Ridership impacts of the introduction of a dockless bike-sharing scheme, a data-driven case study

Sven Boor
Niels van Oort
Ronald Haverman
Serge Hoogendoorn
01-11-2019
Bike-sharing timeline 1965 - now

1st generation (no locks)

1965
Witteveensplant, Amsterdam

1970-1990 period with few innovation

2nd generation, (Coin deposit)

1991
experiment Farsa, Denmark

3rd generation, (card access)

1995
Bycyklar Copenhagen, Denmark

1998
First citywide Introduction, Rennes, France

Experiment with magnetic cards, University of Portsmouth, United Kingdom

2003
Introduction in multiple bigger cities in Europe and U.S.A., 2005 - 2010

OVFlots founded (PT-Bike), the Netherlands

4th generation (Smart locks)

2016
Mobike founded, China

2014
Ofo founded, China

2017
Introduction 4th generation Netherlands (Amsterdam, Rotterdam)

2018
Start pilot Deft, the Netherlands
4th generation bikes

Properties:

- Smartphone
- Smart lock (GPRS + GPS)
- Data-driven operations
- Dockless
- Remarkable colours
Research question

How is bike-sharing used in Delft?

- General usage
- Origin/destination, especially the relation between railway stations and Science Park Zuid.
- Idle time

How can sharing data help to monitor bike-sharing systems by municipalities?
Challenge: How to obtain Data?
PostgreSQL + PostGIS

extract_trips.py

trips.csv

import_mobike.py

Every 5 minutes

Mobike

Data analysis tools

python

Custom data analysis

kepler.gl

Animations

QGIS

Visualisations
How Mobike is used in Delft?

https://www.youtube.com/watch?v=MVqJtJA6_wg
General

- Between 1000 and 2100 daily trips
- 1.6 daily trips per bike
  - When only active bikes considered between 2.5 and 3.8
Usage over time

- **General movements Netherlands**
- **Mobike Delft**

The graph shows the share of trips over time, with peaks during certain times of the day, indicating higher usage of the services.
Relative usage mobike per day of week.
Average euclidian trip length 1.6 km (1.7 km - 2.3 km over road)

18.7% of trips related to railway station

50 trips per day Delft Zuid
Bike-sharing as solution for overfull bicycle-parking facilities?
Bicycles parked for long time

80% bikes that are not used for more than 5 days in residential areas
- Redistributing bikes
Recommendations
Data

Enforce sharing of data via standards

- GBFS(+), open data
- MDS

Goals:

- Increase trust between government <> operator
- Improve travelers information
  a. Where is bike-sharing available?
  b. Include bike-sharing within travel advices (MaaS).
    - Encourage interoperability
bike-sharing dashboard
Virtual docking zones
New subscription model

Combine strenghts:

- 25 euro? per month everywhere a bike.
- Discourage not using bike (while renting) for longer then 72 hours.
Higher utilisation of parking facilities at railway stations

Second bikes cause 45% parking pressure (KiM 2018)
Questions

Sven Boor - sven@transbits.nl >transbits

twitter: @sven4all

Niels van Oort - N.vanOort@tudelft.nl

twitter: @Niels_van_oort (https://twitter.com/Niels_van_oort)

Raw data available on request

Slides will be available on https://nielsvanoort.weblog.tudelft.nl/

Full thesis: https://repository.tudelft.nl/islandora/object/uuid%3A0ac0d41a-5d86-430a-b6c4-af6b44371f8c?collection=education