

Source: Pax Arcana - WordPress.com

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

Kathrin Viergutz, Florian Brinkmann
German Aerospace Center (DLR e.V.)
Institute of Transportation Systems

The 45th European Transport Conference
Annual Conference of the Association for European Transport (AET)
04-06 October 2017, Barcelona



Wissen für Morgen



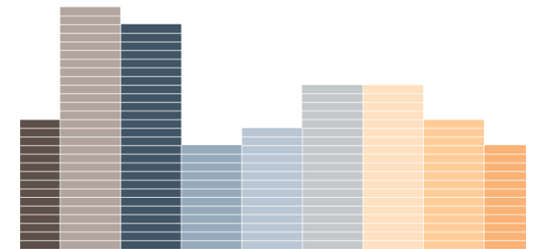


Demand-Responsive Transportation (DRT)

- Research Question
- Study Design

Study Results

- Which requirements do passengers have?
- How should future public transportation be designed?



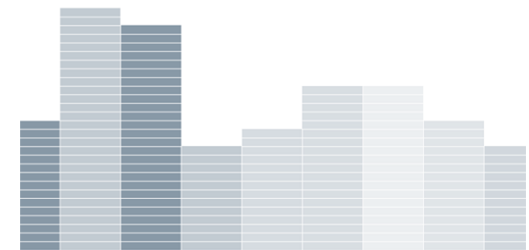


Demand-Responsive Transportation (DRT)


- Research Question
- Study Design

Study results

- Which requirements do passengers have?
- How should future public transportation be designed?

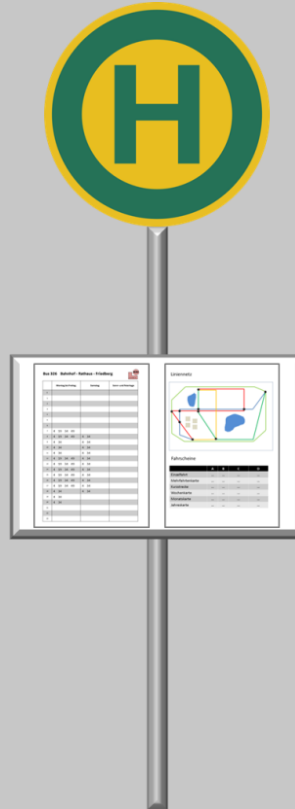


Demand-Responsive Transportation (DRT)

Bus 326 Bahnhof - Rathaus - Friedberg 

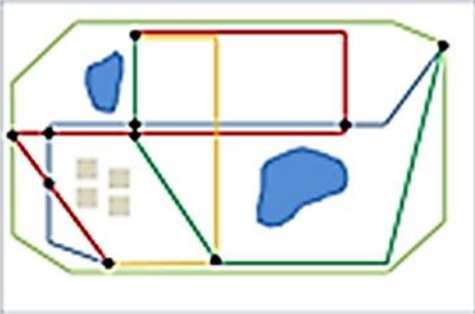
	Montag bis Freitag	Samstag	Sonn- und Feiertage
0			
1			
2			
3			
4			
5			
6			
7	4 19 34 49		
8	4 19 34 49	4 34	
9	4 34	4 34	
10	4 34	4 34	
11	4 34	4 34	
12	4 19 34 49	4 34	
13	4 19 34 49	4 34	
14	4 19 34 49	4 34	
15	4 19 34 49	4 34	
16	4 19 34 49	4 34	
17	4 19 34 49	4 34	
18	4 34	4 34	
19	4 34		
20	4 34		
21			
22			
23			

No
timetable



No
fixed stops

Linienetz



Fahrtscheine

	A	B	C	D
Einzelfahrt	---	---	---	---
Mehrfahrtenkarte	---	---	---	---
Kurzstrecke	---	---	---	---
Wochenkarte	---	---	---	---
Monatskarte	---	---	---	---
Jahreskarte	---	---	---	---

