Feeder Systems fact sheets

Deliverable D3.1

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1 Introduction

1.1 Background

The SmartMove project addresses key action on energy-efficient transport of the Intelligent Energy Europe programme (STEER). In line with the Transport White Paper it focuses on passenger transport and gives particular emphasis to the reduction of transport energy use.

1.2 The SmartMove project

The delivery of public transport (PT) services in rural areas is faced with tremendous challenges: On the one hand the demographic dynamics of ageing and shrinking societies have particular impacts on the PT revenues depending on the (decreasing) transport demand. On the other hand, PT stops density and the level of service frequency are often of insufficient quality. Thus, there is a need for the development of effective feeder systems to PT stops and for the adaptation of the scarce PT resources to user needs. For the SmartMove project, feeder systems are the different ways of linking a specific region with the back bone PT system, usually a bus or train network or a combination of both. This can be done by improving the walking and cycling facilities to and around the stations, by implementing flexible bus systems or by promoting car pooling or car sharing etc.. However, even if sufficient rural PT systems are available, large parts of the population face diverse subjective barriers to use PT. This is even more relevant for PT feeder systems: in many cases citizens are not even aware of their existence or, if they are aware of them, there exist subjective barriers to their use.

These problems are addressed within SmartMove by implementing “Active Mobility Consultancy” (AMC) campaigns for PT lines and their feeder systems in eight rural and peripheral areas. The objective of the AMC campaigns within the project aims at promoting the use of PT via personalised travel marketing approach. The word ‘active’ in the term “active mobility consultancy” has a twofold meaning. On the one hand, it refers to the active process of informing people on PT: it is not PT users, who have to inform themselves about PT services; rather the PT operators that have to inform their (current and potential) customers according to their individual needs. For this purpose, current and potential PT users are contacted to provide them with demand based information via different communication channels. The second meaning refers to several active measures aimed at decreasing subjective barriers such as overestimating prize and travel time whereas underestimating the supply and options to the use of rural PT systems.

The AMC campaigns are more than purely the provision of information: active measures will be offered in addition to the written information and the consultancy talks that are usually applied in similar campaigns. This might include actions like practical traveller training, citizen participation in planning or guided tours for PT feeder schemes. Additionally, information and feedback on user needs can be collected within the AMC campaign. This supports the adjustment of PT offers in line with users’ requirements.
The AMC concept used in SmartMove builds on existing approaches, which will be further developed through SmartMove based on the exchange of experience and mutual learning. In particular, we will develop existing AMC approaches along 4 lines:

(i) the adaptation of the existing approach to recent developments,
(ii) the consideration and inclusion of feeder systems into the AMC campaign,
(iii) the development and application of a common monitoring and evaluation method and,
(iv) the adaptation of the AMC concept to specific requirements of the implementing regions.

The result is an easy to use AMC concept that can be applied by PT operators all over Europe. The aim is to solve the specific, significant challenges of PT schemes in rural areas.

A main pillar of the concept is the extension of the AMC concept to PT feeder systems as they are crucial factors for rural PT systems. Better knowledge gained on this subject helps to improve public transport in rural areas. From a scientific point of view, the information attained about a feeder system based AMC campaign makes an important contribution to the further development of personalized travel marketing approaches. Even more important, by implementing a large range of dissemination activities, such as webinars and take-up seminars, not only the SmartMove partners, but also a broad range of stakeholders are informed about the manifold possibilities and advantages of an AMC campaign.

Eight rural and peripheral regions in Europe prepare, implement and evaluate a local Active Mobility Consultancy campaign. PT operators achieve insight into the demands of both actual PT users and those who do not currently use PT systems, by applying the AMC campaign. If the non-use of PT is caused by hard facts – e.g. the location of the PT stops or schedule organization – PT operators can adapt their services to the demand of potential users. This will increase opportunities to make PT systems attractive for new passengers. Each of the AMC campaigns to be conducted through SmartMove will be based on a shared methodological approach which will then be tuned in practice to the needs of the local specific situation. These include the specific target groups, the specific cultural barriers, barriers and enablers, the type of PT feeder system (a possibility to reach PT stops by individual or public means), the spatial aspect (e.g. compactness vs spread, topography and geography, environment), the socio-political aspects at the appropriate decision making level, the administrative aspects, the economic aspect and the planning aspects. Within each region, we have defined targets of several hundreds of households will be contacted. As a result, we expect a substantial mode shift to public transport, which in turn will lead to a substantial increase on energy efficiency, a decrease of resources consumed and a reduction of the greenhouse gas emissions caused by road traffic.
1.3 Contents of the deliverable

This document, includes in chapter 2, a description of the concept of feeder system that is been considered by the SmartMove Project. It also contains two sub sections including the criteria used to develop the methodology that allowed us to categorise the feeder systems included in this report.

Chapter 3 contains in first place a table listing the feeder systems included in this report. And secondly, it describes, in depth, the main features of each of the 15 feeder systems considered to carry out this deliverable.
2 Analysis of existing PT feeder systems

For the SmartMove project, feeder systems are the different ways of linking a specific region with the back bone PT system, usually a bus or train network or a combination of both. Having said that, SmartMove mainly focuses in regions with a low and sparse transport demand, which can be normally found in suburban and rural areas\(^1\).

To carry out the analysis of the existing feeder systems, we used two criteria:

1. The mean of transportation used (buses, bicycles, pedelecs, taxis, cars, or walking), covering public as well as individual (motorised and non-motorised) transport systems.

2. The degree of flexibility that public transportation (PT) services offer regarding the route, schedule, target users or whether or not door-to-door services are offered. Thus, we identified three categories of PT services:
   - fixed route transport (FRT) systems
   - demand responsive transport (DRT) systems
   - Hybrid/flexible systems.

2.1 Means of transportation considered

We briefly describe below the mean of transport considered within this report:

**Full size Bus:** a road vehicle designed to carry many passengers. Buses can have a seating average capacity that ranges from 35 up to 55 seats. Because of such a high capacity, they are mostly used on fixed route transport (FRT) services (see section 2). Part of the literature underlines that buses offer faster and greater reach, flexibility and connectivity in comparison to what can be achieved solely by walking or biking. (Chandra 2013).

**Minibus:** is a passenger carrying motor vehicle that is designed to carry more people than a multi-purpose vehicle or minivan, but fewer people than a full-size bus. They have a seating capacity of between 8-10 (depending on the national legislation) and 30 seats. Some countries may require an additional class of driving licence over a normal private car licence, and some may require a full commercial driver's licence. The need for such a licence may depend on vehicle weight or size, seating capacity driver age, intended usage and additional training (such as the Minibus Driver Awareness in the UK). Demand responsive transport (DRT) services usually use either vans or minibuses (See section 2)

**Bicycle:** a human-powered, pedal-driven, single-track vehicle, having two wheels attached to a frame, one behind the other. They are very convenient to cover the last

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\(^1\) A rural area, for the SmartMove project is where the majority of inhabitants is not able to satisfy their basic needs (shopping, work, school, services) at their place of residence due to the lack of such infrastructures in proximity of their dwelling area.
and first mile of commuting trips in combination with the use of buses and trains (intermodal transport). In this report we will also include sharing schemes that differ from traditional for-profit bike rental business. There are multiple bike-sharing schemes: unregulated programs, those that require a deposit or even a membership.

**Pedelec**: a bicycle where the rider’s pedalling is assisted by a small electric motor; thus they are a type of low-powered e-bike. They offer substantial advantages over conventional bikes such as reducing travelling time, increasing average catchment area or mitigating mobility limitations of elderly users.: suitable for elderly people and persons with limited mobility, travelling time can be reduced since its average speed is higher and they can increase the average catchment area. They can be also used within schemes that were previously designed for bicycles.

**Taxi**: is a vehicle for hire with a driver, used by a single passenger or small group of passengers, often for a non-shared ride. However, this report will focus only on taxi schemes designed for public transportation under a shared ride basis will be considered (see fact sheets in section 3). The range of vehicles that provide taxi services include a wide range of vehicles: minibuses, cars, vans, minivans etc…

**Car**: we consider this type of vehicle in so far as they allow the implementation of car sharing and carpooling schemes.

**Walking**: is a clear example of a sustainable mode of transport and is especially suited for urban use and/or relatively shorter distances to and from a public transport stop.

### 2.2 DRT/FRT/Hybrid or flexible transit services

As we previously said, public transport systems fall into three broad categories: fixed route transport (FRT), demand responsive transport (DRT) and flexible/hybrid.

**Fixed route transport (FRT)**: in this type of schemes vehicles ran along an established path at pre-set times.

**Demand responsive transport (DRT)**: is "an advanced, user-oriented form of public transport characterised by flexible routing and scheduling of small/medium vehicles operating in shared-ride mode between pick-up and drop-off locations according to passenger’s needs". In many areas DRT is instead known as DART, or Dial-a-Ride Transit PT.

On one hand DRT systems are normally more cost efficient because of its flexible schedule adapting the passenger needs. On the other hand, if the majority of passenger trips are made on regular basis a fixed route time table can avoid the overhead costs for the trip arrangements. Additionally DRT systems request pre booking the trip by the user, which increases the complexity of a public transport ride.
A flexible and demand-responsive transport system has been identified as one of the promising solutions for widespread public transport in rural areas at times that are desired).

Over the last 20 years, many flexible transport services have been established; examples include share taxicabs, shuttle vans, dial-a-ride services, paratransit services, ring-and-ride services, dial-up buses, lift shares, and car-clubs. However, these are introduced largely as stand-alone services often to cater to a specific group of the population or to fill a specific need.

