Response

Demand-Responsive Transport to ensure accessibility, availability and reliability of rural public transport

ANNEX VII: DRT CASES FROM OTHER THAN PROJECT PARTNER COUNTRIES

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Table of Content

Annex VII: DRT cases from other than project partner countries

The following Annex is part of the RESPONSE project WP3.2 overall report. The Annex is giving an overview of DRT cases in countries that are not part of the Response project. The information about the cases was mostly found via desk research. However, some of them were also contacted directly such as Föli from Finland where its development manager Topias Pihlava gave information via an e-mail exchange. A lot of the DRT cases were tracked and contacted also via e-mail to have more specific information, but hardly any of them replied.

1 Finland

Föli, Finland

Demand Responsive Transport (DRT) is a form of public transport which is open to all and in which the bus routes are based on the needs of customers, instead of operating on fixed routes. Demand responsive buses operate in the town of Naantali, and the municipalities of Lieto and Kaarina. The population in Lieto is 19 846, in Kaarina 33 449 and Naantali 19 250.

The customer places a call directly to the phone number of a specific DRT bus and arranges the transport with the driver or they can place their order in the app. The driver then decides the route and picks the customer up from the agreed location. Different customer trips are combined by the driver. Paying for the trip is the same as in an ordinary bus. A single ticket costs 1€, but only if it is purchased in the mobile app.

DRT capacity is limited, so if many requests are placed, it might be that the bus will not have the time to fulfil all the requests. Customers can order their shuttle bus on the previous day, but they can also call the bus on the same day when it is already running.

DRT is operated with low-floor minibuses (except for lines N6 and N11), which are easy to board, and which can also fit into the yard of an apartment building, for example.

There are four lines which run between Luonnonmaa and the centre of Naantali, two of them drive only on school days. In Naantali during school holidays, demand responsive transport can be booked from Monday to Friday from 10:50 am to 12:50 pm, and during school days, from 10:20 am to 12 pm. Four lines run at the centre of Lieto and in the surrounding areas. The lines L8, L9, L10, and L11 in Lieto run during school holidays from Monday to Friday from 8 am to 12 pm. During school days, demand responsive transport is available from Monday to Friday at 9:25 am-10:25 am and 11:10 am-11:55 am. There are two lines in the centre of Kaarina one of which runs on fixed routes according to schedule but will deviate from its route slightly upon demand by up to a few hundred meters.

This service operated for four months in Lieto and Naantali from June 2018, the operator was procured and the service is fully paid for the operator, revenue goes to the authorities. (Föli, 2020)

Kutsuplus, Helsinki, Finland / 2012-2016

In Finland, there is a mode of transportation under operation through the combination of an on-demand bus and a means of transportation along the lines of the Uber profiled at the opening of this report.

We're talking about "Kutsuplus," a distinctive blue-coloured bus driven around the streets of the capital city of Helsinki. More specifically, this is a minibus capable of carrying nine passengers that enables smartphone apps to be used for arranging rides. Prospective passengers input their points of departure and destinations, along with the desired time of arrival, in the app, which instantly generates info on where to get on and off and an accompanying timetable. The system computes the optimum routes to meet rider needs, enabling the bus to truly be operated “on-demand” as required.

With the automatic deduction of the fare also included in this scheme, there's no need to bring along bothersome loose change when readying to ride. The actual fares, while being higher than normal bus service, are lower than taking a taxi.

While the example of Kutsuplus is winning interest as a brainchild unto itself, it is also noteworthy for being adopted as one phase of the urban planning quest to transform Helsinki into a city where privately owned cars are nowhere to be found on the roads.

Kutsuplus failed and was closed in 2016. (Sulopuisto, 2016)

Kylakyyti, Finland (6 months trial)

The Kylakyyti is part of Sitra's funded regional development services project for testing new ways to organize mobility services in sparsely populated areas. The experiment combines publicly supported pens with pays for paying the trip itself, making it easier to move around without a private car in sparsely populated areas. At the same time, travel costs and emissions are reduced.

Kylakyyti Porvoo

Working times: weekdays 18-22. Services different villages near Porvoo (Saksalan, Suomenkylän, Haksin, Virtaalan, Tuorilan, Kerkkoon, Vanhamoision, Kaarenkylän and Monninkylän).

Ordered and paid through Kyyti App. The customer sets the place and time of the pickup and the ride is then added to the bus going in the same direction.

Arrival time can vary depending on the number of customers and routes. The exact arrival times are sent via App.

Price: <10km=3Eur, >10km=5Eur. With Porvoo city ticket and East-Uusimaa area ticket you can ride for free if you have saved the ticket information in the Kyyti App. Payment will be done with the Kyyti mobile app. Direct payment to the driver is not possible. You can cancel Kyyti anytime.

There are semi-fixed routes. You can order the ride no earlier than 5 days prior.

