

# DEMAND RESPONSIVE TRANSPORT

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## Guidelines for Users

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<https://www.interreg-central.eu/Content.Node/SMACKER.html>



## What is Demand Responsive Transport?

Demand Responsive Transport (DRT) is a flexible form of public transport that adapts to the needs of its users. DRT does not follow a fixed timetable or route. Instead, the route or timetable is calculated in response to user requests - vehicles change their routes or timetables based on particular transport demand at the time.

DRT has characteristics of both buses and taxis and can take the form of a wide range of solutions: from the familiar "dial-a-ride" services that are usually booked by phone, to dynamic applications that allow trips to be booked through an application that adjusts the route in near real-time to accommodate new pick-up requests.

DRT services are well suited to be shared and flexible, using fleets of vehicles that are deployed on demand to pick up and drop off passengers according to their needs (1). DRT lies somewhere between the unsustainable, flexible and individual transport services provided by private vehicles (e.g. cars) and the sustainable, shared but less flexible traditional public transport services (metro, tram and bus), with varying degrees of sustainability/shareability/flexibility depending on the service (Figure 1).

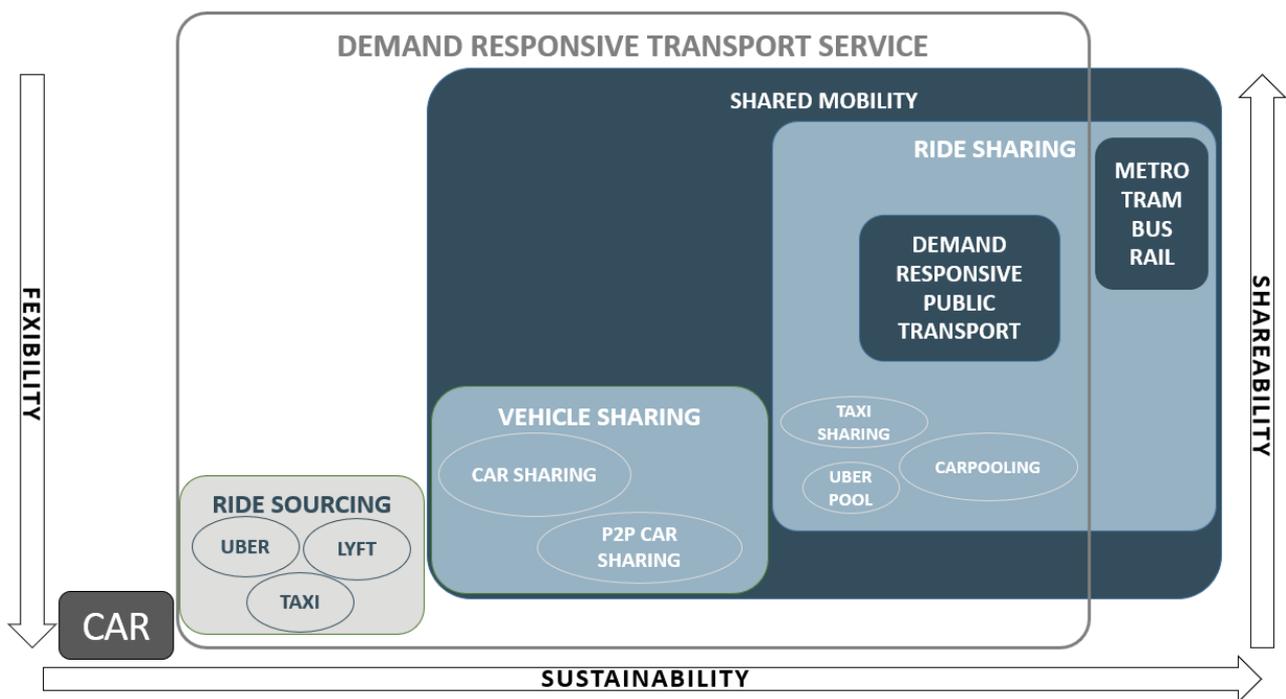


Figure 1: Classification of Demand Responsive Transport services (1)

Recent developments in technology and business models have led to much greater diversity in the modes of transport available (2). In the past, the vast majority of trips in urban areas were made by private vehicles and public transport, with taxis, cycling and walking making up the rest. Fast-forward 10 years and there are now all sorts of transport options, including car sharing and ride sharing, as well as dockless bikes and electric scooters (eScooters). Notwithstanding these new offerings, there remains a significant gap in the market between relatively low-cost/subsidised public transport and walking/cycling and commercial rideshare and taxi services (2). There is growing interest in whether on-demand public transport can fill this gap.