Along the above mentioned categories, there is a third one that combines pure DRT with FRT features. These system are known as flexible/hybrid systems and although their usage has been quite limited so far, they are becoming more popular. These services have established stop locations and/or established schedules, combined with some degree of demand responsive operations, such as route deviations or route extensions on demand.
### 3 Fact sheets

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<th>Means of transport</th>
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<td>Demand responsive transport (DRT)</td>
<td>Buses, minibuses</td>
</tr>
<tr>
<td>2) Dial-a-bus operated by non profit organisations and/or voluntary drivers open to all potential passengers</td>
<td>Demand responsive transport (DRT)</td>
<td>Buses, minibuses and private cars</td>
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<td>3) Demand responsive service dedicated to specific user groups: Paratransit services (US) /Community transport (UK)</td>
<td>Demand responsive transport (DRT)</td>
<td>Minibuses and vans</td>
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<tr>
<td>4) Share taxis</td>
<td>Demand responsive transport (DRT)</td>
<td>Cars and minivans</td>
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<tr>
<td>5) Demand responsive connector (DRC) a point to point shuttle service</td>
<td>Flexible transit services (FTS)</td>
<td>Buses, minibuses and vans</td>
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<td>6) Route deviation services schemes</td>
<td>Flexible transit services (FTS)</td>
<td>Vans and minibuses</td>
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<td>7) Bus (rapid) transit (BRT) – all forms of conventional bus feeder systems</td>
<td>Fixed route transport (FRT)</td>
<td>Bus</td>
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<td>8) Park &amp; Ride</td>
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<td>Cars</td>
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<td>9) Car sharing</td>
<td>Individual motorized transport systems</td>
<td>Cars, e-cars</td>
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<tr>
<td>10) Car pooling</td>
<td>Individual motorized transport systems</td>
<td>Cars</td>
</tr>
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<td>11) Bike sharing</td>
<td>Individual non-motorized transport systems</td>
<td>Bicycles and pedelecs/e-bikes</td>
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<tr>
<td>12) Intermodal transit scheme (pedelecs and electric buses) including the possibility of taking the bike with you on the pt</td>
<td>Individual transport systems combined with a demand transit service (DTS)</td>
<td>Environmental Friendly Buses and pedelecs</td>
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<td>13) Bike and ride (facility at the station)</td>
<td>Individual non-motorized transport systems</td>
<td>Bicycles and pedelecs/e-bikes</td>
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<td>14) Routes for walking and cycling to pt stop</td>
<td>Individual non-motorized transport systems</td>
<td>Bicycles and pedelecs/e-bikes</td>
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<tr>
<td>15) Walking (Pedi-bus) or biking together</td>
<td>Individual non-motorized transport systems</td>
<td>Walking, bicycles</td>
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3.1 Dial-a-bus services with professional operators/drivers open to all potential passengers

<table>
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<tr>
<th>Type of transport system</th>
<th>Demand responsive transport (DRT)</th>
</tr>
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<tbody>
<tr>
<td>Mean of transport</td>
<td>Buses and minibuses</td>
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</table>

Description of the scheme

Dial-a-bus services are demand responsive travel schemes in public transport that adapt their itinerary and time table to suit a particular transport demand.

Dial-a-bus services exist in a variety of schemes. They differ for example according to the area served, types of pick up and drop off points, types and flexibility of routes, booking methods flexibility of minimum pre-booking period, financing and funding models and target groups. Below, four examples of a call bus service: Publicar in Switzerland, Multibus and Taxibus in Germany and PersonalBus in Italy.

3.1.1 PubliCar

Service design

PubliCar is a fully demand-responsive door-to-door minibus service in Switzerland, specifically designed for low density areas. The scheme is seen as a complement or as alternative to traditional public transport. It does not only offer a flexible public transport for low density areas, but also for small towns or during times of weak demand, e.g. night service. In many cases it also provides connections to the main public transport network.

Catchment area

PubliCar is available in 32 regions within Switzerland.

Cost effective operations

On the average, approx. 50 to 90 persons use PubliCar per server area during a day, in certain areas up to 200. During a year approx. 20,000 to 30,000 users are served by the service in each of the 32 operational areas.

Funding

Call a bus services in Switzerland area treated as traditional public transport and therefore have to be financed with public funds. Users pay an extra of 3 SFr (approx. €2) when using the service. The operation of PubliCar is usually not more expensive than fixed bus lines, in many cases even slightly cheaper. The cost effectiveness could be improved by 5% where PubliCar replaced conventional services. Currently the cost recovery rate is at approx. 25%.

Potential Barriers

- Not identified

Conditions for a successful implementation and operation

- PubliCar developed a franchising system that makes possible to assign the service to regional or local private transport companies or private vehicle owners.
- PubliCar is a nation-wide managed scheme. This allows considering greater operation areas to access to economies of scale benefits.
• PubliCar is integrated within the main transport network.

### Impacts on travel behaviour

• Due to the positive assessment from users, PubliCar has been continuously expanded and optimised since it started in 1995.

### Advantages

• PubliCar allows providing a basic transport service to areas that wouldn't have one otherwise.
• The operation of PubliCar is usually not more expensive than fixed bus lines, in many cases even slightly cheaper.

### Disadvantages

Not identified

### Communication channels with users

Users call a free number to order the services at the PubliCar call centre, which bundles demand where possible. The drivers of the minibuses are informed via GSM/SMS about the requested trips. Depending on the situation and complexity of the specific PubliCar service (e.g. served area and users, number of vehicles in an area), different disposition systems are in use. In the simplest case, the driver decides himself how to arrange a tour. In other cases the optimal route is calculated with special software in the call centre.


### 3.1.2 Multibus

#### Service design

The user orders the service an hour before the desired trip via a call centre and is collected from bus stops located very close to the users’ home. The minibus takes the travellers to any destination within the service area and also connects to the main public transport network.

#### Catchment area

The MultiBus service operates on demand with modern minibuses in three municipalities (Gangelt, Selfkant and Waldfeucht, approx. 30,000 inhabitants). In the district of Heinsberg, near the border to the Netherlands. The region is located within the wider catchment area of surrounding agglomerations (e.g. Heinsberg, Geilenkirchen, Aachen, Mönchengladbach, Düsseldorf) and is characterised by small cities and villages with disperse settlement structures.

#### Cost effective operations

The service is integrated into the regional public transport system and users pay the normal fares. Approx. 2,900 persons use the MultiBus service each month. On peak days, around 250 clients use the service. The MultiBus scheme, which is publicly financed, replaces in its operational area a conventional bus service. It could be shown that the MultiBus service operates more cost efficiently than the previous bus services. The cost advantage is approx. 35,000 Euros a year, even higher (42,000 Euros) if new customers that could be gained through the more attractive service, were taken into account.

### Potential Barriers

Not identified

### Conditions for a successful implementation and operation

• It includes innovative measures in marketing, types of vehicles used (minibuses run on biodiesel).
### Impacts on travel behaviour

- The Multibus project involves an innovative instrument of social marketing, trying to reach potential users by appealing to their emotions and values. The service was frequently promoted using concepts of event marketing, e.g. kick-off events, special tours or marketing at soccer games.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Multibus improves accessibility to the public transport system in areas or times where conventional services cannot do this in a satisfactory way;</td>
<td>Not identified</td>
</tr>
<tr>
<td>It tackles social exclusion of people that do not have access to a car; children, teenagers, families and seniors were identified as the main beneficiaries of the scheme.</td>
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<tr>
<td>It offers potential for cost reductions when replacing conventional services in areas or times of low demand.</td>
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#### Communication channels with users

- MultiBus’ users order the service at least half an hour before the trip by contacting a call centre, which uses software to optimise the routing of the minibuses. The call centre agents tell the user the approximate times of pick up. The driver of the minibus receives by SMS the final routing information for the trip. MultiBuses connect the three served communities by a ring road and diverge from this route to pick up clients in the areas between.

### 3.1.3 Taxibus/TaxibusPlus

- TaxiBus or TaxiBusPlus offers additional PT to line-based systems. The TaxiBus is also line-based and is offered mostly during off-peak hours in rural or semi-rural environment. The Taxibus has to be ordered by call, usually 30 or 60 minutes before the trip starts. TaxiBus customers can use with “normal” PT tickets, at TaxiBusPlus customers have to pay additional 1 Euro/trip.

#### Planning features

**TaxiBus** is a fully demand-responsive bus-stop to bus-stop service, specifically designed for low density areas or during times of weak demand. TaxiBus is line-based and can be ordered only at times given on the timetable. It’s a efficient replacement for normal line-based PT.

**Catchment area**
Taxibus is offered in many regions in Germany.

**Responsibilities for funding and operation**
It has to be financed with public funds. At TaxiBusPlus an additional Euro per trip has to be paid.

### Conditions for a successful implementation and operation

- TaxiBus is an additional offer to line-based PT but is integrated in the main transport network.
- It can be used with normal PT-tariffs.
- The line-based system with fixed timetable offers an efficient planning basis.

**Impacts on travel behaviour**

- Due to positive assessment from users TaxiBuses are been expanded across rural areas in Germany.
### Advantages

- TaxiBus allows providing PT to areas respectively during times where line-based PT can't work efficient.
- PT providers can, with TaxiBus, offer a similar amount of trips by spending less money. In other words, they are able to offer a greater amount of PT trips by spending the same money.

### Communication channels with users

Customers call the disposition office. From there the calls are collected, and software-based were the trips coordinated. The disposition is easier because of the line-based timetable with fixed times.

An specific example of a Taxibus is available (in german) at http://www.ovaginfo.de/taxi0.html

### 3.1.4 PersonalBus

- The PersonalBus scheme is an advanced, user oriented form of public transport characterised by flexible routing and scheduling of small/medium vehicles operating in shared-ride mode between pick-up and drop-off locations according to passengers' needs.

### Planning features

**Service design:**

The key component of this scheme is a computer-aided system assisting the control centre staff in the whole process of meeting user's requests, providing dynamic routing and scheduling of vehicles, together with the reporting and accounting operations.

This system is enhanced by the use of:
1) an automated vehicle location device,
2) an on-board small PC to exchange data between the vehicle and the control centre,
3) an automated payment system based on Smart-Cards,
4) an automated geo-coding system to locate all vehicles on a billboard.

