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Cleaner and better transport in cities

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Cluster Report 7: Public Transport

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1 Introduction

Public transport measures are at the heart of the sustainability programme pursued in CIVITAS. Many of the other measures, particularly in traffic reduction, credit their success in part to the achievements of the public transport improvements.

With 55 measures in total, the share of measures on Public Transport (PT) in CIVITAS II is higher than in the previous CIVITAS I program. Of these, 15 are situated in new member states.

The 55 measures cover a broad spectrum. In order to structure the cross-site evaluation, subsets of comparable measures have been created. Infrastructure measures (8) have been implemented to improve the position of Public Transport in the city. A second group of 9 technical speeding up measures is treated in the report on Traffic Management and Control, as these measures do also relate to other modes.
A group of 9 measures concerns network and service design and varies from an overall network redesign to the creation of specific services.

The remaining 4 subsets have regard to topics that are "hot" in the present days:
- Public Transport information (14 measures)
- Public Transport ticketing (7 measures)
- Public Transport accessibility (4 measures)
- Safety and security of public transport (4 measures)

The 46 measures included in the 6 subsets in this report are outlined in the following set of tables. Much more detail and content are provided in the individual measure project reports.

Table 1.1: Public Transport information measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Burgos	12.02	Infomobility tools	Promotion of sustainable transport though electronic displays (parking panels, information panels, web site, touch screens, bus stops shelters)	1	2
Genoa	12.01	Intermodal infomobility platform	Traffic and travel information, real time and mode-specific, with special services for disabled users	2	1
Krakow	12.03	Intermodal infomobility platform	Web based origin-destination trip adviser with environmental impact measure for trip options	2	
La Rochelle	12.03	Real time information systems	Real time information at the bus station, bus stops and via SMS	3	3
Malmö	8.01	Marketing of new bus route system	Campaigns, signs, events, information and staff training to promote new "main lines" bus network	2	2
Malmö	12.01	Use of real time applications for travellers	Real time bus information at bus stops, shopping centres and strategic locations	2	2
Malmö	12.03	Mobile internet services in connection to bus information	Bus timetables, maps and departure point information plus ticket purchase on mobile phones (SMS, WAP, Java and 3G)	1	1
Norwich	8.06	Linking individual passenger transport information with healthcare appointments	Not implemented in full. Study of hospital journeys carried out and public transport information leaflets provided for the hospital instead of the intended electronic journey planner	0	0

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Norwich	12.09	Provision of real time passenger information	Service disruption messages added to bus stop RTI; away from stop, bus timetable electronic displays introduced, also with real time disruption messages	0	1
Ploiesti	12.13	Implementation of real time information system for PT	Expanded real time information at bus stops, integrated with existing telematics systems	3	0
Preston	8.10 & 8.7	Information and promotion for PT	New network concept to promote bus use – not carried out fully due to bus market changes	2	3
Suceava	8.09 & 5.6 & 8.8	Improved public transport information	Support measure to the alternative bus fleet (5.6) and bus priority (8.8): information boards at bus stops and on buses; VMS signs in the city centre showing pollution levels	1	1
Tallinn	12.06 & 12.5	Automatic stop calls & info sign in bus	Electronic displays in vehicles	2	1
Toulouse	12.03	Development of an integrated multimodal traveller information system	Real time information screens at metro interchanges with other modes; P&R information and journey planner to follow	1	2

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Table 1.2: Public Transport ticketing and tariff measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Krakow	8.10	Integrated ticketing and tariffs in Krakow	Integrated bus and rail ticket with multi-operator agreement	2	-
La Rochelle	7.01	Implement further integration of ticketing system	Ticketing mix enhanced by smartcards for schoolchildren and tourist passes covering bus, sea bus and yellow bikes with discounts for entry to attractions	3	3
La Rochelle	7.02	Strategies for integrated pricing system	Simplified structure for multi-modal tickets	2	2
La Rochelle	12.05	Enhanced integration of the ticketing pricing system	Web based sales; contactless ticket validators on all public transport and at P&R to pay for parking and PT	1	3
Norwich	8.05	On street ticket vending machines	Street machines taking cash and credit/debit cards for tickets across all bus operators to reduce boarding times	2	1
Preston	7.04 & 12.9	Implement integrated transport ticketing system	Smartcard for use on all operators' buses in Preston and South Ribble	1	2
Toulouse	7.01	Innovative multimodal PT contracts, services and electronic ticketing	Investigation of multi-operator, multi-modal electronic purse ticketing; simple system introduced during CIVITAS	3	3