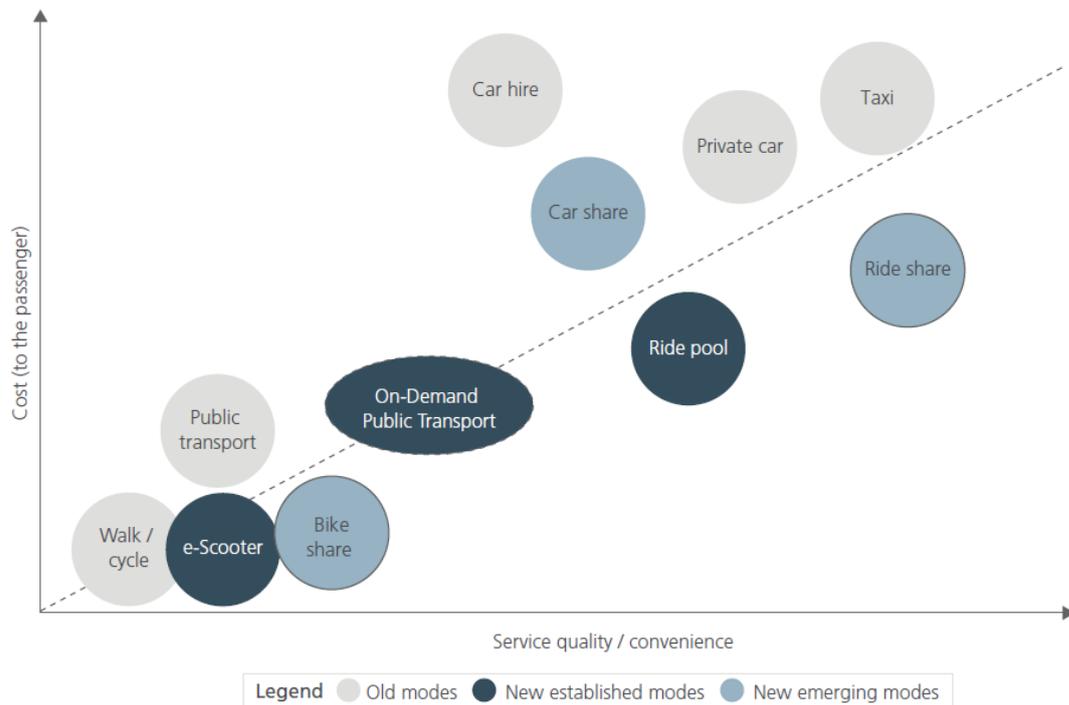


Figure 2: Price and service attributes of different transport modes (2)

DRT can be used to solve a range of mobility problems. It can be used for first and last mile service for passenger and freight transport, or it can replace poorly performing, low-frequency low patronage services by transferring users to the wider public transport network. On-demand public transport is particularly suitable when there is insufficient demand for frequent and direct mass transport.

#### Benefits of Demand Responsive transport for climate and health

- Replace a fixed route

Because a DRT service operates only when needed and on an optimised route, it can cover fewer kilometres overall than a fixed-route service, which reduces fuel consumption. Also, the size of the vehicles can be adjusted to the expected number of passengers, reducing CO2 emissions per passenger and per kilometre travelled. More trips can be made when a DRT service is aimed at unlocking suppressed travel demand to improve social inclusion and rural mobility.

- Substitute car journeys

A DRT service can replace multiple, single occupancy car journeys. For example, in a commuting area where there is insufficient demand for a fixed bus service, or to serve those who work in shifts or work flexibly. Switching from a private petrol or diesel car to a DRT vehicle would improve emission reduction.

- Encourage active travel

There is an opportunity to better link bus and DRT services with cycling and walking to make it easier to travel without a car and by different modes of transport. This can be facilitated by taking bicycles on board or on external racks, or by providing secure bicycle parking facilities at bus stops or frequent destinations.