The on-board small PC can also be connected to other on-board sensors to collect and process vehicle maintenance data, as well as other various devices.

The software, based on industrial standards, supports the service planning phase through an optimisation process that takes into account the operational constraints, such as:

- resources (available vehicles, vehicle type and capacity)
- network characteristics (bus stops location, bus parking area locations, physical and functional features of road network).
- service standards such as: the Direct Ride Time (the passenger ride time from origin to destination with no stop in between and via the shortest route), the Maximum Ride Time (the maximum allowed passenger ride time), the Widest Shift at Pickup Time, (the maximum delay at pickup time allowed during planning) and the Widest Shift at Delivery Time (the maximum early arrival at destination stop allowed during planning).

### Catchment area

PersonalBus is part of a mobility management strategy suitable in situations such as low-density population areas or low travel demand periods in Tuscany (Italy).

### Responsibilities for funding and operation

Compared to the previous transit service structured on three fixed route lines serving only a small part of the built-up area, the DRTs offers the advantage of expanding the transit service...
throughout the built up area of Campi and, consequently, increasing the amount of potential users. Furthermore, this has a positive effect also on the overall perception of the transit effectiveness, thus improving the relation between the Company and its customers.

Recent estimates demonstrate that the PersonalBus is more cost-effective for ATAF (a Public Transport Company owned by 8 Municipalities of the metropolitan area of Florence). The results of a benefit-cost analysis taking into account the costs for the realisation of the new services (such as: acquisition of new hardware instruments and of the related software licenses, training of personnel, etc.), the yearly operating and maintenance expenses incurred before and after (1999) situations and the changes in revenues resulting from the increase in the amount of transported passengers show that the introduction of PERSONALBUS has brought to ATAF an yearly saving of about 51,600 Eur.

**Potential Barriers**
The major obstacles to this kind of services, as pointed out during the project, can be summarised as follows:

- the promoting actors and service managers of this type of schemes are usually local communities with very low experience on the transport sector, as well as on the new technologies that can be applied to it,
- the potential transport companies have usually small fleets (20-40 vehicles) not enough to cover all the users’ needs,
- local communities and service managers do not have an easy access to the requested know-how and to the most appropriate funding sources.

**Conditions for a successful implementation and operation**

- There is a need to improve the co-operation between all the actors involved, so to overcome the obstacles listed above.
- The local Administrations have a leading role in this process as they should also harmonise local DRTs in the much wider strategy of the transport system through the whole regional area.

**Impacts on travel behaviour**

- The number of passenger increased from 4000 in 1997 to more than 10,000 in 2000.

**Advantages**
The total energy savings resulting from the DRT services is approximately 5,84 million megajoules per year; this has been estimated through a model for calculating the amount of energy consumption and the emission in a particular time period, applied to the scenarios before and after the implementation of the service. The annual emission reduction has been estimated as follows (unit in tonnes): CO=30,2 NOx=1,92 VOC=3,68 TPM=0,24 CO2=625,3. 

DRTs can also help to achieve social objectives, such as increasing travel choices and creating a more balanced transportation system, thus facilitating strategies in developing co-ordinated Mobility Management activities.
3.2 Dial-a-bus services operated on voluntary basis or by a non-profit organisation

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Mean of transport</th>
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<tbody>
<tr>
<td>Demand responsive transport (DRT)</td>
<td>Buses, Minibuses, private cars</td>
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</table>

**Description of the scheme**
Dial-a-bus is a DRT service that offers door-to-door services for people who have difficulty walking and for wheelchair users. These services normally act on a very local level. Dial a bus is a community transport that provided by local community in response to specific local transport needs.

**Planning features**

**Service design**
The service may be available through paid membership for those meeting published criteria and is regarded as an effective, flexible, small scale solution for meeting the mobility needs of specific individuals and local groups. However community transport schemes run on a not-for-profit basis, or as a social enterprise, and therefore they rely on volunteers to manage and deliver the service. Community transport lets one make their own travel arrangements and allows you to participate fully in your community without being reliant on friends and family. All vehicles are normally fitted with seatbelts and have access for wheelchairs. This service is not just available to disabled people but also to families and friends, plus volunteers and professionals working with them. There are four groups identified in the rural areas as potential users of community transport:
- Older people living independently
- Mothers with children in the rural area
- Youth in the age of 14-20 years of age
- People who are unemployed and on training schemes
Dial-a-bus is also used for transporting groups of people when needed such as: sports clubs, playgroups for children, age oriented groups and day care centres (Ambrosino, Nelson, & Romanazzo, 2004).

**Catchment area**
The service provided by this type of transportation schemes is designed for covering transport needs at a local level.

**Potential Barriers**
- Financial: These types of schemes are highly dependent on public funds and volunteers.

**Conditions for a successful implementation and operation**
- Drivers should be specially trained if needed to use specialized equipment for the disabled or ill.
- Constant checks to ensure continued roadworthiness of the buses and minibuses.

**Impacts on travel behaviour**
- Reduced reliance on private cars with low occupancy.
- Increase the mobility capability of passengers with special mobility needs and their families and friends.

**Advantages**
Enhanced mobility allows vulnerable (disabled, elderly) groups that may otherwise be marginalized improving their well-being and quality of life.

Increased cost effectiveness of the service encourages increased usage.

The use of volunteers can reduce the overall cost of travel and can strengthen rural communities through their overall participation.

It can provide employment to the local area.

Because the scheme is used for the elderly and disabled in some places, it is equipped to take wheelchairs, so this transport can also be adopted to carry bicycles.

Disadvantages

- It is available in some places for only particular group of people.
- Trips need to be planned in advance.

Communication channels with users

The user needs register at a central place to use the service and then contact a booking office to find out when the service is running in the area. This is usually at a specified advanced time before the journey. In some cases passengers need to book 24h in advance, in other cases half an hour is enough.

Passengers normally book in advance by telephone and the fares and trips are set out by the scheme and are delivered as a combination of bus, minibus or sometimes voluntary personal cars.

As it is often a community initiative, announcements are handled through community notice boards as well as schedules and routes. Community notice boards are often virtual with a page in the country or local government websites.

Case studies

UK

- Community transport association in UK: http://www.ctauk.org/
- West Norfolk: http://www.wnct.co.uk/dial-a-bus.html
- Scotland AtoB Dial-a-Bus: Aberdeenshire, Scotland
  http://aberdeenshire.gov.uk/publictransport/a2bdialabus/index.asp
- Ring and Ride: Fife, Scotland:
  http://www.fifedirect.org.uk/topics/index.cfm?fuseaction=subject.display&subjectid=1122D 509-B5B9-4051-88CE-E6EE5D098D5B&themeid=568AF4CE-B036-4E67-93AB- 36B1E13DFA11
- Dial-a-bus: Highland, Scotland
  http://www.highland.gov.uk/yourenvironment/roadsandtransport/publictransport/dialabus
- Kent: http://www.compaid.org.uk/our-services/kent-karrier/
- West Sussex: http://www.bluebirdcommunitypartnership.co.uk/content/dialaride
- Devon: http://www.devon.gov.uk/community_transport

Germany

- Burgerbus: http://www.pro-buergerbus-nrw.de/

Austria

- Dorfmobil: http://www.ruraltransport.net/
  handbook/ARTS_HB_english.pdf?sprung1=handbook%2FARTS_HB_english.pdf
3.3 Demand responsive service dedicated to specific user groups

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Demand responsive transport (DRT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean of transport</strong></td>
<td>Minibuses and vans</td>
</tr>
</tbody>
</table>

**Description of the scheme**
Paratransit service is the general term for a "demand-response" service in which a passenger must reserve a ride in advance. Paratransit vehicles make only pre-arranged trips for riders who are eligible for the particular service.

**Planning features**

**Service design**
Paratransit is widely used and recognized in North America as it is within The Americans with Disability Act (ADA) of 1990 which requires municipal transit operators to accommodate disabled patrons. ADA paratransit services have become the fastest growing segment of public transit ridership costing the transit industry as much as $1 billion annually in operating funds. It is a specialized door to door transport service for people with disability who are not able to use FRT transportation. The person with disability usually has to make a telephone call to arrange for the service.
Paratransit is not to be confused with ambulance services, a transportation services utilized in the case of emergency.

**Catchment area.**
The size and scale of the paratransit scheme depends largely on the population size requirement and funds available.

**Responsibilities for funding operation**
Since paratransit services in most cases are subsidized by country or municipal agencies there is a strict eligibility criteria to qualify:
- Individuals unable to readily access regular FRT system due to physical or mental impairment.
- Individuals with physical or mental impairment who have access and are able to use FRT but is not available to them.
- Individuals with physical or mental impairment that prevents the person from travelling to a boarding location or disembarking location.

**Potential Barriers**
- In case of United States, any barrier needs to be surpassed since there is a legal requirement that demands the provision of the service. In Europe instead, this scheme will mainly find financial barriers, especially when long term sustainability is considered.
- The vehicles and equipment need regular and frequent maintenance.
- Required accessibility features make vehicles more expensive.

**Conditions for a successful implementation and operation**
The Americans with Disabilities Act (ADA) requires agencies providing transport to maintain in working order those features of facilities and vehicles necessary to make them accessible; e.g., elevators in train stations, wheelchair lifts and ramps on buses, accessibility-related signage, and many other features and equipment. Recently most vehicles have opted for low-floor rump buses instead of special vehicle lift as those tend to need more maintenance and
Different Local Authorities in the US have requirements for ADA Transit service, for instance, Sacramento District has the following conditions for FRT Paratransit: stop announcements, priority seating for riders who have difficulty standing while the vehicle is moving, lift equipped buses to assist riders who use wheelchairs or have difficulty getting up and down the bus steps, reserved wheelchair securement spaces on buses, boarding ramps at most light rail stations to assist passengers who have difficulty climbing steps, braille and raised-print signage posted at light rail stations to assist blind and visually impaired customers, detectable warning tile at light rail stations to assist visually impaired passengers in navigating the system.

