



Demand- responsive transport

A Policy Brief from the Policy Learning Platform on
Low-carbon economy

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Summary

Demand-responsive transport (DRT) is a flexible mode of transportation that adapts to the demands of its user groups. In the past, it has been used primarily for its social benefits, increasing opportunities for people with limited mobility, or those who are socially marginalised. However, DRT can also have significant environmental benefits through reducing the number of private vehicles on the road, and by supporting multimodal transport in cities, acting as the first/last mile solution for linking communities with broader transport networks. The aim of this policy brief is to highlight the benefits of DRT for European regions, outline some of the barriers to its uptake, and show how European support can help to overcome them.

Driving forces for demand-responsive transport

European regions are facing numerous challenges related to transportation and mobility, requiring new solutions, technologies and business models. Transport represents around a quarter of all greenhouse gas emissions (GHGs) in Europe, and if Europe is to meet its climate change targets, then reducing transport emissions is an essential contribution. As well as GHGs, transport also has significant health impacts, being the main contributor to declining air quality in urban areas.

As well as environmental and health concerns, changing demographics and emerging technologies are also driving change. Cities around the world are increasing in size, with the United Nations expecting 66% of the global population to be living in cities by 2050 (from 54% in 2014), resulting in greater congestion, and rising demand for transport services. At the same time, as populations fall in rural areas, it becomes harder to fund and maintain public transport links. Additionally, with an aging society, new mobility solutions will be needed to ensure that people can still enjoy a high quality of living. Other pressures include changing attitudes to vehicle ownership amongst some sections of the population, with increased awareness of the 'sharing economy', and greater uptake of ICT systems, mobile applications and internet connectivity.

What is demand-responsive transport?

DRT is a transport service where day-to-day operation is determined by the requirements of its users. Typically this involves users calling a booking service, which will then plan a route for the day to pick-up users and take them to their required destination. Increasingly, such systems are also using internet connections; via web browser or apps, to enable bookings. DRT, however, remains underutilised, despite its many benefits.

“Demand responsive transport is a user-oriented form of passenger transport characterised by flexible routes and smaller vehicles operating in shared-ride mode between pick-up and drop-off locations according to passenger needs.”

Community Transport Association (UK)



Reducing carbon emissions and improving transport flows in cities

With more people living in cities, and greater increases in the use of private cars, public authorities are looking to support greater use of low-carbon mobility solutions, including public transport, cycling and walking. DRT can fill a particular niche in mobility plans for connecting suburban areas with transport hubs such as train stations and metro or tram lines, thus contributing to reducing carbon emissions and the number of vehicles on the road. A key challenge here though is ensuring that the DRT system is efficient and easy to use, overcoming perceptions that it is slow or inefficient. With greater awareness of 'sharing economy' principles, as well as uptake of ICT solutions, the emerging trend is for Mobility as a Service (MaaS).



Tele-Bus on-demand transport

The municipality of Niepołomice (near Krakow, Poland) wanted to make its public transport routes more efficient and convenient for users, whilst also driving down costs and emissions by reducing the number of unnecessary journeys. Their solution was the Tele-Bus system, an on-demand bus service, with no regular routes or timetable, operating within three districts with low population densities. Users can request a journey between any two of 77 stops in the coverage area, up to 30 minutes before required departure. The main user groups are commuting workers, students and elderly people, and despite some initial opposition to cancellation of traditional bus services, the DRT system now has an average of more than 3,500 users per month, growing from around 300 when the system was launched in 2007, thanks to ongoing communications efforts and a focus on good service.

www.interregeurope.eu/regio-mob/

Cost-efficient connectivity for rural populations

Demand-responsive transport can play an important role in rural areas where public transport connectivity is not well developed, and where running full scale public transport may be prohibitively expensive. Many regions have seen costs of operating public transport rise, and DRT provides a cheaper alternative, running only when needed. Rural areas need to be able to access services, work and leisure activities, which are increasingly becoming focused



within urban areas. DRT can help to make rural areas attractive, preventing the need to move to urban areas for employment opportunities. It can also provide a solution for linking rural tourist destinations with existing transport infrastructure, therefore supporting rural businesses and rural development.