In real-time, you can see the up-to-date retrieval time in the application at least 10 minutes before the earliest possible pick-up time. (Porvoon Kyläkyyti, 2020)

Kylakyyti Loviisa

Working times: weekdays 5.30–7.30 and 16–19. Services different villages and different districts of the city of Loviisa (Liljendal, Koskenkylä, Vanhakylä, Pernajan kirkonkylä, Hopom, Haddom, Kuggom, Loviisa centre).

Ordered and paid through Kyyti App. The customer sets the place and time of the pickup and the ride is then added to the bus going in the same direction.

Arrival time can vary depending on the number of customers and routes. The exact arrival times are sent via App.

Price: <10km=3Eur, >10km=5Eur. With Loviisa city ticket and East-Uusimaa area ticket you can ride for free if you have saved the ticket information in the Kyyti App. Payment will be done with the Kyyti mobile app. Direct payment to the driver is not possible. You can cancel Kyyti anytime.

There are semi-fixed routes. You can order the ride no earlier than 5 days prior.

In real-time, you can see the up-to-date retrieval time in the application at least 10 minutes before the earliest possible pick-up time. (The city of Loviisa, 2020)

Tornio, Finland

Demand-responsive transport services supplement public transport within the city of Tornio and are open to everyone.

https://www.tornio.fi/en/housing-and-environment/streets-and-transport/public-transport-within-the-city-area/

Demand-responsive transport is intended particularly for residents who experience difficulties in using regular public transportation or live outside the reach of public transport services. Demand-responsive transport services supplement public transport within the city of Tornio and are open to everyone.

Rides can be ordered from the driver during the previous journey, or one day before the needed ride.

Prices are determined according to the maximum travel distance:

- 6 kilometres = € 3.30
- 9 kilometres = € 3.60
- 12 kilometres = € 3.90
- 16 kilometres = € 4.70
- 20 kilometres = € 5.50

- 25 kilometres =€ 6.10
- 30 kilometres = € 6.80
- Over 30 kilometres= € 7.40

Customers whose access to transport is provided by legislation on disability services and social welfare may ride free of charge, by verifying their entitlement to transport support. The payment options are cash and Travel Cards issued by Matkahuolto. (Tornio City, 2020)

Oulu, Finland

The City of Oulu, located in northern Finland, announced this week that it would undertake a pilot of a new on-demand shuttle service. The service will be operated in cooperation with Shotl, the company that developed the service, and will serve residents commuting between the city and the nearby town of Haukipodas, home to some 20 000 people, covering an area of 8 square kilometres with two shuttles with the capacity of 16 and 14 seats. The service, in operation 8 am-5 pm between Monday and Friday, will supplement an existing, and popular, bus line as local transport officials look to form an understanding of the role of demand-responsive transit in the area. This service is seen as an able replacement for private vehicle users who make trips in the coverage area yet find the current bus line insufficient to serve their needs. The city aims to increase the level of service it offers to its residents to discourage private vehicle use. The on-demand shuttle service is like the Kutsuplus service tried by the City of Helsinki in 2012 and one currently under development, scheduled to be launched in 2019 in the neighbouring city of Espoo. (Meneghello, 2018)

Etelä-Savo, Pirkanmaa, eastern Uusimaa, Finland

Sitra and Kyyti co-operation pilot

In the cooperation project, four companies work on creating a digital platform. Their work is based on the requirements set by the practical challenges and needs of three different pilot regions. At the same time, co-operation between the public and the private sector is promoted. The project will thus create preconditions and lay the foundation for a cost-effective service model that can also be introduced in other regions. The platform is based on open technical interfaces, which enable its introduction also elsewhere in Finland and abroad. (The Finnish Innovation Fund Sitra, 2019)

2 Netherlands

Bravoflex Helmond, Netherlands

Bravoflex is a demand-responsive transport service, where you can choose your pick-up place and time. Bravoflex can be used to travel everywhere in the municipality of Helmond. Orders can be done via the OV flex app or by calling. When using the OV flex app registration is needed. Bravoflex runs from Monday to Friday from 7:00 AM to 7:00 PM and on Saturdays from 8:00 AM to 6:00 PM. Bravoflex does not run on holidays except Koningsdag and it has a fixed price which is 3 euros.(Bravoflex, 2020)

Ordering a ride using the app.

1. Check your region at the top of the screen
2. Select and confirm your departure point
3. Select and confirm your destination point
4. Choose "Travel now" or "plan a trip"

Scheduling a ride:

1. Select a date up to two weeks in advance
2. Choose departure or arrival time
3. The following steps are the same as with "Travel now"

Cancelling a ride

1. Click on "view details"
2. Click on "cancel trip" in the bottom right

Travel now

1. Select the number of people
2. Indicate whether you are travelling with a wheelchair
3. Check the travel information
4. Select your payment method under "payments"
5. Click on "book now"
6. You will see when the driver will pick you up

When calling to book a trip you can only use the Travel now feature, but the OV flex app lets you plan a trip ahead of time. (Bravoflex, 2020)