## Types of DRT

Demand Responsive Transport is implemented in many different ways. Its main characteristic is flexibility and demand responsiveness, being adaptive in either scheduling, routing or a combination of scheduling and routing. The most commonly used types of DRT are (3):

- **fixed routing** (itineraries) and **flexible scheduling** (fixed time slots or on demand);
- **fixed routing** (itineraries) **with routing deviation on demand**;
- **with flexible routing** (itineraries) **with predefined stops**;
- **with flexible routing** (itineraries) and **flexible stops** (door-to-door service, very similar to a taxi).

DRT services also differ in terms of the type of vehicles used. Depending on the market served, DRT services can be provided by minibuses or medium-sized vehicles (22 to 30 seats), sometimes also by taxi operators:

- **Taxis** provide more cost-effective DRT services in areas where demand is lowest and more dispersed.
- **Minibuses** work better on semi-fixed route patterns in more densely populated areas.

### Examples of demand responsive services (3)

- **A “Virtual line”**. A virtual line is a service that is similar to normal scheduled services since it stops at fixed stopping points, follows regular routes and runs according to timetables set in advance. The basic difference compared with normal scheduled services is that it only runs if requested by one or more users.
- **A “Door-to-Door” service**. A Door-to-Door service, although less common, is a service transporting users from their homes to specified destinations. It is reserved for the elderly or for people with reduced mobility. There is no set route in this case and the service may be provided by taxis or minibuses belonging to the main network operator.
- **“Stop-to-stop” or “point-to-point” services**. Stop-to-stop or point-to-point refers to a system that serves an area with stops defined in advance. Routes may vary depending on stops and user demand. It may also use taxis or minibuses.

On-demand public transport is not the same as commercial ride-sharing services such as Uber, taxis and others (although there may be scenarios where ride-sharing providers could participate in on-demand public transport). Commercial on-demand services typically focus on optimising the journey for the individual passenger to reduce waiting and/or travel times. On-demand public transport focuses on optimising the journey for groups of passengers travelling to or from a hub at a subsidised price. This can result in relatively longer waiting and travel times compared to commercial on-demand services and is more likely to involve shared journeys. The concept is similar to that of pooled ride-sharing services such as UberPool and LyftShared<sup>1</sup>, but these are generally not subsidised.

<sup>1</sup> In UberPool and in LyftShared passengers get matched with other passengers going in the same direction and they share the ride. The trip costs are split between all passengers.



## Benefits of DRT for users

Flexible transport services are a puzzle stone for a seamless sustainable mobility especially in peripheral and rural areas, where conventional public transport supply does sometimes economically not justify. You as a user of such services can benefit of the positive effects, both directly as travelling on your own or indirectly by profiting of the positive effects created for your relatives and friends as well as for the whole region you are living in.

### Direct positive effects as user



- Reduced transport costs as using flexible transport systems are cheaper than taxi operations and if used frequently even cheaper than using a private car.
- Lower risk of getting involved/injured in accidents.
- Satisfying your mobility needs, even if you are (currently) not able to use a private car (e.g. injuries, broken car, car is used by other members of your family, etc.).
- No need to find a vacant parking space at your destination.
- Possibility to travel together in a bigger group.
- Less stress during driving (e.g. because of stop and go traffic, bad weather conditions).

### Good practice example: Demand Responsive Transport in Budapest



BKK Centre for Budapest Transport operates six DRT lines in the outskirts of Budapest. The telephone service booking was expanded into an online service request for the local DRT lines.

During the 1-year pilot, 527 passengers registered, 60% of whom used the system regularly and frequently. As both users and the transport operator were satisfied, the online booking system will remain in operation. The booking system will be integrated into the BudapestGO app in the near future.

### Indirect positive effects as profiting from mobility for your relatives/friends



- If you are owner of a car, less time need to be spend for the transportation of relatives/friends with no access to a car (e.g. grand parents to the hair dresser, children to the sports club training).
- If relatives/friends using flexible transport systems with professional drivers there is a lower risk for them to be involved in an accident or facing security problems, especially, if flexible transport systems offer door-to-door service (e.g. your children do not need to hitchhiking in the night times or need to share trips with friends unexperienced as car drivers/influenced by alcoholics).