Supporting citizens with limited mobility

Demand-responsive transport has been developing in Europe since the 1960s, primarily as a service for people with limited mobility, especially people of advanced age and people with disabilities. In this mode, DRT supports independent living, providing mobility for people who may have challenges using other forms of transportation. These DRT systems have normally been supported by government or third-sector funding, though they can also operate through subscription and fare-based business models. We can expect DRT models to change through new intelligent transport systems and ICT, but solutions relying on these technologies may be out of the comfort zone of many of the traditional users of DRT.



Demand-responsive transport service for persons with disabilities

The Kavalir network in Ljubljana provides small electric vehicles for people with limited mobility to move around the pedestrianised city centre. The free service intends to make shopping and social activities easier for those who may have been adversely affected by limited vehicle access to the city centre. The vehicles can be booked via phone and a driver will make stops as required by the users. Additionally, users of the service can be given cards which they can show to the driver, giving information on their mobility limitations; for example, limited eyesight, to make the service as user-friendly as possible. Currently, four vehicles operate in the city, funded by LPP (the city's bus company), the City Municipality and Ljubljana Tourism.

www.interregeurope.eu/regio-mob/

Demand-Responsive Transport and Mobility as a Service

“Mobility as a Service (MaaS) is the integration of various forms of transport services into a single mobility service accessible on demand.”

MaaS Alliance

Policy brief: Demand Responsive Transport

Whilst the typical form of DRT uses buses and call centres, new technologies and business models are introducing new solutions. MaaS involves a combination of cashless payment systems, mobile applications, and integrated transport networks. DRT would form only a part of a MaaS system, being integrated with public



transport, vehicle sharing and taxi systems, but can fill a gap in this emerging set-up.

So far, there are very few examples of fully operational MaaS systems (such as [Whim, in Helsinki](#)), but the possibilities are emerging thanks to the widespread use of smartphones networks. MaaS requires secure, dynamic, up-to-date information on travel schedules as well as updates on roadworks and travel flows. MaaS systems enable users to both access convenient transport options, but also to shape services, as transport providers adapt to their requirements. It combines public and private mobility providers in a single application, or web portal, which then plans journeys and manages the full trip, with a single payment, which the application will distribute amongst transport providers. Such systems are also able to take account of different user preferences (for example, transport type), finding the fastest and cheapest travel options.

It can be expected that within a few years, full platform solutions will be available for purchase by public transport authorities to tie in with their existing fleets, enabling them to easily adapt to demand-responsivity with help of smartphone apps, providing online booking services and algorithms that can determine the optimal route to answer demand.

Challenges at regional level

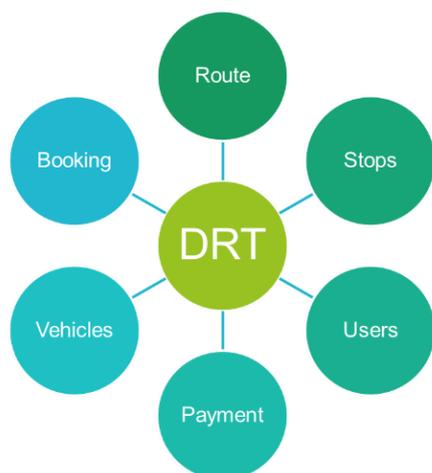
Getting DRT systems to function at the regional level can be challenging, requiring co-ordination of stakeholders, ICT investments and a sustainable financial model. Whilst systems for individuals with limited mobility have been widely tested, scaling these systems up to serve more users requires adaptation to a number of parameters, whilst also ensuring that the system is convenient and efficient, to improve attractiveness and acceptance by various user groups.

Parameters	
How does the user book their journey?	<ul style="list-style-type: none"> • Telephone call • Internet (website/app)
When is booking required?	<ul style="list-style-type: none"> • On the day/when required • In advance • Repeating booking
How frequently should the service run?	<ul style="list-style-type: none"> • Only when requested • Set number of journeys per day
How flexible is the route?	<ul style="list-style-type: none"> • Fully set, but only runs when there is demand • Deviations possible within a set corridor • Fully flexible
Where are users picked-up or dropped-off?	<ul style="list-style-type: none"> • Many-to-many • One-to-many / many-to-one • One-to-one
What area is the service covering?	<ul style="list-style-type: none"> • Rural • Suburbs • Mixed



Who are the main users?	<ul style="list-style-type: none"> • All public • Disadvantaged groups • Private groups
What size of vehicle should be used?	<ul style="list-style-type: none"> • Car • Minibus • Bus
What is the price for the user?	<ul style="list-style-type: none"> • Free • Paid
How is the DRT system financed?	<ul style="list-style-type: none"> • Subsidised • Partly-subsidised • Commercial
What competition is there with other transport solutions?	<ul style="list-style-type: none"> • High • Low

By adapting these numerous parameters, DRT can be a suitable solution for almost any region. DRT services, particularly those in rural areas, often have small numbers of customers or limited vehicle availability. The challenge therefore lies in providing a convenient service that is also cost effective. Finding the right business and financing models are essential, with varying degrees of involvement by private companies and public authorities.