3 Germany

MVG IsarTiger, Munich, Germany

MVG IsarTiger offers a ride-sharing service which is a flexible mobility service that can be requested according to personal requirements. The customer will use his smartphone and download the MVG IsarTiger app to book a trip. In the MVG IsarTiger App, he first indicates his destination within the operating area, then the system checks which vehicle is available and makes an individual offer to the customer. There are no scheduled routes and timetables. The exact route is defined by an algorithm that takes into account the driving orders of other customers who can board as passengers. After the trip, the user receives an invoice by e-mail and the payment is made via the bank account stored in the customer account. The price consists of a basic flat rate and a kilometre price. The MVG IsarTiger is an innovative offer on-demand and cannot be booked in advance. The booking is always made for an immediate trip. (MVG Service on Demand, 2020)

Duisburg – myBUS, Germany

MyBUS is a demand-responsive transport service in the city of Duisburg that offers fully flexible transport for customers. Customers decide the starting point and the destination of their trip. Customers share the minibus with other passengers whose individual trips are on the same route. An algorithm takes in to account different travel demands and calculates in real-time, what is the best route to take so that the myBUS is never without passengers. By sharing the ride, both the exhaust emissions and the number of vehicles on the roads are reduced. (myBUS - the on-demand bus for Duisburg, 2020)

The fare of myBUS depends on the kilometres driven. Everybody can travel with myBUS, but people with disabilities and their companions and children pay a reduced price. The reduced price is applied when the customer presents their monthly pass or a semester ticket to the driver. The fare of the trip will be displayed in the myDVG app before booking. MyBUS is available on Fridays and Saturdays from 6 PM to 2 AM. The maximum waiting time for myBUS is 25 minutes. (myBUS - the on-demand bus for Duisburg, 2020)

Table 1. myBUS fares

Distance	Normal price (€)	Children, people with disabilities (€)	Carpooling (€)
Up to 2 kilometres	3.20 /Reduced 2.40	1.70	1.50
Up to 5 kilometres	5.90 /Reduced 4.40	2.90	2.00
Up to 10 kilometres	8.70 /Reduced 6.50	4.30	3.00
Up to 15 kilometres	12.00 /Reduced 9.00	6.00	4.00
Up to 20 kilometres	15.30 /Reduced 11.40	7.60	5.00

4 Ireland

Shared Mobility Simulations for Dublin, Ireland

This is an agent-based simulation model that has three main agents interacting in a common environment: users, vehicles and a dispatcher. It reproduces the daily mobility patterns in the study area, matches demand and supply, and saves the trip logs for the estimation of performance indicators. Two types of shared services are considered: a door-to-door Shared Taxi and an on-demand bus-like system called TaxiBus. The study area covers the Greater Dublin Area, which comprises the counties of Dublin. (International Transport Forum, 2018)

A trip is generated in the simulation environment when a user (or a party of users) requests a service. The mode is then assigned to the user based on the calculated mode choice probabilities. Then a dispatcher matches the demand with the transport supply. If the user prefers a Taxi-Bus, they need to order the service 30 minutes in advance and give information about the desired trip (location of origin/destination and desired departure time). In the case of Taxi-Bus, the system can generate a new route with the recent demand, allocate the clients to vehicles already under operation, or re-assign this request to the Shared Taxi service. More specifically, the dispatcher finds the best match in TaxiBus service that warrants at least 50% occupancy (at least for a part of the trip) and an average distance-based occupancy rate greater than 25% of the vehicle capacity. If the user requests a TaxiBus but there is no designated stop within the acceptable distance and/or there are not enough users to share a bus and meet the minimum occupancy constraints, the user is upgraded to a Shared Taxi (at the price of a Taxi-Bus). (International Transport Forum, 2018)

Shared Taxi requests are handled in real-time. The dispatcher analyses each request and provides the user with the pick-up time, the vehicle license plate, the number of clients who will share the vehicle and if the user should cross the street to reduce waiting time. The model takes into account the distance-minimization principle that applies not just to the requesting user but also those already underway in the same vehicle. The dispatcher runs a local search algorithm that tries to minimize the additional travel distance generated by the new client, complying with the users' constraints (waiting time and detour time). The waiting time, detour time and arrival time of the resulting trips must be within the model constraints. The constraints are calculated based on the current trip characteristics with some variations within pre-set tolerances. (International Transport Forum, 2018)

The dispatcher defines a set of rules for matching cars to users, centralizing all real-time information required to produce and monitor these trips. The choice of which car or minibus to match with a user's request takes into account a time-minimization principle that applies not just to the requesting user but also those already underway in the same vehicle. The dispatcher also controls the vehicle movements when idle, ensuring efficient vehicle movements to stations and calculating the additional fleet requirements. Whenever the car is not dispatched to a new trip, it returns to the nearest station (depot) and stays there while idle. Taxi-Buses relocate from the last performed service to a departure stop of the next generated route. The Shared Taxi depots and Taxi-Bus departure stops are set across the city at predefined locations. The positioning of the Taxi-Bus stops is constrained by a minimum distance between stops (400 m) and the selection of the road node with greater connectivity in the neighbouring area, to ensure flexible routing for the vehicles, e.g. by avoiding streets with traffic only in one direction or right-turning blocking (since in Ireland driving is on the left-hand side of the road). (International Transport Forum, 2018)