**Impacts on travel behaviour**

- Reduced reliance on private cars with low occupancy.
- It provides a service to groups with special mobility needs, reducing at the same time the risk of their social exclusion.

**Advantages**

- Improved mobility allows for vulnerable (disabled, elderly) groups that may otherwise be marginalized improving their well-being and quality of life.
- Paratransit services are subsidized; the cost to the rider can be very low compared to using a commercial taxi.

**Disadvantages**

- The user will have to make reservations sometimes up to 2 days in advance which may is inconvenient for urgent matters.

**Communication channels with users**

How to arrange a trip (Specific to USA)
When one contacts a paratransit service through one of the methods outlined below, that person should specifically request information about such things as cost per trip, advance notice requirements, scheduling of return transportation, etc.

- Consult your local telephone book as they have a special section in the front of the book containing contact information for community service organizations.
- Contact your local transit authority or municipal bus service operator for referral to the complementary service they are required by the ADA to provide.

How to access information regarding the scheme (schedule and routes)

- Information on paratransit is normally widely available through announcements from the local government and authorities providing as per requirements of law governing provision of such services.

**Case studies**

- **USA** Paratransit services(USA)
  - Kansas: [http://www.kcata.org/about_kcata/entries/ada](http://www.kcata.org/about_kcata/entries/ada)

- **UK** Community transport (UK)
3.4 Share taxi

**Description of the scheme**
A share taxi is widely used and depending on the location and language and usage is called by different names: UK (Share taxi, TaxiPlus), Dolmush (Turkey), Jitney (America), Matatu (Kenya), Minibus Taxi (South Africa).

A share taxi is a service where different users who share the use of a vehicle for a whole or a part of a journey for a pre-determined or flexible route. Passengers pay a portion of the normal fare depending on the distance travelled. They have high modal share and fares are normally lower than the one of taxis for individual use.

The types of share taxi schemes operating in the Netherlands and Switzerland typically use a fleet of small vehicles to provide shared transport to passengers who pre-book. The service operates on a fixed route with a fixed time but as an alternative to when a conventional bus service is not running, however in some cases the service is door-to-door. The pre-booking time is typically an hour before and they operate in the evening or weekends and ticketing is integrated with conventional public transport.

**Planning features**

**Service design**
Depending on the system, users are picked up at pre-defined meeting points; some systems are quite flexible and pick up users along their pre-determined routes. Share taxis will typically combine two or three trips using a normal or large taxi vehicle.

Vehicles normally wait at the beginning of the route until most or all of its seats are filled (Turkey Travel Planner, 2014). In some regions the use of share taxi is predominant in cities and towns but also in nearby towns and villages. They have a terminal in cities or towns near other modes of transport such as trains and buses to allow for ease of use and inter-modality.

Share taxis in some European cities have specific software to plan journeys and pick-up points. In the UK, the Commission for Integrated Transport (CiIT) (the government's transport advisor), assessed Share Taxi all across UK and Europe as a viable option for rural transport in the UK. The share taxi schemes was christened ‘TaxiPlus’ services.

**Schedules**
Share taxis combine fixed schedules at transfer points with on-demand requests.

**Capacity**
It depends on the size of the vehicle used. It can vary from 4 to 12 people.

**Potential Barriers**
- These types of services are not adapted for people with special mobility needs since they offer a poor access for the old and disabled due to lack of access for wheelchair users.
### Conditions for a successful implementation and operation

- Integration with fixed transit systems regarding schedules and ticketing systems.

### Impacts on travel behaviour

- Less car ownership amongst low-income rural dwellers who are obliged to own a car even when they cannot afford to.
- Low income families have access to lower fares.

### Advantages

- Combination of trips by the operator will lower the price for each user.
- Flexibility and door-to-door aspect of the scheme is an advantage for all users.
- Long hours of operation and same day advance booking makes it easy for users.
- If share taxi is part of an integrated network, it allows rural travellers to plan and book door-to-door journeys with access to local facilities and connections to wider public transport network.
- Greater mobility to people who do not have access to private cars.
- High modal share leads to reduced carbon emissions from the use of better utilised small vehicles rather than conventional buses and private cars.
- Share taxis can combine fixed routes with on demand deviations request from the route to pick up or drop off people with walking difficulties.
- They offer a high flexibility that can be used to cover a high variety of routes.

### Disadvantages

- The share taxi industry in most countries is largely unregulated giving rise to a multitude of concerns for the users.
- Opposition from conventional taxi operators

### Communication channels with users

Users can contact a centralized centre to pre-book their trip and inquire on pricing, schedules and routes. The booking centre takes reservations over the phone or/and those made through the website.

Users have to phone in advance. The centre should have capability to store user’s information so they do not need to repeat details such as location, contact details and commonly used pickup points and destination.

Information regarding routes, schedules and fares can be accessed at the taxi-share terminal, by phone or internet or directly from the drivers and dispatchers.

### Case studies

- Turkey
- Netherlands
- USA
  [http://www.jitneyac.com/about.php](http://www.jitneyac.com/about.php)
- Canada
3.5 Demand responsive connector (DRC)

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Flexible transport systems (FTS)</th>
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</thead>
<tbody>
<tr>
<td>Mean of transport</td>
<td>Buses, minibuses and vans</td>
</tr>
</tbody>
</table>

**Description of the scheme**

DRC services operate in demand responsive mode within a zone, with one or more scheduled transfer points that connect with a fixed-route network. The DRC is an effective option when there are scattered origins but a common destination once connected with the fixed-route system.

Some variations on this scheme include the following:

- Service is provided between a transfer point and any safe address within a defined zone where fixed-route service is considered inappropriate or infeasible.
- Service is provided between a transfer point and defined drop-off points at home, and although drop-off points are defined drivers have the discretion to drop off passengers. Pick-ups are always made at passengers’ homes.

**Planning features**

**Service design**

- Vehicles operate in a clearly defined zone.
- Spontaneous boarding is limited to one or two points where the DRC service connects the flexible service to the fixed route network. Therefore they combine a fixed route and scheduled stations with spontaneous pick-up and drop off points.

To be picked up at a location away from fixed schedules stops, passengers must request services through a dispatcher or directly with a bus driver. The most common requirements are to request a pick up sometime the previous day or else sometime before within an hour before service.

In some cases subscription requests for demand–responsive boarding (standing order for the same trip on a repeated basis) are accepted. When it comes to alight, passenger might communicate their desired drop-off locations to the driver at the time of boarding.

**Catchment area**

Information about the size of the area it was not available.

**Schedules**

For demand-responsive connector services, the fixed schedule is typically limited to departure and arrival times at the transfer points.

Coordination with fixed-route services is very important as DRCs act as connectors to larger route fixed systems. There is also a potential for coordination with paratransit services for people with disabilities.
Flexible services are combined fixed schedules. DRCs include per every operating hour, some lay overtime at the transfer points.

In most cases demand responsive scheduling and dispatching are accomplished through some combination of telephone reservations, printed manifests, with list of reserved deviations, voice radios, and/or cell phones for changes or insertions on the day of operation and scheduling on the fly by drivers in response to on board requests.

**Potential barriers**

- Financial: these types of schemes usually charge more than conventional services, therefore higher prices than conventional services are expected.
- Limited accessibility to difficult areas for certain vehicles.
- Technological barriers: the potential capability of flexibility can be limited without state-of-art telematics.
- Service drivers need to have a good knowledge of the area where the service is provided.

**Conditions for a successful implementation and operation**

- Adopt innovative attributes: serving as a community agent of change, optimizing rural resources matching own funds with public funds, embracing technology, acting as a entrepreneurs (contact local business to support the commuting needs of their staff), provide an effective service through tailored needs and a detailed planning process.
- Service should have the acceptance of the community and to achieve the provided service should meet the following features: effective, well-managed service that operates clean and well maintained vehicles with professionally trained drivers.
- Include true innovations such as bus wraps, bicycle racks, flex routes, immediate response dial ride.

**Impacts on travel behaviour**

Can substitute car trips to park and ride facilities as users may use the connector system.

**Advantages**

- DRC can be benefited with synergies generated from the coordination with other transport schemes.

**Disadvantages**

- They need to be coordinated with the other services in order to reduce transfer times. This implies higher levels of planning.
- DRCs as a flexible transport service usually charge more than conventional services, due to extra charges for deviations.

**Communication channels with users**

Information about the service is usually included along with other rider information in bus books, and websites. Other methods used include specially designed brochures, presentations at service organizations and community meetings, appearances at special events such as community fairs, bus advertising, media releases, mailing, websites, information from drivers and word of mouth.

**Case studies**

- Scat bus in Sarasota (USA): https://www.scgov.net/SCAT/Pages/default.aspx
3.6 Route deviation services schemes

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Flexible transport services (FTS)</th>
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<tbody>
<tr>
<td>Mean of transport</td>
<td>Vans and minibuses</td>
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</table>

**Description of the scheme**

Vehicles under route deviation schemes operate on a regular schedule along a well-defined path, with or without marked bus stops and deviate to serve demand responsive requests within a zone around the path. The width or extent of the zone may be precisely established or flexible. There are cases in which the predefined route might get extended due to users’ needs.

A number of subtypes can be distinguished within this category:

- Deviations are incidental to a primarily fixed-route mode of operation, intended mainly for people with disabilities and older passengers who might otherwise need paratransit services (see 3.5).
- Deviations are an essential and prominent feature of the operation, so that separate paratransit service for people is not required or it is provided by means of the deviations.

**Planning features**

**Service design**

- Vehicles operate on a fixed route basis having off routes locations or areas that are covered on-demand basis.
- Boarding and alighting locations: Some fixed stops plus other on-demand locations.

**Catchment area**

Route deviation services usually have a formal policy about how far the vehicles will deviate from the route. However there is a great variation in how the maximum extent of deviation is defined. The extent of deviation can vary from 0.4 km and 2.5km.

