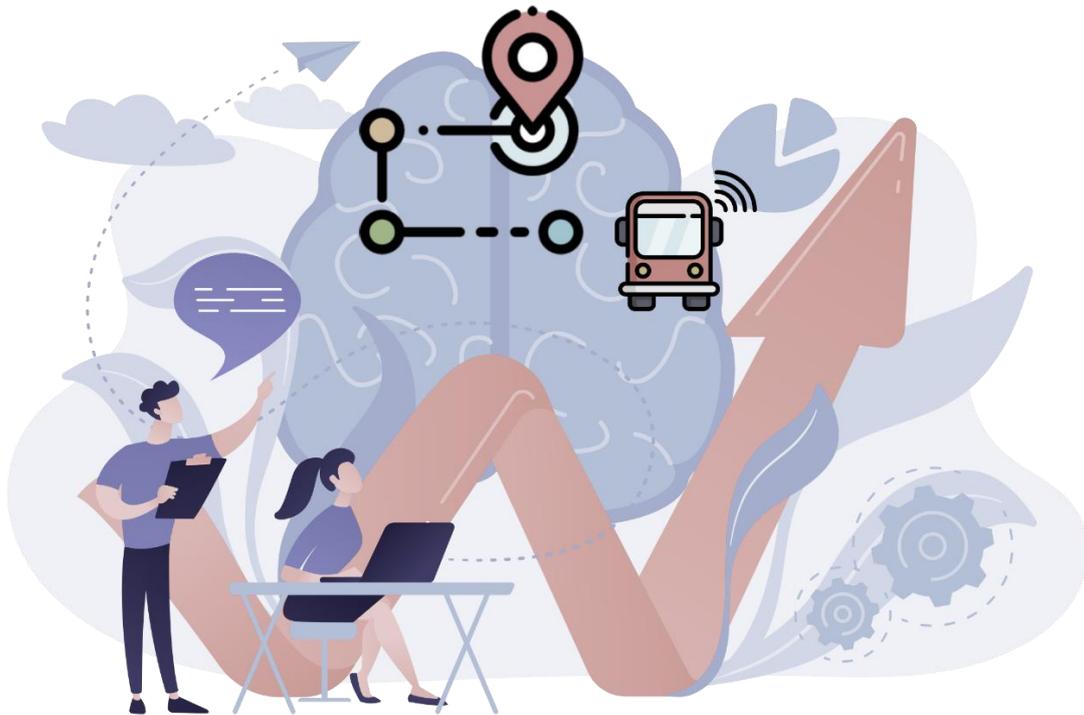


DEMAND RESPONSIVE TRANSPORT

Guidelines for Business and Enterprises



June 2022



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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).