Once the users' trip is finished, the agent representing the user leaves the simulation system and indicators are generated in a trip log so that they can be used for ex-post system evaluation. The model produces detailed information regarding the origins and destinations of each trip, the party

onboard (for members of the same household or people sharing a vehicle), arrival and departure time, waiting and access time, travel time, transfers, and associated costs. The model assumes an app-based wire payment method with no cash transactions, to allow easier, safer and faster pick-up and drop-off of clients. (International Transport Forum, 2018)

The simulation allows for the testing of the system operation either with drivers, constrained by working regulations, or by self-driving vehicles that do not need to relocate to ensure the changes of drivers' shifts. The cost estimations are different for these two options. The simulation model provides detailed outputs from the resulting mobility throughout the day for each mobility scenario tested. These include passenger-kilometres (p km), vehicle-kilometres (v km) by mode, operational performance (fleet requirement, routes operated, occupation levels by mode, estimated costs), client satisfaction (travel time, waiting time, detour time, the average number of passengers on-board by time of the day and mode) and environmental performance (CO_2 emissions). Adoption of electric fleets and their charging requirements are also included as a parameter in the model.(International Transport Forum, 2018)

5 England

DaRT, Northern Essex and The Dengie Peninsula in Maldon, England

DaRT is a DRT service in the rural areas of Northern Essex and The Dengie Peninsula in Maldon. DaRT exists mainly to serve the more sparsely populated rural areas. DaRT covers almost the whole of North Essex, from Southend in the East to Saffron Walden in the West of the county. (Essex County Council, 2016)

DaRT targets all groups, but principally the customers are at the more elderly end of the scale, it handles a lot of school journeys too. (Essex County Council, 2016)

Demand Responsive Transport or DaRT is provided by several minibus vehicles, typically accommodating between 8 and 16 passengers. They differ from the current bus services; in that, they are flexible and can divert on and off route to collect and drop off passengers within their operating area. DaRT service works by grouping bookings together to make it viable. It is not a taxi service, as there must be enough volume of passengers with similar itineraries. Most DaRT work is former bus routes and group bookings. But unlike a large bus, DaRT only needs three or four passengers to make a group booking. And, when not operating a timetabled bus route or group booking, vehicles may be available for individual runs where no alternative transport is available. (Essex County Council, 2016)

On DaRT 1, 2, 3 and 5 customers can travel any time between 6 AM and 8 PM from Monday to Saturday. On DaRT 4 and 5 customers can travel between 6 AM and 8 AM, 9 AM and 2:30 PM, 4 PM and 8 PM. From 8 AM to 9 AM and 2:30 PM to 4 PM DaRT 4 and 5 provide school transport, during that time other journeys cannot be done. On Saturdays DaRT 4 and 5 work from 8 AM to 6 PM. (Essex County Council, 2016)

Unlike a conventional bus, a passenger must book their seat, and register as a customer, at least two hours in advance of travel. But, if passengers wish to travel regularly, they do not need to book every single time they travel, as they can make a regular booking which lasts for three months. (Essex County Council, 2016)

	Adult (age over 18)		Child (age 11 to age 18 inclusive)		Family (2 adults, 2 children)	
Distance	Single	Return	Single	Return	Single	Return
Less than 2 miles	£2.50	£3.50	£1.50	£2.00	£4.00	£6.00
Between 2 and 5 miles	£4.50	£6.50	£2.50	£3.50	£7.00	£12.00
More than 5 miles	£5.50	£8.00	£3.00	£4.50	£10.00	£16.00

Figure 1. DaRT fares

There are still some timetabled journeys because of two reasons. First of all, when removing all timetables causes some confusion. New DaRT services are introduced with a flexible timetable and in the main continue along the same route. This ensures all customers on the old timetabled route are included in the new service. As a new DaRT service builds passenger numbers additional journey options can be introduced. Secondly working group meetings requested public guides for flexible routes and timetables. When a trip is booked then generally the return journey time is also booked.

The passenger has the option to change it but must do it 2 hours in advance. (Essex County Council, 2016)

The first DaRT service commenced in 2011, it has since expanded to 11 routes. All routes have seen growth in passenger numbers, but some have now levelled out, while some are still growing. The original DaRT 99 service was procured by Essex County Council and The Rural Community Council of Essex with a key turning funding of £50 000. That service is now commercial. The second service DaRT 5 was procured by a Tender process, where Arrow Taxis Essex Ltd did a joint bid with a local bus operator, saving £100 000 a year on previous costs. Other DaRT services have been won on a similar Tender basis. Subsidized services run under a day rate contract. (Essex County Council, 2016)