**Schedules**

Flexible services combine fixed schedules with demand responsive requests. These services include per operating hour a variable time available for deviations.

**Cost effective operations**

Passengers per vehicle revenue hour (vrh) can be used as a measure of productivity and performance. In the literature there are examples of average reported productivity of route deviation services that varies from 14 to 20 passengers per hour.

**Potential barriers**

- Financial: these types of schemes usually charge more than conventional service.
- Access to funds is very limited.
- Geographical: limited accessibility to specific areas for certain vehicles.
- Technological barriers: the potential capability of flexibility can be limited without the state-of-art telematics.

**Conditions for a successful implementation and operation**

Adopt innovative attributes: serving as a community agent of change, optimizing rural resources.
matching own funds with public funds, embracing technology, acting as a entrepreneurs (contact local business to support the commuting needs of their staff), provide an effective service through tailored needs and a detailed planning process.

Service should have the acceptance of the community and to achieve that, the provided service should meet the following features effective, well-managed service that operate clean, well maintained vehicles with professionally trained drivers.

Include true innovations such as bus wraps, bicycle racks, flex routes, immediate response dial ride.

<table>
<thead>
<tr>
<th>Impacts on travel behaviour</th>
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<tbody>
<tr>
<td>Not identified</td>
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<table>
<thead>
<tr>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Route deviation services allow high flexibility regarding service design: flexible extent of deviation, allow spontaneous boarding at regular stops along the route.</td>
</tr>
<tr>
<td>• Route deviation schemes are suitable to be used by people with special mobility needs. Therefore, route deviation services can reduce or eliminate expenses of separate paratransit services for people with disabilities.</td>
</tr>
<tr>
<td>• Route deviation services can balance customer access and routing effectiveness.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Route deviation systems as flexible transport services usually charge more than conventional services, due to extra charges for deviations.</td>
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<table>
<thead>
<tr>
<th>Communication channels with users</th>
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<tbody>
<tr>
<td>Information about the service is usually included along with other rider information in bus books, and websites. Other methods used include specially designed brochures, presentations at service organizations and community meetings, appearances at special events such as community fairs, bus advertising, media releases, mailing, websites, information from drivers and word of mouth.</td>
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<thead>
<tr>
<th>Case studies</th>
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</thead>
<tbody>
<tr>
<td>USA</td>
</tr>
<tr>
<td>- Hornell area transit: <a href="http://www.hatrides.com/deviation.htm">http://www.hatrides.com/deviation.htm</a></td>
</tr>
<tr>
<td>- Potomac Valley Transit Authority: <a href="http://www.potomacvalleytransit.org/route-deviation-service/">http://www.potomacvalleytransit.org/route-deviation-service/</a></td>
</tr>
<tr>
<td>Austria</td>
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</tbody>
</table>
3.7 Bus rapid transit (BRT) (including all forms of conventional bus feeder systems)

<table>
<thead>
<tr>
<th>Description of the scheme</th>
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<tbody>
<tr>
<td>The bus rapid transit (BRT) system is a rapid mode of transportation that combines the quality of rail transit and the flexibility of buses. BRT is flexible rubber-tired transit mode that combines stations, vehicles services, running ways and intelligent transportation systems (ITS) elements with a strong positive image and identity.</td>
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<table>
<thead>
<tr>
<th>Planning features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Service design:</strong></td>
</tr>
<tr>
<td>• <strong>Running ways:</strong> Running ways for BRT include mixed traffic lanes, curb bus lanes, and median bus ways on city streets, reserved lanes on freeways; and bus-only roads and tunnels.</td>
</tr>
<tr>
<td>• <strong>Stations characteristics and features:</strong> include spacing, length, bypass capabilities, platform height, fare collection practices, and amenities.</td>
</tr>
<tr>
<td>• <strong>Intelligent Transportation Systems:</strong> such as automatic vehicle location systems (AVL), passenger information systems (e.g. automated station announcements on vehicles, real time information at stations), and traffic signal priorities.</td>
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</table>

<table>
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<tr>
<th>Responsibilities for funding and operation</th>
</tr>
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<tbody>
<tr>
<td>The $46.2 million project received $25 million in funds from the Federal Transit Administration’s (FTA) Very Small Starts Capital Investment Grant program, while the remaining $21.2 million was financed locally.</td>
</tr>
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<table>
<thead>
<tr>
<th>Potential Barriers</th>
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<tbody>
<tr>
<td>BRT works especially well in physically constrained environments where hills, tunnels, and water crossings result in frequent traffic congestion. However this might require a high upfront investment.</td>
</tr>
<tr>
<td>BRT require a high level of planning. Coordinated traffic engineering and transit service planning is essential in designing running ways, locating bus stops and turn lanes, applying traffic controls, and establishing traffic signal priorities for BRT.</td>
</tr>
<tr>
<td>Many roads in rural areas don’t have the capacity for having dedicated lanes for this type of schemes.</td>
</tr>
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<table>
<thead>
<tr>
<th>Information gaps</th>
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<tbody>
<tr>
<td>The use of BRT in rural areas is quite limited. BRT is been mainly used in urban settings, e.g Leeds and Runcorn in the UK or Rouen in France, USA, Australia, Canada, South America. But it recently started to be used to communicate rural areas. (See below the case study). Most of the information available regarding costs and the minimum demand required are based on urban settings.</td>
</tr>
</tbody>
</table>
### Conditions for a successful implementation and operation

- A BRT should be rapid. The best way to achieve is by operating on exclusive rights-of-way and by maintaining wide spacing between stations.
- BRT service should meet the ridership demand.
- Early and continuous community support from elected leaders is required.
- Public decision makers and the general community must understand the nature of BRT and its potential benefits. BRT’s customer attractiveness, operating flexibility, capacities, and costs should be clearly and objectively identified, usually through an alternatives analysis that considers other options as well.
- A close cooperation of transit service planners, city traffic engineers, urban planners, and police is required.
- Key attribute of rail transit should be transferred to BRT wherever possible. These include segregated or prioritized rights-of-way, attractive stations, off-vehicle fare collection, easily accessible multi-door vehicles, and a clean, frequent, rapid service.
- BRT and land use planning in station areas should be integrated as early as possible.
- Parking facilities should complement BRT.
- Regarding vehicles design, they should be distinctively designed and delineated, and provide sufficient passenger capacity, multiple doors and low-floors for easy passenger access, and ample interior circulation space.
- Stations should be accessible by bus, car, and/or foot; provide adequate berthing capacity, passing lanes for express buses (or bus ways), and suitable amenities for passengers.
- Off-vehicle fare collection is desirable. Multiple means of payment, such as smart cards should be considered.

### Impacts on travel behaviour

BRT systems contribute to enhance the use of public transport by reducing travel time. Some studies carried out in the USA state that the reduction can go from 23% to 47%.

#### Advantages

BRT systems offer lower development costs and greater operating flexibility as compared with rail transit. These systems – largely as a result of faster journey times – have resulted in lower operating costs, less fuel consumption, greater safety, and land development.

BRT have even been cited as a catalyst for redevelopment.

#### Disadvantages

This scheme is not been used in rural areas as of today, so there is not much information available about its extent of success.

### Useful information for users

Information regarding schedules and routes can be found at the bus stops and on websites. WI-FI is provided at the bus stops.

Applications for smartphones are available for users to check when is the following service, offering the possibility of track the buses moving on a map.

BRT is been widely used in urban areas. However, the first rural bus rapid transit, called VelociRFTA ([http://www.rfta.com/velociRFTA.html](http://www.rfta.com/velociRFTA.html)) opened in September 2013 in the Roaring Forks Valley region of Colorado (USA). This BRT system will link the commuters in the Glenwood Springs area to travel about 40 miles to Aspen in an hour, half of the travel time of a traditional bus.

The BRT system features nine bus stations with plenty of parking for commuters. The buses are spaced ten minutes apart during peak hours, and they travel in mixed traffic with designated bus lanes and timed traffic lights.
3.8 Park & Ride

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Mean of transport</th>
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<tr>
<td>Individual motorized transport systems</td>
<td>Cars</td>
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</table>

Description of the scheme

Park-and-ride (or incentive parking) facilities are car parks with connections to public transport that allow commuters and other people headed to city centres to leave their vehicles and transfer to a bus, rail system (rapid transit, light rail, or commuter rail), or carpool for the remainder of the journey. The vehicle is stored in the car park during the day and retrieved when the owner returns.

Planning features

Service design

The P&R concept can be disaggregated into its three main constituent elements:

- Public Transport Access
- Through P&R schemes motorists can access to both private and public transport to be utilised. The flexibility benefits of private transport mean that P&R can be accessed by passengers from dispersed origins such as low density suburban areas.
- Planned Service
- P&R provides the intentional or planned integration of private and public modes, since purpose-built facilities can be found near to a public transport service. In some cases the P&R site provides a dedicated bus as a link mode between the transfer facility and the destination.
- Private Transport Mode Terminal
- A P&R scheme is accessed by a private transport mode and provides a terminal for vehicles. The design of the P&R site is central to the experience of users and to schemes’ popularity. This includes waiting areas, timetable information and overall landscaping of the site. The P&R site needs to be designed in a way that the time spent by users in the interchange process is minimised.

In same cities, Park&Ride schemes live together with Park & Pedal Schemes. In those cases Park and Ride sites count with facilities where bikes can be safely stored using secure cycle lockers (see 3.13)

Catchment area

Park-and-rides are generally located in the suburbs of metropolitan areas or on the outer edges of large cities.

Potential Barriers

- Selecting the appropriate location for the development of a P&R site, since it finds quite often public opposition due to increase of traffic accessing the P&R site and the associated local air pollution, noise and road safety implications.

