

<table>
<thead>
<tr>
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<th>DRT Combi</th>
<th>DRT e-Crafter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 emissions (kgCO2Eq/ month)</td>
<td>9.275</td>
<td>1.004</td>
<td>472</td>
</tr>
</tbody>
</table>

NB
- Noise
- Traffic safety
- Space occupation
- Etc.
Conclusion/discussion

• Evaluation of actual replacement of fixed transit by DRT
• Evaluation of wider impacts

• Ridership drop
• Efficiency increase -> costs and societal impacts

Failure or success?

Lessons learnt
• Not black and white results
• Supporting discussions of objectives
• DRT is more cost-efficient, but sufficiently?

Contribution to optimal mix?
• Modal shift?
• Social exclusion?

Discussion
• DRT specific vs. Specific operations?
• Sustainable business case? Rural vs Urban
• Is DRT suitable for dealing with (very) low demand?


http://nielsvanoort.weblog.tudelft.nl/
Questions / Contact

Presentations and papers:
http://nielsvanoort.weblog.tudelft.nl/

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