Because the DaRT DRT service is rather different from the typical DRT the key to DaRT expansion would be technological improvements(software). There appears to be no software on the market that suits their modus operandi. They need software that combines Taxi operation with bus and DRT operation. But they are a small company so they cannot afford to commission and build a system themselves. Systems such as Via, Shotl, DDS, Trapeze are not answering to the demand and have even introduced new problems with the technology. They seem to target bus companies moving down into the DRT market rather than taxi companies moving up into the DRT market, the latter solution has worked better than the former. (Essex County Council, 2016)

DaRT's success comes from a combination of factors. The first factor is the driver. The driver needs to be a kind and helpful person, who is almost like a friend to the passengers. The second is that they have had help and support from all manner of people. It also basically involves something as simple as asking people about their actual needs. Essex County Council put out a Consultancy Document asking the residents what their views were. (Essex County Council, 2016)

Connect2Wiltshire, England

Connect2Wiltshire is the name for flexible demand-responsive bus and taxi services in Wiltshire that provide the ideal transport solution for our various rural areas. Operating in many places including Mere, the Vale of Pewsey, the Woodford Valley and many more. The services provide bookable, timetabled and some door to door transport for anyone living, working and visiting these areas. (Connect2 Wiltshire booking and service information, 2020)

Mere Taxi is a door to door service, the Connect2 service will pick you up and drop you off at your front door. Mere taxis are charged at bus rates. Concessionary bus pass holders will be charged 50p for single journeys within Mere, £1 for single journeys outside Mere. Child fares are available to customers aged 5-16 years, 0-4-year old's travel for free. (Connect2 Wiltshire booking and service information, 2020)

Bookings for the Vale of Pewsey can be made as little as 20 minutes before the bus is scheduled to leave its starting point. You can also book a Devizes or Pewsey area journey on your computer by clicking here and completing the travel request form. Bookings for the Mere TaxiBuzz should be made the day before travel is required before noon and two hours in advance if the service is scheduled to start the afternoon. Bookings for all other services operated by a taxi require more notice. (Connect2 Wiltshire booking and service information, 2020)

Pick Me up, England

The Oxford Bus Company has launched a demand-responsive bus service which allows passengers to request a pick-up on any street corner in the east of the city (Oxford Bus Company, 2020)

The PickMeUp service was started on 25 June 2018, enabling users in a 12.2 square mile area around Oxford to request a bus pick-up within minutes at a virtual bus stop, using a new mobile phone app with technology developed with Via. It was piloted by Oxford Bus Company to reduce congestion and improve services in the east area of the city. The service will be operated across

the Eastern Arc, covering the railway station, Thornhill and Redbridge Park & Ride sites, the Science Park, Oxford Business Park, the John Radcliffe Hospital, University Science Area and Brookes University. (Oxford Bus Company, 2020)

PickMeUp is cheaper than a taxi and more flexible than a bus, as it is not tied to existing bus stops. With an expected average response time of around 10 minutes, an introductory fare of £2.50 per journey will be charged, with a surcharge of £2.50 if the journey could be made via an existing bus route. (Oxford Bus Company, 2020)

Oxford Bus Company has invested £850,000 in six 17-seat ultra-low emission Euro 6 minibuses, with Wi-Fi, USB charging points, wheelchair access and comfortable high-back seating to launch the service. (Intelligent Transport, 2019)

As PickMeUp proved to be very popular, the service was expanded to serve also Summertown, an additional area of Oxford, from 21 April 2019. PickMeUp operates between 06:00 and 23:00 Monday to Friday and between 07:00 and midnight on Saturday and 09:00 to 21:00 on Sundays, with an average response time of 10-15 minutes. An introductory fare of £2.50 per journey is still being charged, with a surcharge of £2.50 if the journey could be made via an existing Oxford Bus Company bus route and the walk is 200m or less. Go-Ahead partnered with New York ride-sharing start-up Via. (Intelligent Transport, 2019)

ArrivaClick, England

ArrivaClick is a flexible minibus demand responsive service in Liverpool and Sittingbourne, England. It takes on multiple passengers that are all heading in the same direction. Customers have to use ArrivaClick app, bookings cannot be done over the phone. They register their details and credit or debit card information and select their pickup and drop off place. The minibuses have comfortable seats, wifi and charging points. Customers pay on their phones once their ride has been confirmed. (About ArrivaClick, 2020)

ArrivaClick operates mainly in urban areas with high population density. There are two zones for ArrivaClick, the first one has a population of 130 000 and the second 65 000. Everyone from the age of 16 to 100 can use this service. ArrivaClick buses have low floor vehicles for disabled people and they also carry passengers who are in a wheelchair. The minibuses have 15 seats. (About ArrivaClick, 2020)

This service offers corner to corner service, which is the most efficient when matching shared rides. It allows for larger vehicles, as they stay on major roads rather than trying to park outside houses. ArrivaClick buses run 7 days a week from 6 AM to midnight. The DRT service can be booked 30 days in advance, but mainly runs on demand, which is also the priority. (About ArrivaClick, 2020)

ArrivaClick costs are per miles and they have Peak and Off-Peak costs, usually, the customers pay for the service, but it can be charged to the local authority if required.