Conditions for a successful implementation and operation

- P&R must be part of an overall travel and parking strategy
- P&R should not lead to increased car mileage.
- P&R services may be linked to dedicated buses or to rail services.
- P&R should provide secure parking (CCTV systems, appropriate lightening and on-site...
security staff).
- P&R can offer time savings to users, in terms of both journey time and search time for car parking.
- A carefully developed marketing and publicity strategy is required to sell the potential benefits to interest groups and potential users both at the planning stage of schemes to ease the implementation process and when the scheme is launched to attract patronage.

<table>
<thead>
<tr>
<th>Impacts on travel behaviour</th>
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<tbody>
<tr>
<td>Persuade motorists to transfer to public transport for part of their journey.</td>
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<table>
<thead>
<tr>
<th>Advantages</th>
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<tbody>
<tr>
<td>Park and Ride schemes can potentially reduce congestion on urban roads and reduce the requirement for parking in central locations.</td>
</tr>
<tr>
<td>P&amp;R contribute to improve accessibility to centres of cities that host this type of schemes and at the same time release land otherwise would be used for car parking.</td>
</tr>
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<table>
<thead>
<tr>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Abstraction of users of traditional public transport services.</td>
</tr>
<tr>
<td>Generation of new trips and diversion of trips from elsewhere.</td>
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<table>
<thead>
<tr>
<th>Case studies</th>
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</thead>
<tbody>
<tr>
<td>Northern Ireland: <a href="http://www.translink.co.uk/Services/Other-Translink-Services/Park--Ride/Park--Ride-FAQs/">http://www.translink.co.uk/Services/Other-Translink-Services/Park--Ride/Park--Ride-FAQs/</a></td>
</tr>
<tr>
<td>Oxford: <a href="http://www.oxford.gov.uk/PageRender/decTS/Park_and_Ride_occw.htm">http://www.oxford.gov.uk/PageRender/decTS/Park_and_Ride_occw.htm</a></td>
</tr>
<tr>
<td>York: <a href="http://www.york.gov.uk/info/200237/park_and_ride/367/park_and_ride">http://www.york.gov.uk/info/200237/park_and_ride/367/park_and_ride</a></td>
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<tr>
<th>Park &amp; pedal examples:</th>
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<tbody>
<tr>
<td>York: users can cycle to any Park&amp;Ride site around the city, park their bikes and then hop onto one of Park&amp;Ride bus services into the city.</td>
</tr>
</tbody>
</table>
3.9 Car sharing

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Individual motorized transport systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean of transport</td>
<td>Cars, e-cars</td>
</tr>
</tbody>
</table>

**Description of the scheme**

Car sharing (US) or car clubs (UK) is a model of car rental where people rent cars for short periods of time, often by the hour. They are attractive to customers who make only occasional use of a vehicle, as well as others who would like occasional access to a vehicle of a different type than they use day-to-day. The organization renting the cars may be a commercial business or the users may be organized as a company, public agency, cooperative, or *ad hoc* grouping.

**Planning features**

**Elektro car sharing in rural areas in Austria.**

The “Gaubitscher Stromgleiter” (power glider) is an example of a sharing cars scheme developed in Gaubitsch (Austria). The municipality has purchased a “municipality second car” – a car placed on a central parking position.

For a yearly membership fee of 99 Euro, individuals can use the e-car for only 10cent/Km (cost covering for electricity maintenance and insurance). The battery range is around 130 km. In the first year, the "Stromgleiter" has clocked 22,000 km and thus saved 2.8 tons CO2. The e-car is currently shared by 29 users.

The government of Lower Austria is increasingly supporting peer-to-peer e-car sharing on a greater scale. The government realized that intelligent mobility solutions can significantly contribute to climate and environmental protection. Therefore e-car sharing projects are supported with funds to be able to purchase car sharing technology such as on-board units and reservation software. Additionally, consulting and workshops are offered to interested municipalities.


**MODO a not for profit Car sharing cooperative in Canada.**

This scheme was born in 1997 and promotes the benefits of sharing cars over individual ownership. With currently nearly 10,000 members, this scheme gives the user access to a variety of vehicles (from hatchbacks and hybrids to cargo vans and trucks) at over 300+ locations. The membership fees cover gas insurance, parking permits maintenance, car cleaning and some bridge tolls. Two different types of membership are available: co-op membership and a casual membership.

Modo has roaming agreements with several car sharing organizations (CSOs) around the world. That means that you can car-share in other cities easily because of your Modo membership. When you want to roam with a CSO listed below, Modo will contact that CSO to let them know you are a Modo member in good standing: namely, you meet our driving standards and generally pay your bills on time.

More information is available in [http://www.modo.coop/](http://www.modo.coop/)

**Mobil.punkt- CarSharing in Bremen**

This innovative service gives a car at the disposal for the customer, which reduces the dependence on a private car. Car Sharing started in Bremen in 1990 and reached about 3800
users in summer 2006. The fleet is now around 200 cars. These are parked at 50 stations in the city. About 900 private cars have been replaced by Car-sharing. Currently, this scheme provides a service to 8,600 clients.

Bremen Car-Sharing initiative is mainly innovative for its integration with other modes and into urban development, which was a key element for the success of the scheme. Besides, the model is transferable with some work and political support. The initiative also proposes a “car-on-call” service that can substitute the private car, which is a step towards less car dependence.

In first place the city of Bremen carried out two pilot projects of on-street Car-sharing station in 2003, representing a combination of a car-sharing-station on public street space with adjacent Public transport stop, with cycling and also taxi.

The stations (“mobil.punkt”) are located in densely built urban areas in the inner city. Both pilot stations have 5 parking-bays exclusively reserved for Car-Sharing plus bike racks for 10 bikes. The “mobil.punkt” reduces parking traffic and offers information and services for alternative modes.

More information is available at http://mobilpunkt-bremen.de/index.php?/English.html

Potential Barriers

- Social barriers: some people might be reluctant to share their car with other users in the long term.
- Financial barriers: local authorities might need to make high upfront investment to firstly implement the scheme in their cities.

Conditions for a successful implementation and operation

- These schemes need to be integrated with other modes of public transportation.
- It is very important obtain the support the potential users of the scheme and involve them in its design.
- Effectiveness depends on the availability of appropriate incentives (HOV, subsidies, free parking, etc...).

Impacts on travel behaviour

- Car Sharing users reduce their car kilometres travelled and each Car Sharing vehicle replace several private passenger cars. In Munich (MOMO Project data) car-sharing schemes produced:
  - 59% in km travelled by car per year (before and after joining a Car Sharing service).
  - every Car-Sharing vehicle replaces 4 to 8 private passenger cars
  - 2,900 private passenger cars.
- Savings in fuel consumption and pollutant emissions are expected because the Car-sharing vehicles are typically newer than private vehicles and with better engine technology, improved fuel efficiency and lower emission levels. In Germany 104,023 t CO2 emission saved by Car Sharing customers in 2011 (MOMO Project data).

Car Sharing reduces private car ownership and use per capita and encourages public transport, walking, cycling. In Italy, according to the results of a national survey involving 12,000 Car-Sharing customers, after joining the service the average user travelled by car 3,000 km less per year, choosing other modes (PT, bicycle, walking) more frequently.

Advantages

- The pay-as-you-drive principle and related reduction of car-borne mileage (shift to public transport, rail, cycling and intermodal chains) and the availability of a variety of low-emission cars lead to a reduction of emission and noise.
- Car-sharing scheme facilitate access to cars for low-income families.
- Car-sharing provides consumer savings in terms of fuel.
- Reduces peak period automobile travel (daily commuting trips to work).
## Disadvantages

- The number of drop off / pick up point is limited and again need to be accessed (similar to the bus stop).

## Communication channels with users

Every scheme counts with a specific website where instructions about how to get involve with the scheme. In many cases websites provide direct contact telephone number.
3.10 Car-Pooling

Carpooling is the sharing of car journeys so that more than one person travels in a car. The car is usually owned by the driver itself, who gives a lift to other passengers he/she may know or not. Carpooling schemes thus matching services that bring people together who are travelling in the same direction, aiming to encourage individuals to share private vehicles for particular journeys. They use advanced technologies e.g. matching software, the internet (see case studies section below), applications for smartphones (Uber: https://www.uber.com/) and optional call centres for trip matching, increase the potential to reach the necessary critical mass of users, targeting as a main group commuters in urban agglomerations and the surrounding regions, but also improving mobility options for other trip purposes and areas.

Planning features

Service design
Some innovative ridesharing programs have been proposed to encourage motorists to share rides for individual trips, creating a cross between hitchhiking and taxi service. Some involve pre-registering motorists and riders to increase security, and establishing standard reimbursement rates.

The increasing diffusion of internet, smart phones and social networks are giving new chances to carpooling schemes.

Responsibilities for funding and operation
Carpooling programs costs consist primarily of administration and marketing expenses. They can be implemented by businesses, Transportation Management Associations and other business organizations, local and regional governments. Regional programs are best, because they create a larger pool of potential users than ride matching at a worksite or local level.

Carpooling programs can be implemented by an individual employer as part of a Commute Trip Reduction program, by a Transportation Management Association or a Campus Trip Management program, a transit agency, or by a regional transportation agency.

Potential Barriers

- Rideshare programs require sufficient funding to provide efficient matching services.
- Effectiveness depends on appropriate incentives (HOV facilities, financial subsidies, parking management) and solid marketing efforts (to inform potential rideshares about this option).

Conditions for a successful implementation and operation

- Effective promotion programs are required to encourage a significant portion of potential users.
- Implementation of incentives such as high occupancy lanes or preferred parking spaces.
- Carpooling services need to be flexible in order to deal with en-route stops or changes to working times and patterns. To counter this some schemes offer 'guaranteed ride home' arrangement with a local taxi company.
- It should be reliable and secure.

**Impacts on travel behaviour**
- Experience indicates that ridesharing programs typically attract 5-15% of commute trips, if they offer only information and encouragement, and 10-30% if they also offer financial incentives such as parking cash out or vanpool subsidies.