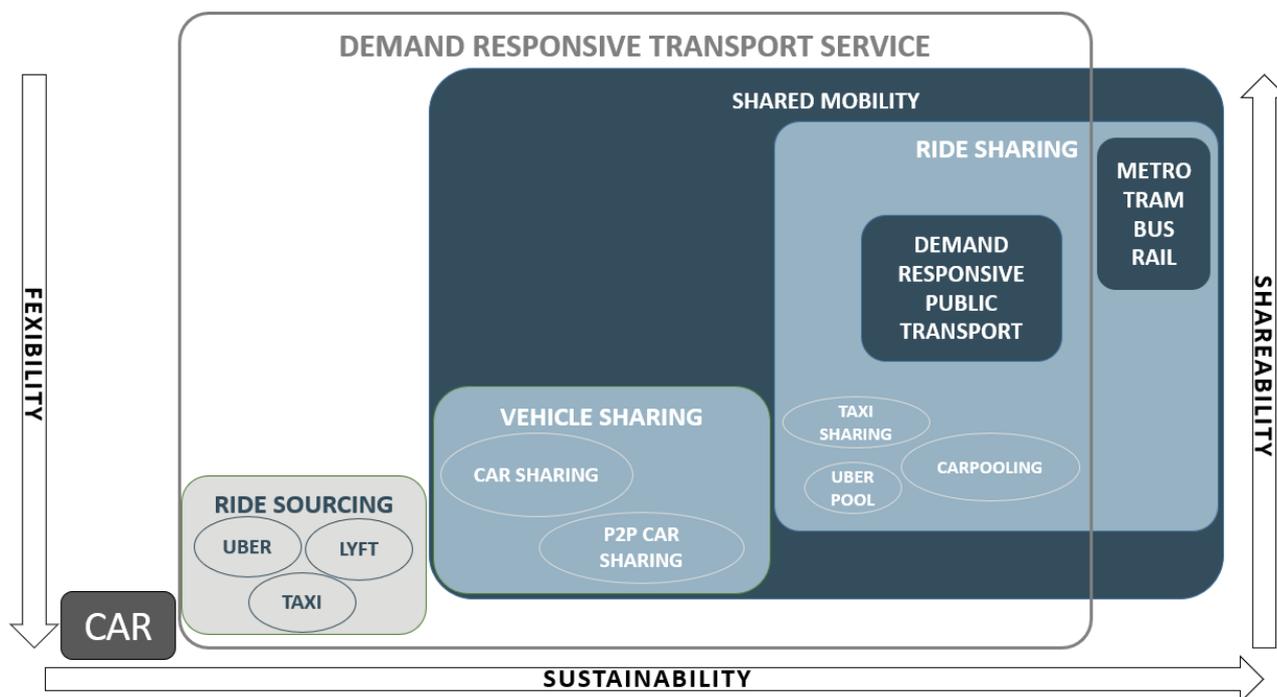


Figure 1: Classification of Demand Responsive Transport services (1)

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.

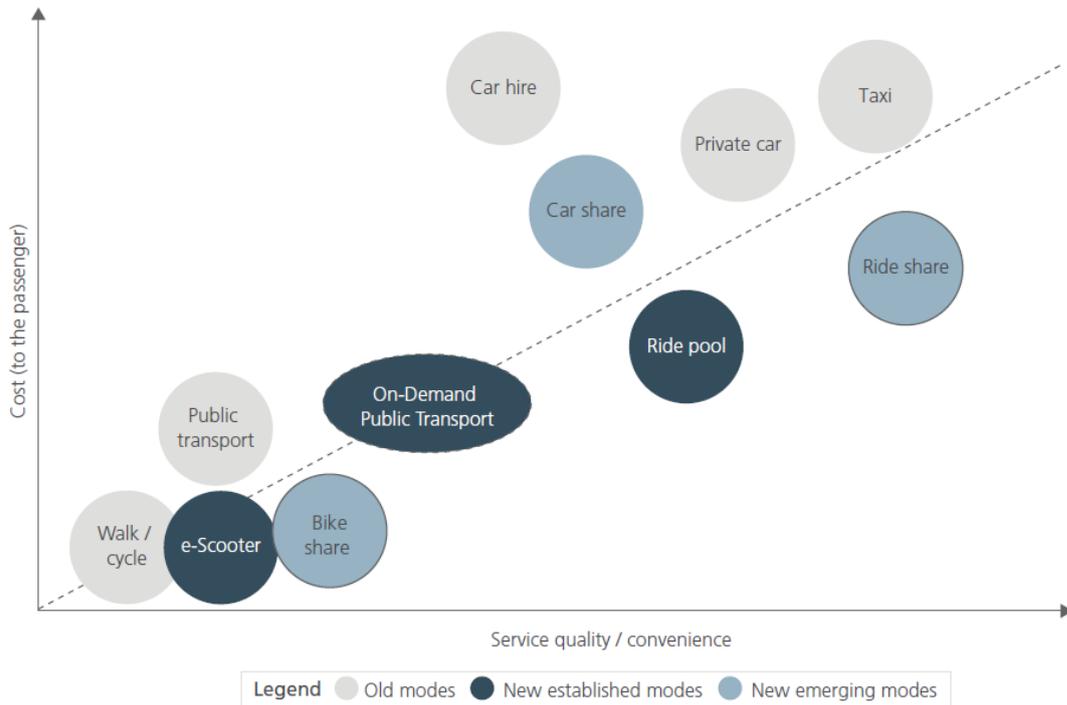


Figure 2: Price and service attributes of different transport modes (2)

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

- 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 (2):

- **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 (2)

- 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 LyftShared¹, but these are generally not subsidised.

