104 days of a life

does an average passenger spend with waiting for busses and trains

Assumptions: 75 years on 250 days a year twice a day with busses or trains (Ø waiting period 4 min)
Fast rides, short walks:
Demand Analysis and Willingness to Use of Passengers of Flexible Public Mobility Concepts

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Wissen für Morgen
Demand-Responsive Transportation (DRT)

- Research Question
- Study Design

Study Results

- Which requirements do passengers have?
- How should future public transportation be designed?
Demand-Responsive Transportation (DRT)

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Study results

- Which requirements do passengers have?
- How should future public transportation be designed?
Demand-Responsive Transportation (DRT)

- No fixed stops
- No fixed routes
- No timetable
Demand-Responsive Transportation

Supply-led mobility concepts are established.

Demand-responsive mobility concepts are unusual for
• passengers
• providers
• researchers.

Experience is limited.

→ Need for research: Requirement analysis.
Aim and Method of Research

Research questions:
Would passengers use DRT? How should future mobility concepts be designed?

Challenge:
Passengers do not have enough experience in use of DRT.

Method:
Investigating passenger’s acceptance of selected characteristics of DRT → Derivation of the willingness to use.

What do passengers appreciate about public transportation?

DRT = Demand-responsive transportation
### Characteristics of DRT

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>nearby</td>
<td>Door-to-door-service, short walking distances.</td>
</tr>
<tr>
<td>spontaneous</td>
<td>Short waiting periods.</td>
</tr>
<tr>
<td>fast</td>
<td>Few detours, few intermediate stops, minimal travel time.</td>
</tr>
<tr>
<td>direct</td>
<td>Minimum interchanges, direct connections.</td>
</tr>
</tbody>
</table>
Demand-Responsive Transportation (DRT)

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Study Results

- Which requirements do passengers have?
- How should future public transportation be designed?
Who are our study participants?

60.6%

35.6%

Rest: not specified

In total 879 study participants
Accessibility of Stations and Walking Distances

Key Findings

• Good conditions for pedestrian access and egress of stations is one of the key factors to *willingness to use* of public transportation. (Beimborn, Greenwald & Jin, 2003)

• Poor conditions of accessibility is one of the main reasons for a *low frequency* of use of public transportation. (Wardman & Hine, 2000)

• The more a destination is located near the city center, the more passengers are walking the „last mile“. (Wiwobo & Olszewski, 2005)

• When the *walking distance increases* by 10 per cent, the frequency of use of the public transportation at this station decreases by 10 per cent. (Dill, 2003)
How long to walk to the station?

(classified text input)

Average: 9.3 minutes

- 16.7% over 10 minutes
- 44.5% up to 10 minutes
- 17.1% up to 10 minutes
- 18.4% up to 8 minutes
- 1.7% up to 5 minutes

What does that mean? Walking to bus stops is generally acceptable.

How many minutes of walking to the bus stop would you be willing to accept?
**Few stops:**
- longer walks to stations
- quick ride

**Many stops:**
- shorter walks to stations
- longer travel time
What is more popular: Few or many stop?

When there are many stops along a line path walks to the station are short. On the other hand, when there are fewer stops during the ride busses do not need to stop frequently and can run faster.

What does that mean? Few stops are more popular due to faster rides.
Shared Rides
Key Findings

• Due to digitalization new capabilities of matching are enabled.
  (Haucap, 2015)

• In model regions a big trend towards ridesharing is recognizable.
  (San Francisco Municipal Transportation Agency, 2015)

• Advantages for users: Lower fares, shorter travel time (reduced congestion in long-term), less stress.
  Disadvantages for users: Reduced flexibility and convenience, less privacy, less fulfilment of need for safety.
  (Rayle, Dai, Chan, Cervero & Shaheen, 2016)
Would you share a taxi with other (foreign) people?

- Same route: fare remains the same
- Small detour: lower fare
Would you share a taxi with other people?

I would share a taxi with other foreign people, if …

<table>
<thead>
<tr>
<th>Condition</th>
<th>11%</th>
<th>15%</th>
<th>23%</th>
<th>41%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fare remains the same</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small detour (10 minutes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fare is lower</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What does that mean? When the fare is lower, participants are ready to share a taxi. Even a small detour is accepted.
Derivation of Requirements for Future Mobility Concepts

**nearby**
- Walks to the station are generally acceptable, in particular when the bus can ride faster due to fewer stops.

**spontaneous**
- An instant start is desired only if the travel time in total is short.

**fast**
- A fast arrival at the destination is important. That is why connections with fewer stops are preferred.

**direct**
- Direct connections are preferred over connections with interchanges - even if the overall travel time is extended.
Research questions: Would passengers use DRT?

YES, if ...
... travel time is short.
... connections are direct.

DRT = Demand-responsive transportation
Thank you for your Attention.

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Bibliography