**Advantages**
- Carpooling is one of the most common and cost effective alternative modes as it tends to experience economies of scale: as more people use the service, the chances of finding a suitable carpool or vanpool increase significantly. In fact carpooling has minimal incremental costs because it makes use of vehicle seats that would otherwise be unoccupied. It tends to have lower costs per vehicle-mile than public transit because it does not require a paid driver and avoids empty backhauls.
- Carpooling can reduce peak-period vehicle trips and increase commuters travel choices.
- It reduces congestion, road and parking facility costs, crash-risk and pollution emissions.
- Carpooling tends to have the lowest cost per passenger-mile of any motorized mode of transportation, since it makes use of a vehicle seat that would otherwise be empty.
- Carpooling provides consumer financial savings and time savings if there are HOV and priority parking facilities.
- Carpooling programs improve transportation options, and are particularly helpful to commuters who cannot drive or lack a reliable automobile.
- Carpooling might encourage urban sprawl by making longer-distance commutes more affordable.

**Disadvantages**
- Carpooling programs might include:
  - Additional travel and time to meet rideshare partners.
  - Schedule constraints needed to match commuting times.
  - Loss of privacy.
  - Restrictions on stops for errands.

**Case studies**
- The Smart Trip Reduction Manual by Pollution Probe (2001) provides information on calculating the benefits of ridesharing to employers and employees: [http://www.carpool.ca/Includes/Documents/SMComplete.pdf](http://www.carpool.ca/Includes/Documents/SMComplete.pdf)
- **UK**: [https://www.liftshare.com/uk/](https://www.liftshare.com/uk/)
- **Germany**: Pendlernetz NRW: The Bürgerservice Pendlernetz NRW (commuters’ network for citizens) is a web-based matching service for lift-sharing which is available in more than 165 municipalities in the Federal State of North Rhine-Westphalia, Germany. The catchment area of the service has 7.2 million inhabitants, 2.2 million of whom are commuters. Currently there are 8,000-9,000 lift-share offers and requests online daily. Pendlernetz is open to all. The main target group is commuters, but people with other trip purposes also show interest in the service. [http://pendlernetz.de/](http://pendlernetz.de/)
3.11 Bike sharing

A bicycle sharing system, or bike share scheme, is a service in which bicycles are made available for share use to individuals on a very short term basis. The main purpose is transportation: bike sharing schemes allow people to depart from point "A" and arrive at point "B" free from the worries of ownership.

**Planning features**

**Funding responsibility**
There are different models of provision:
- Governmental Model, which are funded through public funds.
- Quasigovernmental organization.
- Transport -University model, usually provided within the campus boundaries (ex. University of Portsmouth, UK)
- Non-profit (ex Bycyklen in Copenhagen, Denmark)
- Advertising company (ex. JCDecaux's Cyclocity®)
- For-profit (ex. Nextbike).

However, data shows that most of the big-share programs are, in whole or in part, supported financially by local authorities

**Potential barriers**
- People with physical limitations would be left out from the services unless the scheme provides e-bikes or pedelecs.
- Vandalism or bicycles theft may disincentive certain users and decision makers.
- Topography (Hilly cities are not suitable for this type of schemes).
- Climate matter extreme temperature and precipitation, data suggests a significant decline cycle usage when cold (<5 C) or when hot and humid (>28C and >60% humidity).
- Safety concerns: cyclists are more prone to accidents in mixed traffic conditions. Furthermore, from a commuter’s point of view safety plays a key role in making cycling a credible choice as a transport mode. As the level of safety improves, more commuters will choose to cycle.
- It is important to underline that most of the bike-sharing schemes have been designed to be used in urban areas. Thus, there are not many examples of bicycle-sharing schemes in rural areas.

**Conditions for a successful implementation and operation**
- Systems to avoid unauthorised removal.
- Minimum standard of bicycle infrastructures.
- Sufficient resources to achieve a real impact.
- Good bicycle parking at transit stations have been shown to encourage the usage of
bikes as a last mile transportation.

- City governments should invest directly in cycling infrastructure to create an environment where cycling is an alternative commuting option. When that happens, individuals can buy and use their own bicycles, thus rendering bike share systems non-essential.

<table>
<thead>
<tr>
<th>Impacts on travel behaviour</th>
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</thead>
<tbody>
<tr>
<td>Cycle can encourage modal shift from private car to public transport by providing efficient last mile connections. Around 20% of transit users use cycling as a last a mile mode in Tokyo.</td>
</tr>
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<table>
<thead>
<tr>
<th>Advantages</th>
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<tbody>
<tr>
<td>Bicycles are one of the most sustainable and efficient transportation modes for trips of distance up to 5 km.</td>
</tr>
<tr>
<td>Creating a large cycling population.</td>
</tr>
<tr>
<td>Reduce greenhouse gases</td>
</tr>
<tr>
<td>Improving public health.</td>
</tr>
<tr>
<td>Bike-sharing schemes allow commuters to save the cost of owning and maintaining a bike.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Bike-sharing programs have not shown to be economically sustainable. In the long-run continued support of these bike-sharing projects using public funds may reduce resources available to improve and maintain the cycling safety and parking infrastructure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Useful information for users</th>
</tr>
</thead>
<tbody>
<tr>
<td>All bike sharing schemes have a specific web platform where information regarding the requirements to obtain access to the system can be provided. Information can be also found at bicycles stations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folding bike sharing <a href="http://www.bromptondock.co.uk/">http://www.bromptondock.co.uk/</a></td>
</tr>
<tr>
<td>University bike sharing model in Portsmouth <a href="http://www.port.ac.uk/departments/services/estates/campusenvironment/transportation/bikesafe/">http://www.port.ac.uk/departments/services/estates/campusenvironment/transportation/bikesafe/</a></td>
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</table>
3.12 Intermodal transit scheme (bicycles/pedelecs combined with buses or trains)

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Mean of transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual transport system (pedelecs) combined with a fixed route transport (FRT).</td>
<td>Environmental Friendly Buses and pedelecs</td>
</tr>
</tbody>
</table>

### Description of the scheme

An exceptional example of intermodal schemes is INMOD. This is a feeder system initiated by the Competence Center Country mobility of Hochschule Wismar. This intermodal feeder system combines environmental friendly bus with rental pedelecs. It is thought for rural areas, to connect villages with the main city.

Although INMOD uses pedelecs, electric bicycles can be, depending on the specific circumstances, substituted by bikes.

From their home town users can take a pedelc, a human-electric hybrid bicycle that allows pedalling and thanks to its powered electric motor can be used in hilly areas. The INMOD pedelecs are able to achieve 25 km/h and have a battery suitable for 60 km.

#### Planning features

**Service design**

At the bus stop users are able, with their INMOD card to take or replace pedelecs from the "boxes" where they are safely stored from weather conditions, vandalism and theft. During the time that pedelecs are stored, their batteries are charging. Bus stops are placed at a maximum of 15 minutes by pedelc from each village.

The INMOD scheme is equipped with three buses for three different routes. Two of these are hybrid buses, and the latest is an electric bus.

One ticket costs 1,70€ and allows to rent a pedelec from the home village and to catch a bus, after having left the pedelec at the pedelecs station.

**Schedules**

The bus follows a fixed route planned to be reached within 15 minutes by pedelec from every village considered.

**Catchment area**

It serves a rural area of Mecklenburg-Vorpommern, in northern Germany.

#### Potential Barriers

- **Financial:** this scheme requires important upfront investments for purchasing pedelecs, water and vandalism proof systems, or solar recharging units.
- **Social:** a behavioural change is needed to enhance pedelecs use among potential users.

#### Conditions for a successful implementation and operation

- Every bus stop should be equipped with water and vandalism proof looked system for pedelecs. Storage system needs a recharging system that could be equipped with solar power and a save energy timer.
INMOD has the potential for financial sustainability in the long term since it might attract a wide variety of users.

### Impacts on travel behaviour

There are no data available yet

#### Advantages

- Pedelecs can increase the level of acceptance in comparison to bikes. They are light enough to allow easy pedalling but have a strong motor to help pedalling in hilly areas and are suitable also for limited physical power people; travel distance capabilities of pedelecs is 9.8km (50% more than bicycle).
- Pedelecs reduce traveling time in comparison to bikes. They can also increase the catchment area of the scheme.
- Pedelecs allows a big saving because has low energy cost per distance and does not need any insurance or licences.

#### Disadvantages

- Pedelecs require higher upfront investment in comparison to bicycles.
- Pedelecs might not be suitable to everybody due to its weight. They might be too heavy for certain users.

#### Communication channels with users

On the INMOD website all the information required for users to arrange a trip is available; moreover there is an app for smartphones that allows checking up buses schedules, routes and pedelecs stations location. Every user needs an INMOD-card with a costumer number that provides access to pedelecs boxes and buses. More information is available at http://www.inmod.de/

#### Cases studies

Other examples of intermodality that combine the use of bicycles and train are:

- Bike and go (UK): is an ingenious new scheme that lets users hire a bike from participating train stations and continue their journey cycling: http://www.bikeandgo.co.uk/

- Call a bike (Germany): this scheme allows users to complete the last mile of their trip by hiring a bicycle at the train station to conclude their trip: http://www.eltis.org/index.php?id=13&study_id=198

Bitibi (bike train bike): this is project funded by the European Commission that promotes the combined use of bicycles and trains. There are 4 pilot regions: Barcelona, Liverpool, Milan and Louvain: http://bitibi.eu/projects.html#all

Another way of promoting transport intermodality is though the incorporation of bike racks to public bus. For instance Lucketts a company in Portsmouth (UK) have fitted bike racks in three buses, allowing users to strap their bikes to the bus: http://www.coachtours.co.uk/news/lucketts-racks-up-another-specialist-service?id=178
3.13 Bike & ride or Park & Pedal

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Individual non-motorised transport systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean of transport</td>
<td>Bicycle, pedelecs</td>
</tr>
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</table>

**Scheme concept**

Users can cycle for the first mile of their trips until the parking lots where they can safely lock their bicycles and continue their trip to the city centre taking the fixed route bus services offered at the bike & ride terminal.