ArrivaClick was launched in March 2017 and they have had 2 new launches since then. They operate the service themselves. In the future, they want to begin integration into social needs and educational transport. (Intelligent Transport, 2018)

6 Slovenia

Ljubljanski Potniski Promet Demand responsive transport for disabled people (LPP), Slovenia

The public company Ljubljanski potniški promet d.o.o. (LPP) provides safe, reliable and comfortable transport in the City Municipality of Ljubljana and 16 suburban municipalities. The population of Ljubljana is 280 000, but the service is dedicated to older, disabled people and tourists. The company also provides demand-responsive transport for persons with disabilities, they can travel everywhere in the LPP transport network. There is also another DRT service in Ljubljana with e-Golf which is in the test phase right now.

The passenger calls the LPP traffic control centre on a certain telephone number, requesting transport on a certain day at a certain hour, and receives immediate feedback on the possibility of that transport and confirmation of it. The LPP traffic control centre forwards the information about the disabled passenger to the driver who takes the passenger on board the bus in the appropriate manner at the agreed time and place. The driver is informed in advance about a passenger requiring assistance. In this way, it is easier for them to do their job and simultaneously knowingly take on and help a disabled person if there is any problem. LPP service operates between 6 AM and 10 PM. The service schedule is flexible and has no fixed stops. The service buses are equipped to transport all passengers regardless of their disability. If there is a need for it, timeframe and locations ride can be shared. The transport of elderly and disabled people is free of charge. (Javni Holding Ljubljana, 2020)

When a customer calls the traffic control centre, they obtain their identification number under which information about the user is kept (the type of disability, contact number). The user then always uses the same number to register in the system. Based on this information, the traffic control centre can inform the driver about the manner of approaching the passenger without indicating their name and surname. As soon as such passengers obtain their identification number, they no longer need to keep describing their needs. It is recommended to register the journey one day before, or at least two hours before, to obtain appropriate information on the possibility of getting a ride. Daily and regular travels should be aligned with the LPP traffic control centre in advance so that the transport provider can ensure a suitable service on the requested day at the requested hour. (Javni Holding Ljubljana, 2020)

The other DRT service is for everyone, but unfortunately, the vehicles are not equipped to transport wheelchairs. This service operates only when public transport is not available, but the service schedule is flexible. This DRT must be booked 2 hours in advance and it operates between bus stops, that means pick-up and drop-off locations are in LPP bus stops. Customers can pay with URBANA card and the fare is calculated regarding the price list. The testing of this service started in 2018. The yearly cost of this service is 190 000 € and LPP started to provide it in 2008. (Javni Holding Ljubljana, 2020)

7 Czech Republic

Radiobus, Czech Republic

"Radiobus" is a kind of city transit system. It is operated like line bus transport and has a regular timetable, but every ride is held only when somebody confirms by telephone or by the internet that it will be used and only the needed part of the route will operate.

In the Czech Republic, several local lines in Rychnov and Kněžnou (since 2003) and Týništěnadorlicí (since 2004) have been operated this way by "Audis Bus" company in sometimes of the day. The Czech legislation does not consider this either as public transport or a taxi. The operator AudisBus states that this way of transport was inspired by similar ones in the Netherlands. (AUDIS BUS Ltd., 2020)

DHD, Czech Republic

This system works complementarily to regular Transit buses in the area about 1200 km^2 close to Prague. The population in the area this DRT operates in is 100 000, but they mainly serve the 1500 workers from three plants that are in this area and only ¼ of them use this service. (Dispecink Hromadne Dopravy, 2020)

The system is financed by major employers and passenger contribution. The DHD company provides booking and organization, however, the transport is implemented by several local transport companies. DHD is now trying to extend this system as an alternative to the less effective and expensive (however easier to use) rural public transport with fixed timetables.

The carrier only runs on the order (preferably written, exceptionally telephone or SMS). The carrier shall, as far as possible, use the lowest-priced cars that are still in compliance with the order. By default, the vehicle stops at public transport stops (or as close as possible) with the name given in the order, if it exists or the name is some other place. The Driver can only deviate from the ordered route or stops after prior approval from the employer. The driver is not allowed to leave the stop before its time in the order. (Dispecink Hromadne Dopravy, 2020)

The DRT network topology is star-shaped and the plants are in the centre of each star. The lines are combined with public transport lines, very busy stops have a fixed schedule other stops have a flexible timetable. The service runs according to the workers' needs. The main times are 6 AM, 7 AM, 2 PM, 3:30 PM, 6 PM and 10 PM. If needed the service runs on other times too. (Dispecink Hromadne Dopravy, 2020)

The operator uses advanced booking and has a program in an internal computer network in two of the three factories. The passengers order their every ride and they can use patterns according to their shift group. The third factory workers book their trips by calling. Minibuses, cars and regular-sized buses are all used in this service, the size of the vehicle depends on the orders. Passengers share their rides with other workers. Rides may be requested several weeks in advance according to their working time, requests are gathered in a computer program. The operator is developing a web booking application also. (Dispecink Hromadne Dopravy, 2020)