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Table 1.3: Accessibility of Public Transport measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Burgos	11.11	Access for mobility impaired people	Improved information, bus accessibility and footway access	3	3
La Rochelle	8.06	Infrastructure improvement for collective transport	Hierarchy for bus and stop accessibility; accessible information at stops and on buses	2	3
Toulouse	8.03	Improving the accessibility of PT services	Dedicated mobility service; more low floor buses; lifts and queue priority at metro stations	1	1
Venice	8.08	Introduction of low impact, access-for-all waterbuses	New waterbuses with greater passenger capacity, lower environmental impact and suitable for the transportation of disabled passengers on a busy boat route	3	3

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Table 1.4: Public Transport infrastructure measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Debrecen	12.04	Tramway priority scheme and real time passenger information system	Traffic control system; Automatic Vehicle Location for priority and real time information at tram stops	2	1
Genoa	8.01	Clean high mobility corridor	Bus lanes and enforcement; Automatic Vehicle Monitoring; ecological, comfortable buses; static and real time information at bus shelters, stops and on board	2	2
La Rochelle	8.01	Implementation of a second P&R	P&R near motorway intersection and on the route into the city centre from nearby towns	2	2
Norwich	8.04	Rail station interchange	Bus and cycle access, with improved bus boarding, ticketing and waiting facilities	2	2
Ploiesti	8.11	Improved infrastructure for collective transport	Public transport signing, information and access	1	3
Preston	8.07 & 8.10	Creation of an overground network for PT services	New network concept to promote bus use – not carried out fully due to bus market changes	2	3
Preston	8.09	Improved infrastructure for collective transport	Bus shelters and stops, information and bus priority	2	2
Toulouse	8.02	Development of proximity services at important passenger transport hubs	Shops and other services at Metro stations in order to make an attractive environment	2	2

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Table 1.5: Public Transport network measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Burgos	8.02	Clean high mobility services	Bus lanes, real time and on-bus information, smart card	2	2
Burgos	8.05	Collective mobility services for target users in Burgos	Streamline ad hoc bus and minibus services for companies, to provide clearer routes serving more employers	1	1
Krakow	8.06	Demand-responsive transport services	Development of routes, marketing and management and control centre for demand responsive services in rural areas	1	-
La Rochelle	8.03	Reorganisation of the bus network	A simpler, hierarchical bus network, easier to understand and better fitted to demand	1	3
Odense	8.07	Integration and quality improvements of sustainable modes	Bus priority and information scheme to promote alternatives to solo car use: bus, cycle, taxi, car sharing	3	3
Potenza	8.07	Demand responsive transport system	Design of a dial-a-ride demonstration in the peri-urban zone	0	0
Preston	8.08	Demand responsive and feeder services	Semi-fixed timetable service with the ability to deviate off-route, providing local links in a rural area of social exclusion	3	3
Toulouse	8.01	Improving quality and structure of PT services	Quality management system with targets and benchmarks for distinct, demand-related levels of PT service	2	2
Toulouse	8.04	Integration of the demand responsive transport as a complementary service to PT	Standardise and extend demand responsive services; increase efficiency; improve connections with core PT; improve reservations	3	3

Table 1.6: Safety and security of Public Transport measures

City	No.	Measure Title	Outline Description	Success of implementation[1]	Success of outcome[1]
Debrecen	8.05	Safety and security training for PT drivers	Driving skills for safety and energy efficiency	2	3
Krakow	8.11	Security action plan for PT	Comprehensive strategy for PT security and safety, including speed reduction near PT stops; supporting measures on infrastructure, information, comfort	1	-
Malmö	8.02	Improved security & safety on buses	Security cameras on buses	1	1
Stuttgart	8.12	Security action plan for suburban railway	Workshops with bus and train drivers on increasing passenger confidence and diffusing conflict; media launch and leaflets for passengers on travelling safely	1	2

Note 1: Rating of success: 0=not successful, 1=moderately successful, 2=successful, 3=very successful

Tables 1.1 -1.6 also show the ratings of success of the measures in relation to the implementation process and the outcome. The estimated ratings were made by the CIVITAS projects themselves and collected at the end of the project. In relation to other clusters, the cluster 7, Public transport related measures, is characterised by an averagely successful implementation process and an averagely successful outcome.

