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On-Demand Transportation Beyond Big City Areas: User Motivations and Ridership Prospects

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This work addresses the following topic(s) from the Call for Contributions:

- Placemaking to integrate urban spaces and mobility
- Promoting sustainable mobility choices in metropolitan regions
- Governing responsible mobility innovations
- Shaping the transition towards mobility justice
- System analysis, design, and evaluation
- other: _____

Extended Abstract

Introduction and motivation

Demand-responsive transit (DRT) is particularly suitable for times and areas of low demand. It is supposed to supplement conventional scheduled services, because under low passenger volumes, DRT has lower absolute costs compared to scheduled services. While the concept is old and dates back to 1970s or even earlier, it is only since around 2010 that we have seen its revival and an increase in the number of DRT systems being launched.

The birthplace of the system is primarily the US, where we can observe many examples of DRT due to proliferation of suburbs around metropolitan areas, and the resulting dearth of conventional public transportation in many places. Thereby, much of the scholarly work on DRT is in the US context, which, however, differs from Europe in terms of geographic and urban structures, cultural peculiarities and attitudes, organizational frameworks, etc. In Europe, the concept has also been known for a long time, but in an analog form so far (bookable on the phone, manual dispatch), and only recently re-started in a fully-digital format backed by mobile apps for booking and a software for efficient routing and pooling of travelers.

However, since this rebirth of DRT many failed and discontinued initiatives have been observed. The barriers range from inadequate technology, wrongly defined spatial and temporal conditions, to lack of knowledge about users, low ridership, and of course funding, since many trials are ceased once the subsidy is stopped. This is why the operator of a new DRT service *RegioFlink* in Wattens, a small municipality (around 8,000 residents) in Austria, wanted to avoid failure and commissioned a study *intended to examine the user motivations and ridership prospects of the service*.

Data and background

RegioFlink is the first flexible on-demand transportation service in Tyrol, running on the software provided by *Via*, operated by VVT (regional transit operator) and co-financed by the municipality. The service is booked via an app or by phone, and operates using so-called virtual stops. The service is present in entire town, but it is not running on routes where public buses are available. Season ticket holders can use *RegioFlink* for free. In other

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cases, it is max. 2.30€ per ride. The service is primarily intended to supplement the local bus network on the section connecting downtown with train station located on the outskirts.

We collected data through a quantitative survey of Wattens population, as well as commuters and visitors. Non-users of DRT were explicitly invited to participate. We designed the survey in a way that we can compare the results with a similar study conducted in Hamburg, Germany, for a service called *MOIA*.

Initial results

We collected 338 fully completed questionnaires. About a third of respondents had already used *RegioFlink*, while another 56% were aware of the service but had not yet used it. Around 10% were not aware of the service at the time of the survey.

We asked respondents to rank the reasons for using and not using DRT (Table 1). Each position was then assigned points, and eventually a ranking list was created. Getting to/from train station is the most important reason for using *RegioFlink*. This is followed by to distance too far to walk and bad weather. Price (lower than that of cabs) ranked fourth, which raises the question of whether *RegioFlink*, through underpricing is not generating overuse, and hence induced traffic.

Table 1. Ranking list – reasons for using RegioFlink.

Reasons for using RegioFlink	Score	Detailed ranks			
		1.	2.	3.	4.
Getting to/from train station	1258	53	19	13	4
Walking distance too long	835	8	19	17	11
Too far a distance to walk	71	16	20	8	6
Cheaper than a cab	495	13	6	11	3
Personal vehicle not available	454	14	10	4	5
No direct transit connection available	454	5	13	6	9
More convenient now than before launching <i>RegioFlink</i>	441	2	3	9	6
Testing the new <i>RegioFlink</i>	409	5	2	7	14
No parking space available at the destination	315	8	5	6	3
Carrying luggage	307	1	4	5	11
Faster now than before launching <i>RegioFlink</i>	294	0	2	3	5
Cycling to the train station is too dangerous for me	256	0	5	6	3
Driving not possible because of fatigue or drinking	185	1	6	3	2
Traveling together with other people, hence used <i>RegioFlink</i>	112	0	3	3	1

For non-users (Table 2), the availability of their own car is the most important reason for not using the service. This is followed by a need to travel outside the *RegioFlink* operating area, third ranks the availability of a conventional bus, and fourth is too short operation times of *RegioFlink*.

Table 2. Ranking list – reasons for not using RegioFlink.

Reasons for not using RegioFlink	Score	Detailed ranks			
		1.	2.	3.	4.
Personal vehicle available	2776	85	25	6	7
Travel to a location outside Wattens	1293	10	11	24	21
Good weather, hence opted for cycling	1270	36	39	12	4
I haven't had the chance yet, but I will try <i>RegioFlink</i> in future	1175	10	7	15	9
Direct transit connection available	854	12	12	5	11
Travel beyond the operating hours of <i>RegioFlink</i>	837	10	12	6	12
Traveling with luggage, hence used personal vehicle	778	2	1	12	6
Parking space available at the destination	725	1	13	16	12
Bad weather, hence opted for driving	712	1	15	21	3
Traveling together with other people, hence opted for driving	506	2	3	7	4
Slower than my transportation alternatives	421	2	7	5	3
The additional costs of using <i>RegioFlink</i> are too high for me	384	5	5	3	1
Additional effort due to separate booking	384	5	6	3	4
Less comfortable than my transportation alternatives	330	1	2	1	5
I don't have Paypal or a credit card, so I can't book via the app	297	0	5	7	1
I don't understand where the <i>RegioFlink</i> picks me up	278	2	2	1	3
I downloaded the app just to check it out	246	1	1	1	5
Booking (by phone or app) is too complicated for me	211	3	6	3	1
<i>RegioFlink</i> appears unreliable to me	189	0	0	2	1
I don't like being in a <i>RegioFlink</i> vehicle with strangers	181	0	3	0	0
I do not understand how <i>RegioFlink</i> works	152	2	1	1	0
Inconvenient, as pushchairs & wheelchairs have to be folded up	135	0	1	1	1

Next, we analyzed whether the decision to use DRT is related to everyday mobility behavior or sociodemographic characteristics. The results show a positive significant correlation between the possession of seasonal ticket or transit use frequency and the frequency of ridepooling. In contrast, car ownership or frequency of driving correlate negatively with frequency of *RegioFlink* use. Further, there is a positive significant correlation between age and booking behavior – older people book more often by phone.