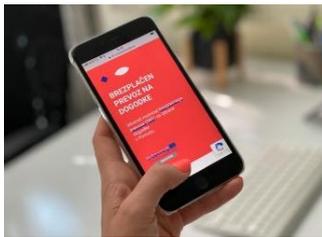


**Indirect positive effects as profiting on the life quality in the region you are living in**



- Less traffic and less demand for parking places in your area.
- Social infrastructure, pubs, restaurants and shops will more likely stay alive in your village: if there is a local flexible transport service available, people are tending to shop locally more likely. If they once sit in the car, more likely they travel to bigger shopping malls in the regional centres with good car park supply or are doing online shopping.
- Less injured people reduces the social costs because of the consequences of accidents;
- Elderly people can more easily care for themselves by independently satisfying their mobility needs. So they keep active and can stay longer in their private residences with less external support (e.g. delivering goods, medical assistance at home). As a consequence, costs for providing municipal senior residences and care homes are reduced.

**Good practice example: RESPONSIBUS - mobility between hotels and major event site**



The DRT service connects hotels and the city centre with a major event area in a small rural region in Slovenia. It serves both residents and tourists and is offered as a free-of-charge transport option for event visitors to promote sustainable mobility and provide an alternative to mobility by car. A customized IT solution has been developed that allows booking of RESPONSIBUS rides via application in three languages.

**Community engagement**

Check out & inform your local decision-maker

[SMACKER Methodology for stakeholder involvement](#)



To ensure the best possible acceptance of DRT, local and regional stakeholders should be involved from the outset. In the broadest sense, stakeholders are those who are affected by the outcome or can influence the project in a positive or negative way. Stakeholders such as mobility providers, transport operators, employers, community groups, tourist boards, etc. should be involved. Particular attention should be given to inclusion of disadvantaged and vulnerable groups.

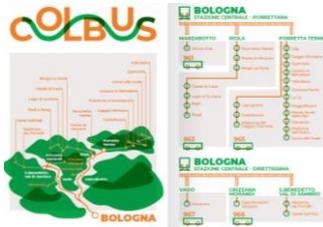
Stakeholder engagement can be seen as the process of including the concerns, needs and values of stakeholders in the decision-making process. It is a two-way communication process that provides a mechanism for stakeholders to exchange information and interact with the formal decision-makers. Therefore, raise your local decision-makers attention to these activities, to elicit the demand for communication and participation about this topic in your community.

Stakeholder involvement brings in knowledge about problems and needs, enables the development of alternative solutions, ensures better quality of decisions, helps overcome conflicts and increases public support and social empowerment.

It increases the legitimacy of planning and decision-making and allows stakeholders to provide feedback on the acceptability and usefulness of management actions. So, it is important that you get engaged closely with local decision makers in your community to ensure successful planning of DRT service.



**Good practice example: ColBus - last mile connection for tourists and residents**



ColBus complements the "traditional" public transport services in the mountainous part of the metropolitan city of Bologna. The services improve accessibility of the area for residents and tourists and provide last-mile mobility between scattered villages and municipalities where rail/bus stations are located. The ColBus works with an ad-hoc IT management and booking system, which is also endowed with an app for smartphones. It is used both by the transport service provider, including the drivers, to manage the DRT service and by the passengers to easily book their journeys.

**Getting people on-board**

Attracting sufficient ridership is critical to the viability and success of a DRT service. Communication and continuous engagement are needed to increase understanding of any DRT service, encourage improvements and build confidence in the reliability and sustainability of the service. The more people know and understand about the service, the more familiar they are with it, the more likely they are to use it. Therefore, tell your family and friends about the DRT and raise your voice and get in contact with your local decision-makers! If you consider your DRT a viable part of your daily activities, raise your local decision-makers attention about nudging activities and communication activities, which can they can conduct to further fostering the usage of the DRT service among other potential users.

For instance, you can raise your local decision-makers awareness about:

- Guided (demand responsive) public transport tour per target group.
- Demand responsive public transport try-out activities (free public transport test ticket etc.).
- Competition with lottery to promote (demand responsive) public transport commuting from home to work/school.
- Personal mobility assistants for elderly people or persons with disabilities at major transport interchanges.
- Bonus mile programme for (demand responsive) public transport.
- Gamification for (demand responsive) public transport.
- Mobility management in workplaces and organisations.

Promotion of Demand Responsive Transport can be combined with promotion of public transport and sustainable mobility in general.

Check out & inform your local decision-maker

[SMACKER Review of behaviour change](#)





Interested in knowing more about Demand Responsive Transport?  
SMACKER can help you!

Use **SMACKER TOOLBOX** and access best practices, guidelines and templates to learn more about DRT services.



### Project Partners



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