2 Implementation

2.1 Public transport information

Within CIVITAS II there were different components of Public Transport Information systems implemented:
- Real-time passenger information via boards and terminals, on and off the public transport system
- Real-time passenger information via SMS and/or e-mail
- Online and SMS journey planners
- Internet services providing public transport information
- Overground network map and mini map available on board public transport vehicles and other campaigns and information material to promote public transport
- Real-time traffic and parking information for drivers via Variable Message Signs

The following implementation steps can be identified:

- Analysis of basic conditions and target groups' needs

Data regarding existing information systems need to be collected and analysed first. This stage also includes meetings with stakeholders (especially passengers, drivers, bus operators or other commercial operators, police, representatives from the municipality) and questionnaire surveys to point out the needs and priorities of the stakeholders. Like every ICT based project, it is vital to examine the various solutions available on the market from a technical and economical point of view.
Based on the results of the analysis it is advised to set up a transport information plan to outline the project at the best. The plan should be confirmed by the local decision-makers.

- Political and legal approval

All projects deal with the need for political and legal approval. The concept of widespread transport information is generally well received; nevertheless it is advised to hold working groups and/or stakeholder meetings to put this issue on the agenda. It is essential to consult the local authorities for political approval from the very start of the project.

- Public involvement and public approval

The involvement of the public can take place in different ways and at different stages of the project. They can participate actively in planning and decision making or can attend public meetings and hearings. In view of the amount of financial investment for technical design and implementation, official support is essential from the very start of the project.

- Call for tender procedure

Suitable technical solutions and associated costs should be assembled. Specifications have to be written and the call for tender procedure launched. Basic criteria considered are the financial offer, the respect of deadlines and the economic aspects.

- Setting up user oriented information systems:

Below, the most important reflections are reported by type of information project:
- Real-time passenger information via boards and terminals

The selection of bus stops where real time passenger information should be installed was often made with consideration as to where they will reach most travellers. Innovations such as VMS signs showing pollution levels can act as a 'push' to use public transport, where the real time information is a 'pull'. Integration of real time information across traffic control functions can bring car, tram, bus and other information into the passenger environment and enhance management of the network.

- Internet services in connection to public transport information

Most important is the system specification phase. Specifications have to consider the aggregation of different data coming from different sources, the investigation of server to server links from existing information systems to a common database, the integration of internet tools, etc. For example, internet service might show all departures from a chosen stop location, download of timetables to a mobile phone for off-line use and simple help functions. A statistical information system for analysing usage of Mobile Internet services can be an add-on. Maps with route information, search from chosen stop location and support for travel planner are advised.

- Real-time passenger information via SMS and/or e-mail

The definition of the cost-revenue model of an SMS service is important: for instance, the service it could be free for users and the municipality pays the costs or the users make a small contribution only, or the users could make a full contribution though none has in these demonstration projects.

Three technical options for the mobile system were reported (La Rochelle): Information through a WAP interface (but not all users have access to the internet through WAP and WAP access takes a long time), vocal server (accessible through a phone number) or SMS service. Such an SMS system provides users with the departure time according to the schedules at a bus stop by sending a request SMS to a short and unique number.

In La Rochelle, the main focus of the implementation was the link between the Exploitation Aid System, the SMS system and the accounting system. In the event of delays in the bus network the SMS service was offered for free. This service is directly accessible via SMS after signing up to subscribe to the service on the bus operator's website. The picture to the right shows the communication support for the SMS service.

- Overground network map and mini map and other information material to promote public transport

The preparation of information material (maps designed by cartographers, flyers, schedules, question and answers folders, route by route brochures, nearest bus stop folders, business card information, a quick way for bus drivers to help passengers (Stuttgart), etc.) and its distribution according to a communication plan is another way of promoting public transport.

- Real-time traffic and parking information for drivers - signs

First, define where information concerning traffic flow and the parking situation should be installed. For real time passenger information, it is necessary to consider visibility of the place. Only visible and/or accessible information is useful.

- Communication and information campaigns

The measures can be communicated with press-releases, maps, flyers and brochures, letters and/or awareness campaigns. Basic criteria are: Preparation and publication of articles for local magazines and newspapers, information on urban website(s) about new services including the link to internet services. In relation to internet information services it is also advised to design a user-manual.

- Promotion

The promotion of transport information systems helps to raise awareness among the public about the benefit of the new services.