The study reveals also that there is only a small shift from cycling and conventional transit to *RegioFlink*, and many trips with *RegioFlink* actually replace driving. But there is a concern of the induced traffic, as some respondents would not have made the trip if the DRT was not available. And large number of respondents using *RegioFlink* do so instead of walking. However, over 60% of the replaced walking trips begin/end at the train station, so *RegioFlink* acts a feeder for rail in this case. The other thing is that *RegioFlink* is free for many users. The (re)introduction of a convenience surcharge for all users could potentially change the substitution rate of walking by DRT.

In 2019, a sub-company of the VW group, *MOIA*, launched the DRT system in Hamburg. While it has a similar operating scheme to *RegioFlink* (with virtual bus stops), it has characterized by a completely different spatial structure, usage patterns, trip purposes, and organizational form. The outcomes of the comparison reveal that *MOIA* is used mostly for leisure trips (maybe even induces them) – they make up to 60% of all trips, compared to only 8% in the case of *RegioFlink* in Wattens. *RegioFlink* is mostly used as a feeder bus to/from train station (61%), where it complements transit that is insufficient for commuters.

In terms of service quality, *RegioFlink* scores better notes than *MOIA* in many respects (Figures 1 and 2). Waiting time, virtual stops, routing, travel time, punctuality, price and reliability are rated better. This could possibly be due to the smaller service area, where major detours or heavy congestion is less likely. The bus drivers and privacy are rated similarly. Only the vehicles are rated clearly lower – not surprising given that *MOIA* vehicles are based on the newest models from VW.

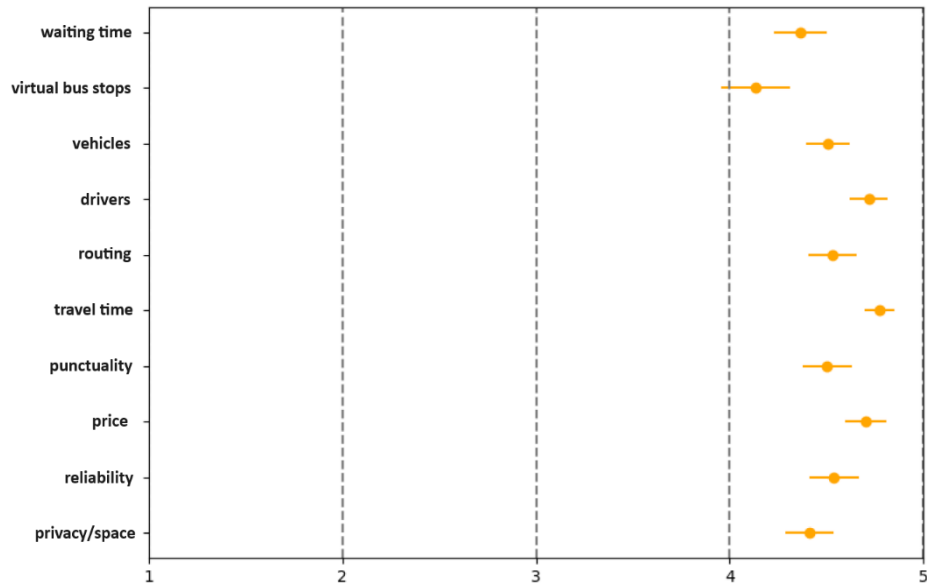


Figure 1. Users' evaluation of selected aspects of RegioFlink.

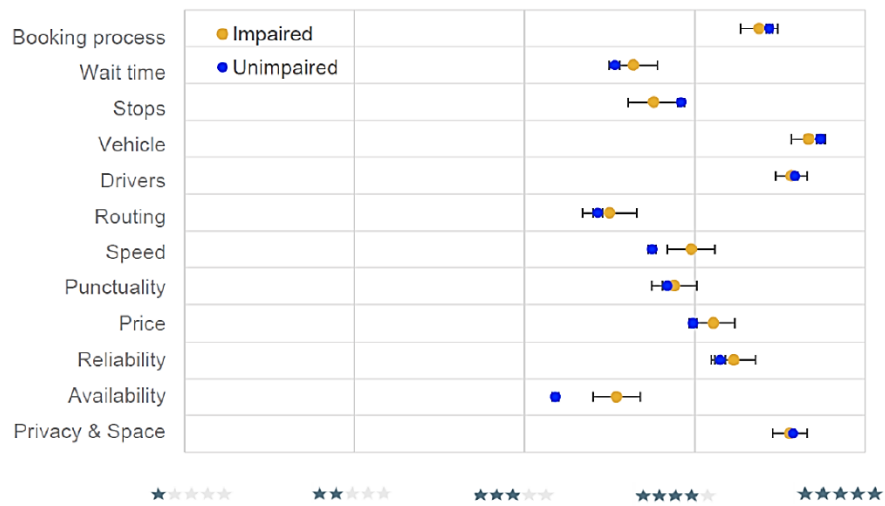


Figure 2. Users' evaluation of selected aspects of MOIA (source: Kistorz et al. (2021)).