Bicycle and Transit: A Powerful Combination

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Pressure on the (urban)road network is large, because of the economic growth of last years...
... and larger cities struggle with pollution.
Bicycle and Transit: Best of both worlds
The story of bicycle and transit
Spatial Planning

- 1970s: Sectoral planning
- 1980s: ABC-planning
- 1990s: VINEX: last centrally organized masterplan
- 2008: Provinces may overrule local zoning plans
Spatial Planning

- 1970s: Sectoral planning
- 1980s: ABC-planning
- 1990s: VINEX: last centrally organized masterplan
- 2008: Provinces may overrule local zoning plans
Transit
- 1980 and 1990s
  Major losses on transit

- 2000s
  PSO contracts: emphasis on efficiency and attractiveness.
  Provinces became responsible for efficiency of PT
Transit network design
Transit

- 1980 and 1990s
  Parallel lines

- 2000s
  Fishbone network

Image: Goudappel Coffeng
Transit

- 1980 and 1990s
  Parallel lines

- 2000s
  Fishbone network

https://www.youtube.com/watch?v=XGwbGAM5YII
Image: KiM
Bicycle

- **1950s**
  Welfare brings car mobility

- **1970s and 1980s**
  Oil crises and negative consequences: revival of the bicycle mode

Image: PvdA, Breda
Bicycle

- 1970s and 1980s
  Nationale government:
  Bicycle masterplan

- 1990s
  Comprehensive and decentral approach
Governance

- 1990s and 2000s
Provinces became responsible for spatial planning, regional transit, and bicycle infrastructure

Image: Raymond Huisman
Understanding the bicycle and transit chain
The chain

Image: Goudappel Coffeng
Who uses Bicycle and Transit?
If Bicycle-Transit users were 100 people...
..., we could split them into 7 groups...
... with different characteristics.
... with different characteristics.

Opportunities: last mile solutions
Shared bike types

- **Two-way station-based**
  - Take and return bike to original location
  - fiets, Syntus

- **One-way station-based**
  - Take and return bike to docking station
  - hopper, GoBike

- **Two-way free-floating (p2p)**
  - Share or rent an existing bike
  - listride, Spinlister

- **One-way free-floating (incl. dropzones)**
  - Take & drop bike anywhere or dropzones (smart-lock, GPS, app)
  - hellovelo, FlickBike, OBike, Donkey Republic

Return-trips (A-A) vs. Single-trips (A-B)

Van Waes et al. 2018
Lessons from Delft

Average daily trips/ bicycle: 1.6.
Avg daily trips/ active bicycle: 2.5-3.8
Avg trip length: 1.7- 2.3 km

Boor et al. (2019)
https://youtu.be/MVqJtJA6_wg
Different systems

<table>
<thead>
<tr>
<th>Bike-sharing Type</th>
<th>OV-fiets</th>
<th>Mobike</th>
<th>Swapfiets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image illustration</td>
<td><img src="image1.png" alt="OV-fiets" /></td>
<td><img src="image2.png" alt="Mobike" /></td>
<td><img src="image3.png" alt="Swapfiets" /></td>
</tr>
<tr>
<td>Year Launched in the Netherlands</td>
<td>2003</td>
<td>2017</td>
<td>2014</td>
</tr>
<tr>
<td>Feature of systems</td>
<td>Docked bike-sharing system</td>
<td>Dockless bike-sharing system</td>
<td>Bicycle-lease system on a subscription basis</td>
</tr>
<tr>
<td>Way to use</td>
<td>1. Subscription online or on a NS App</td>
<td>1. Subscription on a Mobike App</td>
<td>Subscription online or on a Swapfiets App and get a Swapfiets bike within 1 day at a location of your choice</td>
</tr>
<tr>
<td></td>
<td>2. Using the Personal public transport chip card (NS card) to rent a bike.</td>
<td>2. Using the Mobike App to open the bike.</td>
<td></td>
</tr>
<tr>
<td>User pricing</td>
<td>€ 3.83/day</td>
<td>€ 12/month, 49.90/year or €1.5/20min</td>
<td>€ 15/month</td>
</tr>
</tbody>
</table>
Modal split

(a) Modal Shift as a result of Mobike
(b) Modal Shift as a result of OV-fiets
(c) Modal Shift as a result of Swapfiets

Ma et al. (2019)
Lessons learned
Lessons learned

- Chain is as strong as the weakest part
- Understand the Transit-Bicycle user
- Last mile is an opportunity
- What do last mile-users want?

Image: Annabel Jeuring
Sources and further reading

• Boor, S., R. Haverman, N. van Oort, S. Hoogendoorn (2019), Ridership impacts of the introduction of a dockless bike-sharing scheme, a data-driven case study, CRB annual meeting

• Brand, J., N. van Oort, B. Schalkwijk, S. Hoogendoorn (2017), Modelling Multimodal Transit Networks; Integration of bus networks with walking and cycling, MT-ITS Conference Napoli.

• Ma, X, Y. Yuan, N. van Oort, S.P. Hoogendoorn (2020), Investigating Impact of Bike-sharing Systems on Modal Shift: A Case Study in Delft, the Netherlands, TRB annual meeting (submitted)

• Shelat, S., R. Huisman, N. van Oort (2018). Analysis of the trip and user characteristics of the combined bicycle and transit mode. Research in Transportation Economics.
Catchment area

Walking

Catchment area

Cycling

Catchment area

Cycling