No
fixed routes



Demand-Responsive Transportation

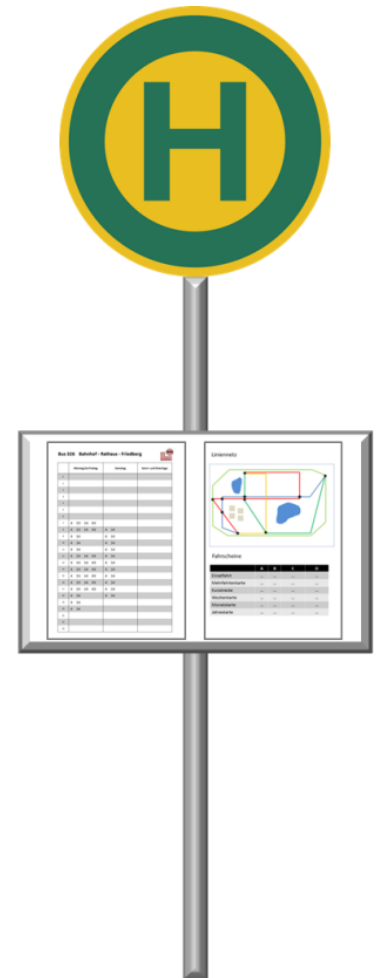
Supply-led mobility concepts are established.

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

nearby

Door-to-door-service, short walking distances.

spontaneous

Short waiting periods.

fast

Few detours, few intermediate stops, minimal travel time.

direct

Minimum interchanges, direct connections.



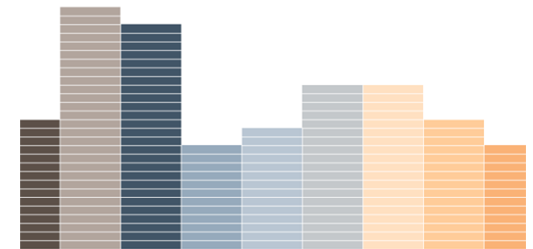
No.timetable Ridepooling
Mobility.as.a.service
Uber Call.a.bus
MaaS MOD Public.transport
Demand.responsive Taxi
Ridesharing Sharing
Bus Urban.Mobility
No.fixed.stops DRT demand.analysis
Mobility.on.demand
Dial.a.ride Future.mobility

Demand-Responsive Transportation (DRT)