Regions will also face a challenge in supporting long-term changes in consumer behaviour and preference. So far, DRT has been provided mainly for use by those with limited mobility, but if it is to have a wider environmental and social impact, then it is going to have to attract new users and compete with other transport solutions, including private cars. Using DRT will need to be seen as an efficient, environmentally friendly, and convenient option if it is to become a transport choice, rather than a necessity.

Consideration also needs to be given to how to integrate DRT into other modes of transportation, and ultimately, how to integrate into MaaS systems. DRT often provides a link between travellers and existing infrastructure, and will require the involvement of many different stakeholders including regional mobility management players, telecommunications companies, payment processors, transport providers and local authorities. As well as needing to involve all of these actors in planning, there are also a lot of regulatory issues to be considered regarding multi-modal transport offers, where regulations are different between, for example, taxis, private hire vehicles and public transportation.



European frameworks and support

The European Union has introduced a number of roadmaps, strategies and legislative initiatives to support low-carbon transport. From the 2001 Gothenburg Strategy onwards, the EU has aimed to develop its transport sector to be both integrated and sustainable. The *Roadmap to a Single European Transport Area (2011)* set out 40 initiatives to build a competitive transport system that could remove major barriers, support economic development, and reduce carbon emissions. For the first time, long-term goals were set, including that by 2050, no conventionally-fuelled cars are used in cities, and that a 60% reduction in transport emissions should be achieved.

The *Urban Mobility Package (2013)* set out the concept of Sustainable Urban Mobility Plans (SUMP), with guidance on how to devise modern and sustainable urban transport plans. SUMP consider the entirety of an urban area and encourage joined-up and collaborative policy-making across different policy-areas, different levels of government, and different stakeholder groups.

Urban mobility is highly complex, requiring integrated planning processes, and new approaches that avoid compartmentalised thinking. SUMP guidelines advocate having a long-term vision, goals and objectives, covering the full urban area as well as the surrounding regions which are economically and socially linked. SUMP should consider how to assess and monitor performance of the transport system and link different modes of transport; not only cars, buses and trains, but also walking and cycling. Furthermore, technical issues, infrastructure requirements, support policies (including financing) and information campaigns has to be taken into account. Specific consideration also needs to be given to integrating stakeholders through co-operation, co-ordinating and consulting, including businesses, civil society, public bodies at all levels, and citizens.

The main support provided for drafting SUMP is from **ELTIS** (www.eltis.org), European Commission DG Transport and Mobility's urban mobility observatory. ELTIS provides SUMP guidelines, to help urban areas to develop mobility strategies. Additionally, ELTIS provides case studies, training materials and tools, and organises events to help regions. The **SUMP Guidelines** are currently in the process of being updated and are expected to be published in mid-2019. The revision will add greater focus to the need for sustainability, and provide new content on MaaS in cities.

“A Sustainable Urban Mobility Plan has as its central goal improving accessibility of urban areas and providing high-quality and sustainable mobility and transport to, through and within the urban area. It regards the needs of the 'functioning city' and its hinterland rather than a municipal administrative region.”

European Commission

The **CIVITAS** (www.civitas.eu) initiative is a network of cities dedicated to cleaner transport which aims to support local partnerships to implement and test novel urban mobility approaches in real conditions. The network is co-funded by the European Commission and



supports demonstration projects of new urban transport solutions, including the topic of collective passenger transport, looking at inter-modality, e-ticketing and accessibility.

URBACT (www.urbact.eu) is an exchange and capacity building initiative funded by the European Regional Development Fund and EU Member States, which aims to support sustainable urban development. The initiative involves 550 cities across Europe, developing solutions that integrate economic, social and environmental dimensions of development, to inform urban policy across Europe, including topics of social inclusivity and urban mobility.

In the MaaS sector, the European Union has founded the **MaaS Alliance** (www.maas-alliance.eu), a public-private partnership to support deployment of these systems. The Alliance considers issues related to business rules and collaboration, end-user issues, and legal and regulatory barriers.