Employers who have made a contract with this service provider pay for their workers, other passengers and guests must pay credit in advance. The price is calculated according to the direct distance from the start to the destination rather than for the driven time or mileage. The dispatching cost of two full workloads is 3500 EUR/month and the ticket revenue is 4500 EUR per month. (Dispecink Hromadne Dopravy, 2020)

This DRT service has operated since 2003 and has proved to be a working model. The operator would like to expand this type of transport to rural public transport also, but this can only happen when the government decides to support demand responsive transport services. (Dispecink Hromadne Dopravy, 2020)

8 Australia

Kan-go Toowoomba, Queensland, Australia

Kan-go is a partially demand-responsive service and a partially fixed-route service. The fixed route is between the Range Shopping Centre, St Vincent's Hospital and Toowoomba City, and operates the same as any other bus service with designated stops and passengers can get on or off at any of these stops. The roam zone allows passengers to be picked up at variable locations and dropped along the fixed route, or to be picked up along the fixed route and dropped at variable locations, but it does not allow for pick up and drop off in the roam zone. (Queensland Government, 2020)

To use Kan-go service in the roam zone people need to first register by calling the Kan-go booking team and then they can book their trip. Booking needs to be done at least an hour before the trip. (Queensland Government, 2020)

Telebus, Melbourne, Australia

The Telebus operates in the outer eastern suburbs of Melbourne, it offers a combination of fixed-route and demand-responsive service which enables passengers to be picked up or dropped off anywhere in the Telebus zone for a small surcharge. Users can also be picked up or set down at designated bus stops along the route at the normal bus fare. Currently, 12 Telebus low-floor vehicles with 33 seats are deployed across 7 designated Telebus zones, as well as one hybrid route with a demand responsive area in the middle of the route. (Wang)

The Telebus operates from 5 am to 7 pm on weekdays, running every 20-40 minutes in peak times and hourly in off-peak. (Wang)

Keolis Downer, New South Wales (NSW), Australia Background on Newcastle Transport

Keolis Downer, the Newcastle Transport On Demand, picks you up from a point close to your home and takes you to a designated point close to your destination within the On Demand area. The service has continued to grow since it launched in January 2018 from 25km2 to now expanding to 56km2 to include Charlestown, Dudley, Whitebridge, Gateshead, Redhead, Warners Bay, Mount Hutton, Windale, Tingira Heights, Eleebana, Croudace Bay, Valentine, Belmont North, and Belmont areas. (Keolis Downer, 2019)

The service is available from 9 am to 4 pm on weekdays, 7 am to 6 pm on Saturday and 9 am to 6 pm on Sunday. The flat fare is $3.20 per trip. Concession fares of 50% are available for an eligible concession card. Most customers have less than 150m walk to reach the pickup point for their personalized bus service and customers can travel to areas when they want, thanks to this new flexible service. While buses are smaller to enable access to a greater number of streets, these 20-seated vehicles are also fully accessible. (Keolis Downer, 2019)

Developed in a partnership with New York-based tech company Via, the app enables the dynamic service to be booked live and provide real-time information on the service, allowing more flexibility for customers. Combining this technology with the corner-to-corner service gives customers a high-quality public transport service and access to more mobility options. (Keolis Downer, 2019)

About Keolis Downer

Keolis Downer is a leading operator and integrator of public transport in Australia. With more than 4,000 employees and a presence in five states, Keolis Downer enables 250 million passenger journeys per year. We operate and maintain the largest tram network in the world in Melbourne (Yarra Trams), the light rail network on the Gold Coast (G: link), and more than 1,200 buses in NSW, Western Australia, South Australia, and Queensland. Established in 2009, Keolis Downer is a joint venture between Keolis, a leading public transport operator established in 16 countries, and Downer, the leading provider of integrated services in Australia and New Zealand. Keolis Downer

also operates two trials in Sydney powered by Via, including in the Northern Beaches area and the City of Ryde/Macquarie Park precinct. (Keolis Downer, 2019)

9 Available software providers

Kyyti, Finland (software provider- Kyyti MaaS)

Kyyti, the world's first Mobility-as-a-Service (MaaS) solution with on-demand ridesharing capabilities. Kyyti is dedicated to making everyday mobility more efficient, convenient, and environmentally sustainable. We ensure that people have every transport option available at their fingertips so they can commute better and save time for the important things in life. Kyyti offers the most advanced turnkey MaaS platform solution for public transit authorities, transport operators, and large enterprises. Deploy the Kyyti MaaS solution to build personalized mobility solutions in your region under own brand. MaaS is an ecosystem of digital solutions to facilitate efficient and environmentally sustainable door-to-door travel. In addition to the public transport route planner, Kyyti's MaaS platform has already been connected to a variety of highly intuitive APIs for other services and is easy to integrate with other systems. (Kyyti Group Ltd, 2020)