In many cases park and ride facilities dedicate some space for bicycles parks. Cities such as York (UK) offer secure lockers (see picture above).

**Planning features**

**Service design**

Taking the example of the city of York, bicycle lockers have been installed in 5 Park and ride sites. Users can simply cycle to one of the sites that are located in shopping areas and at the outskirts of the city, and securely store their bikes at a Park & Ride. All Park& Ride sites are covered by 24-hour CCTV surveillance.

Users have to pay a one off refundable deposit (£15) and then choose whether to pay monthly (£10) or annually (£100).

**Potential barriers**

- Park and Pedal schemes might face the same barriers as Park and Ride sites do, as long as both schemes share location. But Park&Pedal sites shouldn't face them individually since bicycles don't have associated any issues regarding air pollution or noise in contrast to cars.

**Conditions for a successful implementation and operation**

Pedal and ride should:

- be part of an overall travel and parking strategy
- be linked to dedicated buses or to rail services.
- provide secure parking (CCTV systems, appropriate lightening and on-site security staff).
- be able to offer time savings to users, in terms of both journey time and search time for car parking.

A carefully developed marketing and publicity strategy is required to sell the potential benefits to interest groups and potential users both at the planning stage of schemes to ease the implementation process and when the scheme is launched to attract patronage.

**Impacts on travel behaviour**

- Pedal & Ride enhance the use of bicycles against private cars.

**Advantages**

- Pedal &Ride can enhance the beneficial effects of Park&Ride by promoting the use of bicycles, much more sustainable than cars. Pedal & Ride schemes might able to reduce the congestion on urban roads as well as the requirements of parking in central locations.
- Pedal & Ride contributes to improve accessibility to centres of cities that host this type of...
schemes and at the same time release land otherwise would be used for car parking

**Disadvantages**

Pedal and ride schemes don’t face any the disadvantages that Park& Ride do (see fact sheet 3.8)

**Case studies**

- **York**
3.14 Footpaths for non-motorized modes of transportation

**Scheme concept**
Greenways are a footpath network for non-motorized modes of transportation. It is a big network which connects cities, rural areas and countries. Usually it affects natural or pre-existing corridors (railroad, river beds). It offers different benefits that can be grouped in three different categories: ecological, recreational, and educational. Greenways are suitable for bicycles, walking and riding transportation means.

**Planning features**

<table>
<thead>
<tr>
<th>Type of transport system</th>
<th>Mean of transport</th>
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</thead>
<tbody>
<tr>
<td>Individual non-motorised transport systems</td>
<td>Bicycle, pedelecs, and walking,</td>
</tr>
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</table>

**Service design**
An example is the footpaths network that has been developed in the region of Zeeland in The Netherlands ([http://routes.vvvzeeland.nl/en/walking/the-walking-network](http://routes.vvvzeeland.nl/en/walking/the-walking-network)), where 1,500 kilometres of footpaths have been developed to enhance the walking experience in the region. It consists of seven networks spread out through the province that are interlined wherever possible.

The footpaths have been selected according to safety requirements, attractiveness and the diversity of paved and unpaved paths as well as facilities and places interest along the way. Wherever the footpaths and roads intersect numbered signposts have been put up. The signposts have been put up at crossroads, forks in the road and junctions and have arrows on them pointing in the direction of the next intersection. The numbers on the boards refer to the number of the next intersection. The signposts are double-sided so it doesn’t matter which direction you end up coming from.

**Catchment area**
As far as The Walking Network is concerned, 1,500 kilometres spread out in Networks on Walcheren, noord-Beveland, Zuid Beveland and Zeeuws-Vlaanderen.

**Responsibilities for funding and operation**
- Public-corporate partnerships.
- Local funds
- Volunteer Labour

**Potential barriers**
- Quality of soil: some soil is more suitable for trails than others.
- Safety concerns: paths need to be well-lit.
- This feeder system would not be suitable for people with physical limitations unless they are equipped with their own means of facilitation.

**Conditions for a successful implementation and operation**
- Active involvement and support of the local community in the conceptual planning, physical design and long-term care and monitoring of these greenways systems is required. A way to do that would be through surveys or with community planners.
- To make suitable the use of Greenways, planners have to take into consideration safe community principals: to make people feel safe. They should be able to recognize strangers and to be seen from others (drivers), a proper lighten system is one of the
most important toll for a useful Greenway.

- It would be preferable to develop this kind of paths in areas threatened by urban development so they could be protected.

### Impacts on travel behaviour

- Greenways enhance the mobility of dwellers and tourists using non-motorized modes of transport.
- It also improves neighbourhood accessibility.

### Advantages

“Greenways” is a multipurpose tool; it protects natural environment through reduced runoff and bio purification, moreover it provides ecological education and recreation to local dwellers and tourists.

### Disadvantages

In some locations wildlife can be affected by the construction this type of footpaths.

### Useful information for users

Each scheme count with a website where all information regarding paths location and design is displayed. In some cases, schemes have contact information telephone numbers that users can use to report about any issues.

### Case studies

**VenTo**

VenTo is the feasibility project of the longest cycle path in Italy: 632 km (422 miles) from Turin to Venice, from the Alps to the Adriatic sea. It is a 632 km green way which connects two important Italian cities Turin and Venice along Po river. VenTo is also linked to Milan and the EXPO area (+ 47 km), through Leonard's canal (Naviglio Pavese is strategically connected with public means as trains).

[http://www.project.vento.polimi.it/](http://www.project.vento.polimi.it/)

**San Sebastian Mobility plan**

During the year 1995-2000 the city of San Sebastian experienced an opening of three important pedestrian axles in the city centre, which interconnects activity areas and public transport terminals as well as the construction of a long pedestrian-cycling access to the three beaches from the centre and all peripheral districts. From 2000 onwards the network of pedestrian and cycling facilities was extended to the entire city. District centres were optimised for pedestrians and some hilly parts of town were connected by means of elevators and escalators. In 2006 a plan for vertical transport was issued, aiming at the extension of the pedestrian and cycling network to the upper city. The case of San Sebastian can provide interesting insights on how to build a long-term planning strategy for neighbourhood accessibility.


**The Slow Traffic” Approach in Switzerland**

The federal government provides strategies, legislation, standards, concepts and guidelines on non-motorised transport.

Funding for the agglomeration programme of the federal government can only be obtained for integrated approaches which also include measures on non-motorised transport. The 26 Cantons (regional level) are elaborating cantonal transport plans which also consider walking and cycling networks. Cantons also provide part of the funding for many measures in the area of “slow traffic”. The local authorities finally are in charge of planning and implementing local and regional pedestrian and cycling networks and to improve the connection with other transport modes and the identification of safety.

[www.langsamverkehr.ch](http://www.langsamverkehr.ch)
3.15 Walking (‘‘Pedibus’’) or biking together

**Type of transport system**
- Individual non-motorised transport systems

**Mean of transport**
- Walking, bicycles

**Description of the scheme**
The Pedibus project was designed to cover short distance (home-school) by walking instead of being driven by car.

**Planning features**

**Service design**
The Pedibus scheme in Riccione is based on 3 lines and initially has involved more than 70 children of the primary school ‘‘Fontanelle’’. 20 adults have been involved on voluntary basis; 2-3 of them will accompany the children to school. The service is organised like a public bus, with stops, timetables etc. Parents and/or children on walking buses are encouraged to wear brightly coloured jackets or waistcoats.

**Catchment area**
 Normally a Pedibus scheme is organised with students that attend to the same school. The catchment area normally covers neighbourhoods located close to the school in question.

**Responsibilities for funding and operation**
In case of Riccione, the budget was equal to 3,000 euros, financed by European, national and local funds.

**Potential Barriers**
- The fear of parents concerning the safety of their children whilst going to the school along trafficked roads.
- Identify a sufficient number of adults to supervise walkers.

**Information gaps**
- Not identified

**Conditions for a successful implementation and operation**
- The key components of the practice are the prevailing desire of children to walk to school (instead of car), the willingness of the great majority of families to trust their children to other adults to accompany them to school, the willingness of 20 adults to assist the project and, last but not least, the strong will of the Municipality of Riccione (first of all by its Municipal Police) to promote and support the project.
- Strong determination of multiple stakeholders: parents, local NGOs, school’s direction and municipality.
- This scheme has a high transferability.

**Impacts on travel behaviour**
- Pedibus is expected to reduce car traffic around the schools, reduce pollution, noise and CO2 emissions as well as promote more active mobility and hence healthier life styles

**Advantages**
- Improve personal health
- Contributes to protect the environment by reducing the CO2 emissions produced by cars.
- It is an important social innovation: children and adults have the opportunity to rediscover the city, increase their autonomy and self-esteem, improve their personal health as consequence of more physical activity and, last but not least, enhance the human social interactions (they go to school in groups).

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>Not identified</th>
</tr>
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</table>

**Case studies**

- **Italy**
  - Riccione: [http://urbact.eu/fileadmin/Projects/Active_Travel_Network/documents_media/ATN_Casestudy_Riccione_Pedibus_01.pdf](http://urbact.eu/fileadmin/Projects/Active_Travel_Network/documents_media/ATN_Casestudy_Riccione_Pedibus_01.pdf)
  - Loano: [http://www.comuneloano.it/files/PEDIBUS/comunicato%20stampa%204-3%20loano%20PEDIBUS.pdf](http://www.comuneloano.it/files/PEDIBUS/comunicato%20stampa%204-3%20loano%20PEDIBUS.pdf)

- **France**

- **USA**
  - The American Walking School Bus organization provides online resources in the following link: [http://www.walkingschoolbus.org/resources.html](http://www.walkingschoolbus.org/resources.html)
4 References