Finally, the European Union supports sustainable transport by providing funds for mobility projects through the [European Structural and Investment Funds \(ESIFs\)](#) and the [Connecting Europe facility](#). Sustainable transport can be funded through both the European Regional Development Fund (ERDF) and the Cohesion Fund. The ERDF is mostly targeted at four priorities, including 'supporting the shift towards a low-carbon economy in all sectors', with the sub-priority of 'promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures.' Both the ERDF and the Cohesion Fund can furthermore be used to support sustainable transport under Investment Priority 7, 'promoting sustainable transport and removing bottlenecks in key network infrastructures,' including sub-priorities on enhancing regional mobility through linking multimodal nodes (7b) and developing low-carbon transport systems (7c).

Supporting demand-responsive transport with Interreg Europe

The spending of all ESIFs are managed through operational programmes, which are the main policy instruments targeted by the Interreg Europe programme. Regions taking part in Interreg projects are able to exchange experience and good practices to build upon previous successes, and perform evaluations and studies to ensure that European support is targeted to solving their regional challenges. In the field of demand-responsive transport, the above-featured partnership of REGIO-MOB is complemented by LAST MILE, an interregional co-operation project designed to develop smart mobility solutions for the last stretch of journeys.



The LAST MILE project has been exploring DRT as a solution for promoting and supporting tourism, providing links for the 'last mile' between transport hubs and tourist destinations. The project has performed a detailed analysis of framework conditions and barriers to implementation of such systems, and will produce action plans for each region. The project is producing guidelines which can be used to make sustainable mobility plans for rural regions, which can be used by regional authorities across Europe.

The project has produced two synopsis reports, which will be used to shape the upcoming guidelines. The first, 'National and regional framework conditions and barriers of flexible transport', provides a concise overview of the challenges that regions face, whilst the second, 'State-of-the-Art of regional public transport systems and particularly flexible systems', analyses the current state of DRT in the project's regions in order to identify existing best practices.

Both reports are available now through the project website.

www.interregeurope.eu/lastmile

Recommendations

DRT has been considered primarily as a solution for those with limited mobility, but targeting new user groups and combining with new ICT systems and transport management tools is an innovative and effective approach. It can bring numerous benefits to European regions, including cost savings, reduced road congestion and emissions reductions, whilst also improving quality of life for citizens. DRT systems are adaptable to almost any region, with numerous parameters which can be changed to fit varying regional scenarios.

- DRT systems usually need to be stimulated by a public authority. By their nature, the potential user groups are often dispersed and fragmented and thus difficult to identify for private operators. Regions should take stock of the performance of their transport systems and consider where public transport is used, and at what cost, to see where it may be cheaper and more environmentally friendly to use a DRT system, as with the Tele-Bus service in Niepołomice;
- SUMP's should be developed or altered to include DRT, considering linkages with other transport modes. The process should be overseen by a single transport authority, setting clear targets for low-carbon transport to show the long-term direction of travel;



- Lead partner of DRT initiatives will need to bring all stakeholders together and manage the process of co-operation. It is the role of the public authority to consider the long-term aims and to set goals to meet broader public policy goals; focus on the issues of social inclusion and reducing congestion;
- DRT needs to be made attractive and convenient if it is to have a wide impact. Communication should focus on the multiple benefits of DRT, and ICT should be used as far as possible, to effectively integrate services into public transport information systems;
- Integration of smart cards and electronic payments can help to improve convenience of the DRT solution; but care must be taken to avoid alienating users who may not have access to those technologies. For example, avoid app/mobile only services;
- Systems should aim to provide both instant and pre-booked service for maximum convenience, as demonstrated in Krakow.
- Support is available for developing and implementing DRT systems; look in particular at using ESIFs and take inspiration from what regions have done before.

Sources, further information

- Community Transport Association – The Future of Demand Responsive Transport (2017)
- LAST MILE – [National and regional framework conditions and barriers of flexible transport](#) (2017)
- LAST MILE – [State-of-the-Art of regional public transport systems and particularly flexible systems](#) (2017)
- LIMIT4WEDA documents – <http://miema.org/projects/limit4weda-med-programme/>
- MaaS Alliance – [White Paper: Guidelines & recommendations to create the foundation for a thriving MaaS ecosystem](#) (2017)

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#mobility #DRT #MaaS*



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