Kyyti has two Demand Responsive Transport (DRT) solutions for providers designed to fill the gap between single party taxis and fixed-route buses. The platform can simultaneously have different pricing structures and levels for different types of users such as the general public, government-aided. (Kyyti Group Ltd, 2020)

Other available apps:

- https://whimapp.com/
- https://www.padam.io/en/
- https://skedgo.com/drt-simulator/
- https://www.zipabout.com/platform
- https://www.hacon.de/en/solutions/mobility-as-a-service/demand-responsive-transport/
- https://shotl.com/platform

10 References

AUDIS BUS Ltd. (2020). *RadioBUS*. Retrieved from Audisbus: http://www.audis.cz/projekty/radiobus.htm

Intelligent Transport. (2019, April 11). *Demand-responsive bus service set for expansion in Oxford after success*. Retrieved from Intelligent Transport: https://www.intelligenttransport.com/transport-news/78232/demand-responsive-bus-service-expansion-oxford/

About ArrivaClick. (2020). Retrieved from: https://www.arrivabus.co.uk/arrivaclick/about-arrivaclick/

Bravoflex. (2020). Retrieved from Bravo: https://www.bravo.info/bravoflex-1

Connect2 Wiltshire booking and service information. (2020). Retrieved from Connecting Wiltshire: https://www.connectingwiltshire.co.uk/getting-around/bus/flexible-transport/connect2-booking-and-service-information/

Dispecink Hromadne Dopravy. (2020). *Demand Responsive Transport (DRT)*. Retrieved from DHD: http://www.hromadnadoprava.cz/

Essex County Council. (2016, March 30). *Demand Responsive Transport (DaRT)*. Retrieved from Essex Highways: https://www.essexhighways.org/getting-around/bus/accessible-transport/demand-responsive-transport-dart.aspx

Föli. (2020, April 6). *Demand responsive bus*. Retrieved from Kutsubussi Föli: https://www.foli.fi/en/demand-responsive-bus

Intelligent Transport. (2018, March 8). *ArrivaClick on-demand bus service a success*. Retrieved from Intelligent Transport: https://www.intelligenttransport.com/transport-news/65899/arrivaclick-on-demand-bus-service-a-success/

International Transport Forum. (2018). *Shared Mobility Simulations for Dublin.* Paris: OECD/ITF.

Javni Holding Ljubljana. (2020). *Demand-Responsive Transport service for persons with disabilities*. Retrieved from LPP: https://www.lpp.si/en/information-bus-arrivals/demand-responsive-transport-service-persons-disabilities

Keolis Downer. (2019). *A new On-Demand transport service starts in Newcastle providing more mobility choices to local communities*. Retrieved from Keolis Downer: https://www.keolisdowner.com.au/a-new-on-demand-transport-service-starts-in-newcastle-providing-more-mobility-choices-to-local-communities/

Kyyti Group Ltd. (2020). *Kyyti DRT platform*. Retrieved from Kyyti: https://www.kyyti.com/demand-responsive-transport/

Meneghello, S. (2018, November 19). *Shotl launches in Finland*. Retrieved from shotl: https://shotl.com/news/shotl-launches-in-finland

MVG Service on Demand. (2020). Retrieved from MVG: https://www.mvg.de/services/mobile-services/mvg-sod.html

myBUS - the on-demand bus for Duisburg. (2020). Retrieved from DVG: https://www.dvg-duisburg.de/mybus/

Oxford Bus Company. (2020). *Pick Me Up*. Retrieved from Oxford Bus Company: https://pickmeup.oxfordbus.co.uk/

Porvoon Kyläkyyti. (2020). Retrieved from Kyyti Help Center: https://support.kyyti.com/en/articles/3288610-porvoon-kylakyyti

Queensland Government. (2020). *Kan-go Toowoomba*. Retrieved from TRANSLink: https://translink.com.au/travel-with-us/taxi-and-community-transport/kan-go

Sulopuisto, O. (2016, March 7). *Why Helsinki's On-Demand Bus Service Failed*. Retrieved from Citylab: https://www.citylab.com/transportation/2016/03/helsinki-on-demand-bus-service-kutsuplus/472545/

The city of Loviisa. (2020). *Village ride - a new kind of carpool*. Retrieved from Loviisa: https://www.loviisa.fi/asuminen-ja-ymparisto/liikenne/kylakyyti/

The Finnish Innovation Fund Sitra. (2019). *Public and private mobility services to be offered side by side*. Retrieved from Sitra: https://www.sitra.fi/en/projects/public-private-mobility-services-offered-side-side/#what-is-it-about

Tornio City. (2020). *Public transport within the city area*. Retrieved from Tornio: https://www.tornio.fi/en/housing-and-environment/streets-and-transport/public-transport-within-the-city-area/

Wang, F. (n.d.). *MEETING OLDER PERSONS' MOBILITY AND ACCESS NEEDS – A RE-THINK ON PUBLIC TRANSPORT.* Victoria: Public Transport Division Department of Infrastructure. Retrieved from https://pdfs.semanticscholar.org/6680/7cecfa1e1094b3f097872701608336ae7faa.pdf