Modelling of micro-mobility (M3)
Travel patterns, potential and design of shared e-scooter services

Access distance to e-scooters: Analysis of trip and app use data in Stockholm

Boel Berg Wincent, Erik Jenelius, Wilco Burghout
Modelling of micro-mobility (M3)

Project aim:

- Understanding of **how people use the service**
- Determine what their **travel patterns look like**
- Identify the **type of travel** that constitutes the market niche in total mobility
- Describe **potentials of the service**

Project outcome

Outputs that can help improve service design strategies
Why do we need to know the access distance?

• User travel behavior
• Catchment area
• Further analysis of interaction with public transportation
• Parking regulations

The study answers the questions:

1. How far do users of shared e-scooters walk to utilize the service?

2. How does the distance to public transportation influence the access distance?

3. What is the catchment area of the micromobility service?
What does current literature say?

• Zurich: willing to walk **60 m on average** and **210 m at maximum** to access a vehicle\(^1\)
• Paris: users do not walk for more than **3-4 minutes** to find an available e-scooter\(^2\)
• Two studies of public station-based bike-share system in Beijing
  – **The average walking distance was 144m**, to or from a public transportation station was 120m\(^3\)
  – Only 5 percent walked more than 200m. The willingness to use a shared bike by a transportation hub decreased rapidly when the distance was greater than 60 m\(^4\)

Methodology
Data

• 11598 trips by Voi from one week in May 2019

• Information about
  – App opens
  – Origin
  – Destination

• Location information about station entrances on the street level

• 6188 trips remain after filtering
Overall and spatial distribution

• Large std (177 m) -> median values
Temporal variations

- Longer distances and time as the day progresses -> fleet placement and dispersion
- E-scooter users walk shorter and slower
Influence of ride distance and public transportation

- The access distance is shorter by public transportation
- Users walk slightly further to an e-scooter when further from public transportation
- Users walk slightly further to an e-scooter when taking longer trips
Variations in access distance and catchment area

Users of e-scooters walk on average 147 m and 4.3 minutes to use an e-scooter. However, the median values of 77 m and 2.7 minutes are more representative.

Time-of-day pattern

A travel time minimizing behavior - to some extent

Distance to public transportation significantly impacts the access distance to e-scooters
Limitations and future studies

- Data limitations
  - 2019
  - Only one week
  - Only one operator

- We know how far users walked, not willingness to walk

- Has the access distance changed?
  - More operators
  - Change in fleet size management
  - New parking regulations

- Elasticity of access distance with respect to the supply of vehicles

- Optimal design and location of designated e-scooter parking
Thank you for listening.

Questions? Frågor?