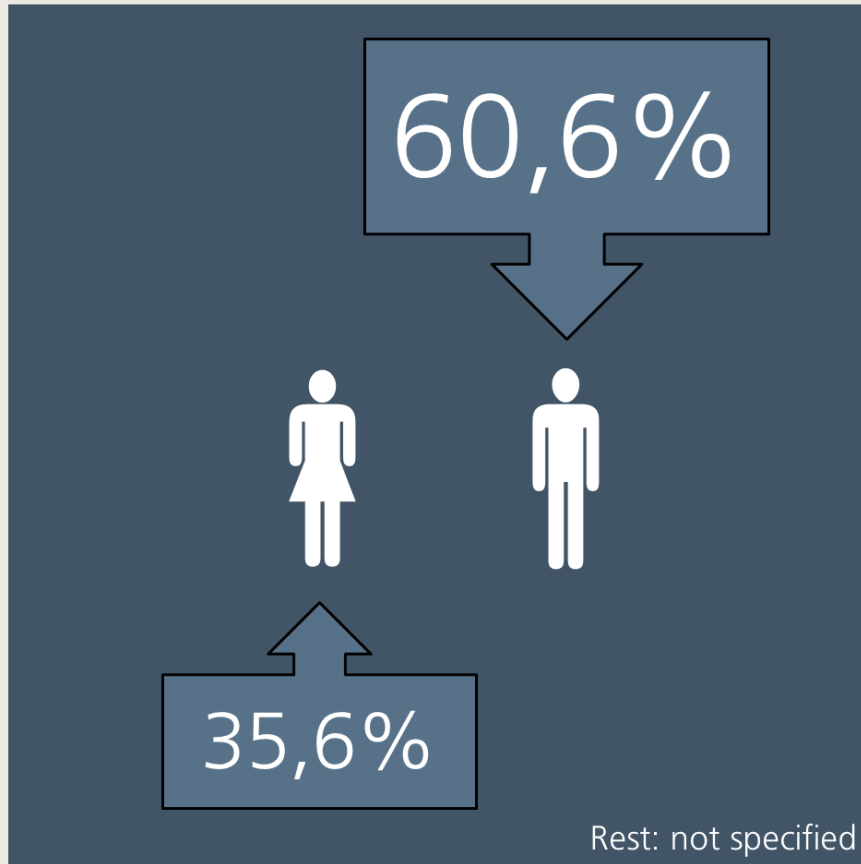
- Research Question
- Study Design

Study Results

- Which requirements do passengers have?
- How should future public transportation be designed?



Who are our study participants?



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)