¹ 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 business and enterprises

The following benefits could be created for enterprises or businesses when a DRT is set up in the region (and therefore rebalancing investments/financial contributions in flexible transport services).

Positive effects for business and enterprises



- Easier access and therefore higher frequency of visits of clients (e.g. tourism, shops) - likely more revenues.



- If there is a local flexible transport service available, people are tending to shop locally more likely (as well an environmental effect), 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. The rural and peripheral areas are suffering on this deviation of payment streams.



- Less demand for parking, if clients and/or employees arrive without own car at enterprise or business area.

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.



- Employees can easier access their work places, e.g. especially in business sectors with a high share of people employed on half time basis. It is an extra income for the household, but if there is only one car, in rural or peripheral areas this is usually not available for this person. A lot of businesses (especially in rural and peripheral areas) lacking of employees, partly as potential employees are not able to access their work place (in general or at start and ending time of their work shift), additionally if there is a fixed time table, flexible working time is an additional challenge, which can be solved with flexible operation times of such services.



- This concerns apprentice people as well, likely because of their age, they do not own a car/driving licence/motorcycle and therefore cannot reach their desired apprentice place; Enterprises lacking of skilled employees on the long run.

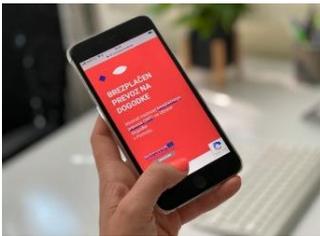


How is DRT applicable in enterprises?

Enterprises can of course operate or commission a service provider for such a service internally for clients and/or employees. But it is more advisable to share or operate this as a public, flexible transport service without restrictions to any potential users. In the best case, the public sector (e.g. municipalities, regions, transport divisions) is also interested in such a service and a public-private partnership can be established where the service is set up jointly, taking into account both interests, those of the public sector and those of companies.

When designing the service, enterprises can focus on their employees, e.g. starting and ending times of work shifts, providing services to their employees' homes or at least filling gaps in sustainable mobility provision along the commute, shuttles to main transport hubs or shuttles between company locations. As far as customers are concerned, the origin of the customers and the route to company's facilities should also be analysed and the opening hours taken into account when designing the flexible transport service. Special needs of clients (depending on the type of clients) must also be taken into account (transport of equipment, transport of people with mobility impairments, etc.).

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.

Enterprises can also consider the possibility of using flexible transport services for parcel/goods transport (to and/or from customers or between locations of businesses).

In the tourism sector, additional funding resources for the flexible transport service can be generated by the customers themselves by charging for parking or including mobility cards in the hotel's guest packages (where guests can use the flexible transport service at a reduced rate or for free with their guest card). Parking fees for employees on the company's premises can also cross-fund such services.

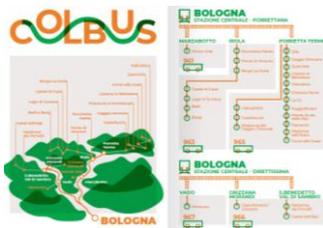
The vehicle fleet of the flexible transport service and the vehicle fleet of companies could be merged, which reduces the costs for the entire fleet (e.g. maintenance costs, use of the vehicles during peak times for the flexible transport service and off-peak as company cars). An additional element is the integration of a car sharing system, where employees can rent the vehicles during times when the service is not in operation (e.g. weekends).



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. It is therefore crucial to raise awareness about Demand Responsive Transport among staff and business partners and to involve local decision-makers. If DRT is to be considered a viable part of daily business activities, nudging and communication activities should be considered. Companies and businesses can promote understanding and acceptance of the DRT service among potential users and/or draw the attention of local decision-makers to these activities.

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.

For instance, enterprises can raise awareness through implementation of following campaigns:

- 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 & engage local decision-makers

[SMACKER](#)
[Review of behaviour change](#)





Interested in developing Demand Responsive Transport?

SMACKER can support you all the way!

Use [SMACKER TOOLBOX](#) and access best practices, guidelines and templates to develop a DRT service.



Project Partners



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