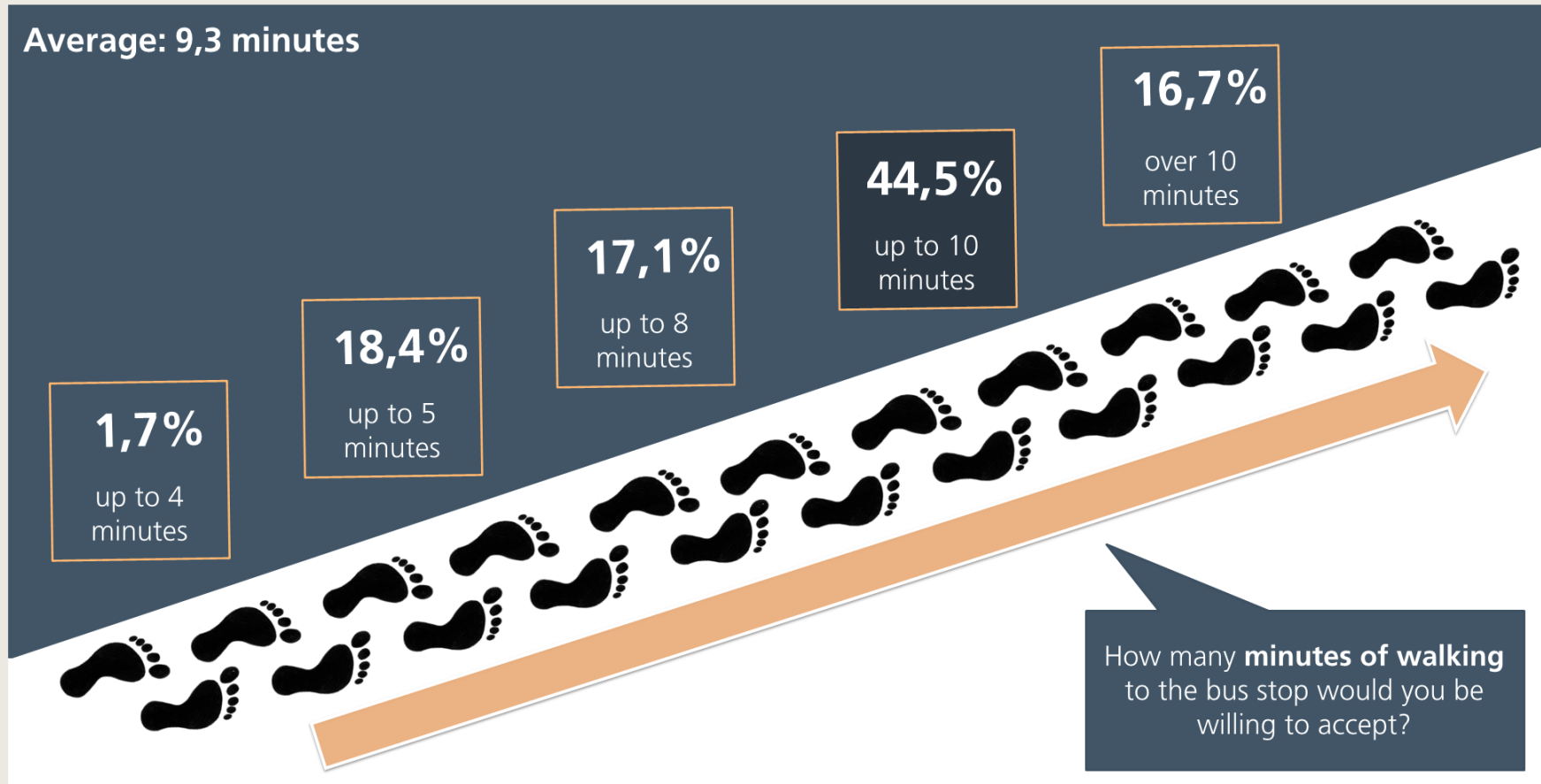


Source: Google Maps with additions



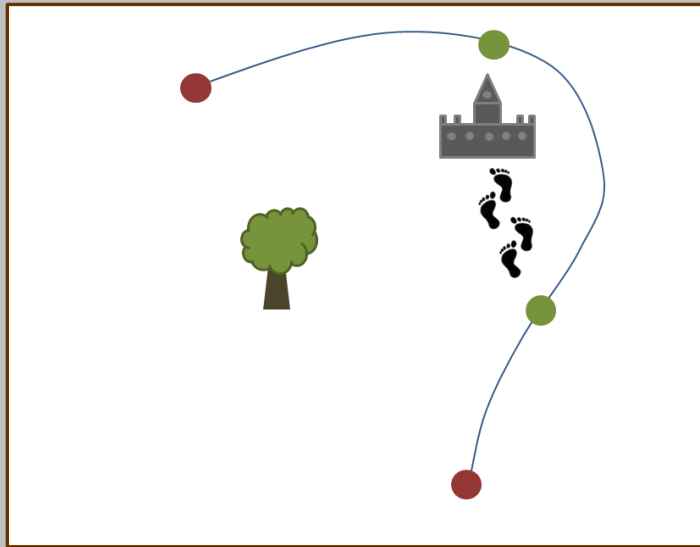
How long to walk to the station?

(classified text input)



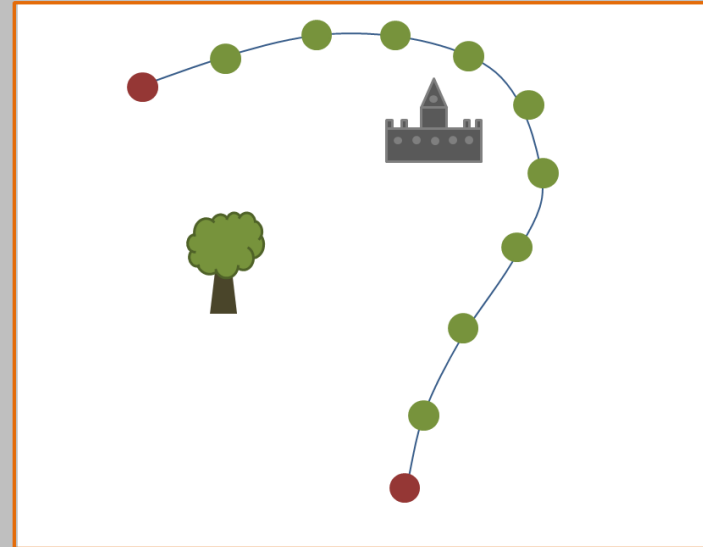
What does that mean? Walking to bus stops is generally acceptable.





Few stops:

- longer walks to stations
- quick ride



Many stops:

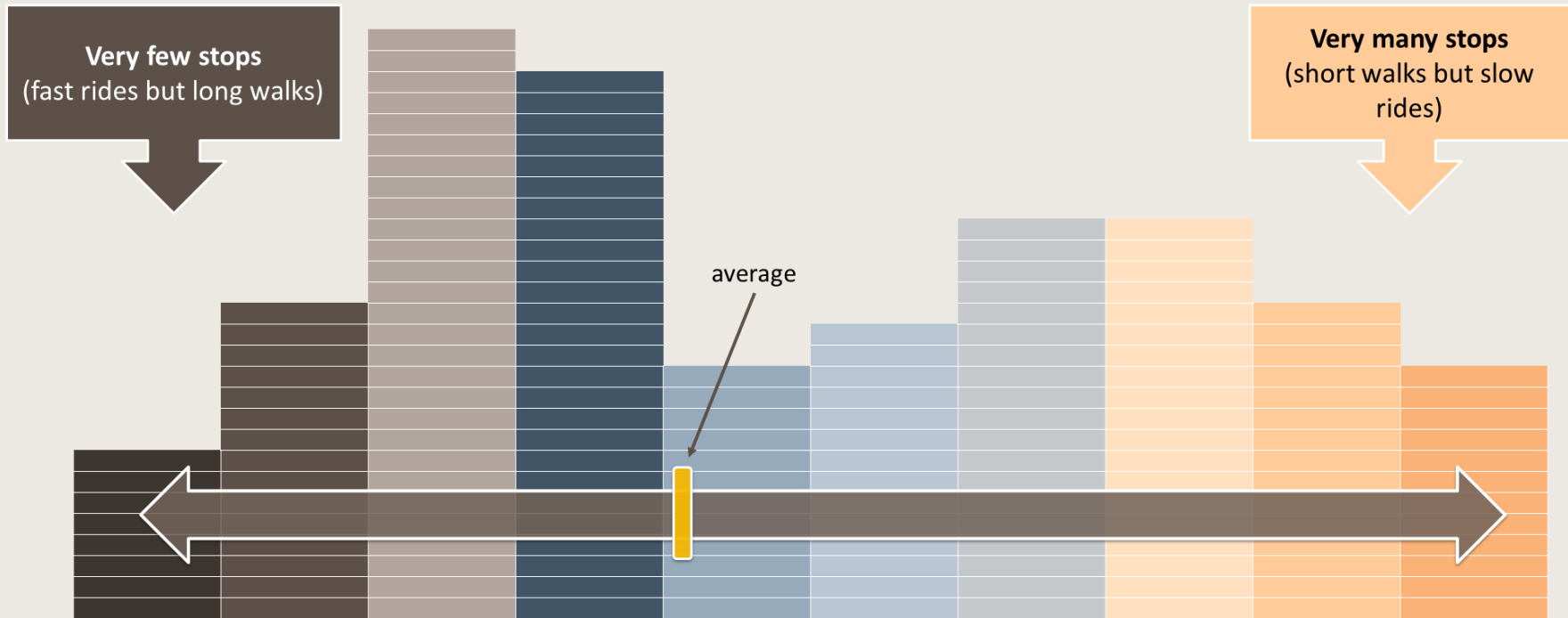
- shorter walks to stations
- longer travel time



879 participants

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

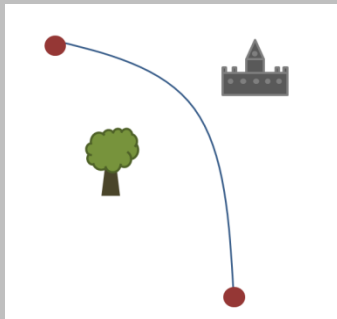
- Due to **digitalization** new capabilities of matching are enabled.
(Haucap, 2015)
- In model regions a **big trend** towards ridesharing is recognizable.
(San Francisco Municipal Transportation Agency, 2015)
- **Advantages for users:** Lower fares, shorter travel time (reduced congestion in long-term), less stress.
Disadvantages for users: Reduced flexibility and convenience, less privacy, less fulfilment of need for safety.
(Rayle, Dai, Chan, Cervero & Shaheen, 2016)



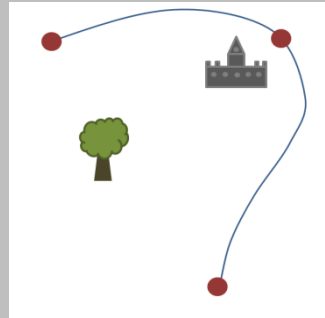
Would you share a



with other (foreign) people?



same route



small detour



fare remains the same



lower fare



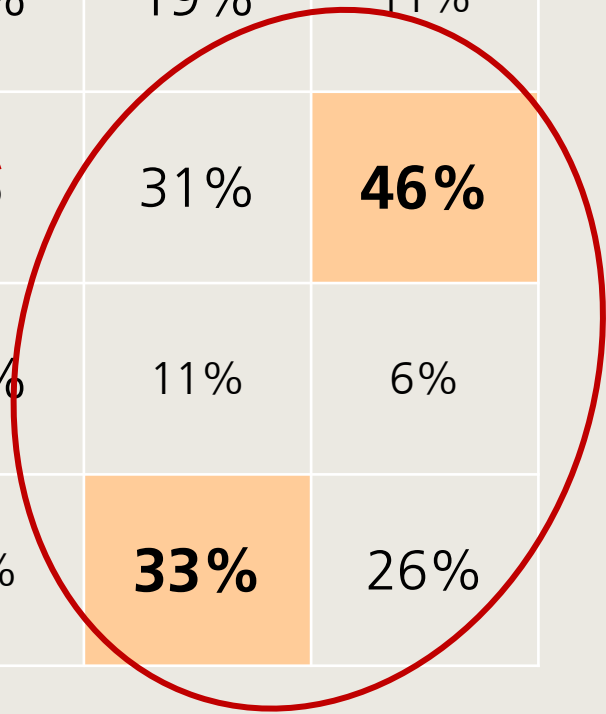
Would you share a taxi with other people?

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



Yes, if the fare is lower.

	☹️	☺️	neutral	😊
Exactly the same route			9%	11%
Fare remains the same			19%	11%
Exactly the same route	7%			
Fare is lower			31%	46%
Small detour (10 minutes)	41%	23%	15%	6%
Fare remains the same			11%	6%
Small detour (10 minutes)	12%	11%	14%	
Fare is lower			33%	26%



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.



Answers to the Research Questions

Research questions:

Would passengers use DRT?

YES, if ...

... travel time is short.

... connections are direct.

DRT = Demand-responsive transportation



Thank you for your Attention.



Please contact me:

M.Sc. Kathrin Viergutz
kathrin.viergutz@dlr.de



Bibliography

- Beimborn, E.; Gerenwald, M.; Jin, X. (2003): Accessibility, Connectivity and Captivity: Impacts on Transit Choice. TRB Paper, 2003.
- Dill, J.. (2003) Transit use and proximity to rail: results from large employment sites in the San Francisco, California, bay area. Transportation Research Record, 1835, 19–24.
- Haucap, J. (2015) : Ökonomie des Teilens - nachhaltig und innovativ? Die Chancen der Sharing Economy und ihre möglichen Risiken und Nebenwirkungen, DICE Ordnungspolitische Perspektiven, No. 69.
- Luethi, M.; Weidmann, U.; Nash, A. (2005): Passenger arrival rates at public transportation stations.
- Myhrvold, C. (2015): Uber Expectations As We Grow. Available at: <https://newsroom.uber.com/uber-expectations-as-we-grow/>
- Rayle, L.; Dai, D.; Chan, N.; Cervero, R.; Shaheen, S. (2016): Just a better taxi? A survey-based comparison of taxis, transit, and ridesourcing services in San Fransisco. Transport Policy 45 (2016), Seiten 168–178.
- San Francisco Municipal Transportation San Francisco (2014): Travel Decisions Survey 2014 - Sumary Report. Available at: <https://www.sfmta.com/sites/default/files/reports/2015/Travel%20Decision%20Survey%202014%20Summary%20Report.pdf>
- Wardman, M.; Hine, J. (2000): Costs of Interchange: A Review of the Literature. Working Paper. Institute of Transport Studies, University of Leeds, Leeds, UK.
- Wiwobo, S. S.; Olszewski, P. (2005) Modeling Accessibility to Public Transport Terminals: Case Study of Singapore. Journal of the Eastern Asia Society for Transportation Studies, Vol. 6, pp. 147 - 156, 2005.