- Monitoring

Monitoring of internet services can provide data which lead the authority or operator to consider technical development to update the services.

2.2 Public transport ticketing and tariffs

Topics here are integrated ticketing, introduction of chip card systems, selling tickets through websites or SMS services and the introduction of vending machines.

Implementation steps are the following:

- Development of basic principles

The integration of ticketing and tariffs can be between different public transport modes with the main objective to foster intermodality, or with additional services for which the main reasons are to increase its attractiveness and ease of use. It can be stated clearly, that the new form of ticketing gives access to all kinds of public transport modes and/or provides special reduced prices to access the main tourist attractions and cultural sites, etc. For systems demanding a payment in advance (credit) for a number of journeys, some discounts could be offered, e.g. a 10 % level of discount for young passengers (Preston). This upfront payment is being adopted more often, yet may need consultation with the national financial regulators.

Public transport passes could be developed to combine transport with cultural events (e.g. festivals) and leisure activities. Pass prices could depend on the combination of duration (e.g. 1-, 2-, 3- or 7-day-passes) and the age of the users as well as number of sites they want to visit. There could also be specific family prices available (La Rochelle). A smartcard could be configured for the combined use of public transport means with P&R facilities, bike-sharing, car-sharing or ferry rides (La Rochelle).

- Specifications in cooperation with key-stakeholders

Specifications should be made e.g. for the intended modalities and conditions for the delivery of new forms of ticketing (e.g. smartcard), the functional design or the personalisation of tickets e.g. for schoolchildren (La Rochelle).

The key-stakeholders such as the transport operators, tourist offices and the community councils need to discuss what ticket types should be offered and how the ticket should be purchased. Market research can help identify the types of offer for which there is a demand.

- Design of an integrated ticketing system

The design of an integrated ticketing system could cover the monitoring and managing of different tickets such as season tickets, the issuing of cards (e.g. anonymous smartcards with an impersonal public transport subscription) via electronic ticketing and the provision of different methods of payment. It may, for example, be possible to offer an e-recharging service integrated on the transport operator's website. For this purpose, secure payment must be assured for credit card/debit card users (La Rochelle).

Smart card reloading machines could be installed at main transport hubs (La Rochelle) and could be combined with the service of delivering conventional bus tickets and passes as well.

- Adaption of the vehicle fleet and complementary infrastructure

Contactless ticket validators and card-readers can be installed on public transport vehicles, which might also display fare values for each fare stage, the class of passenger (young, adult, etc.) and the running credit balance (Preston, pictured). These machines could be combined with top-up systems as well. Smart card reload machines with information on public transport service provision could be set up at main transport hubs. Graphical user-interfaces require careful design, including consideration of the needs of people with impaired vision.

For the purpose of communication and real-time data transfer to a control centre, vehicles might be equipped with WIFI antennas and WIFI interfaces.

The siting of on-street ticket machines is a key consideration: in Norwich, some machines sell 1,000 tickets per month and others only 50 to 100. Integrating on-street machines with other policies and plans is also important, as the introduction of multi-trip cards can reduce single-trip sales, thus having a negative impact on the machine's return on investment.

- Staff training

The introduction of new ticketing systems demands the training of staff dealing with cash collection and machine maintenance. When selling special combination passes (La Rochelle) it is also useful to inform and train staff of facilities such as tourist offices, camping sites and hotels, especially if the passes will be sold at such tourist sites as well as at transport offices. For transport drivers, pocket-sized "how to" cards can be developed to assist them with the new product (Preston). It has to be kept in mind that the introduction phase in particular needs special training of the staff, as the training often demands special efforts in terms of management and personnel.

- Promotion activities

The introduction of a new ticketing system needs a specific and long term promotion and information campaign to make people used to and able to use the new payment system. Promotion activities could include the distribution of brochures in different languages, promotion on the tourist office's website and at special events, articles in local newspapers, television reports and sending out information to bed & breakfast facilities. Posters at bus stops and on buses as well as leaflets can promote the measure and raise public awareness. Even the system design can include an element of promotion: in Norwich, on-street ticket machine use rose significantly once large and highly visible vinyls were added to the machines.

2.3 Accessibility in Public transport

This type of measure concerns full accessibility for mobility impaired people focusing on specific needs for visual, hearing, mental and physical handicaps (Burgos, La Rochelle, Toulouse, Venice).

The implementation steps are:

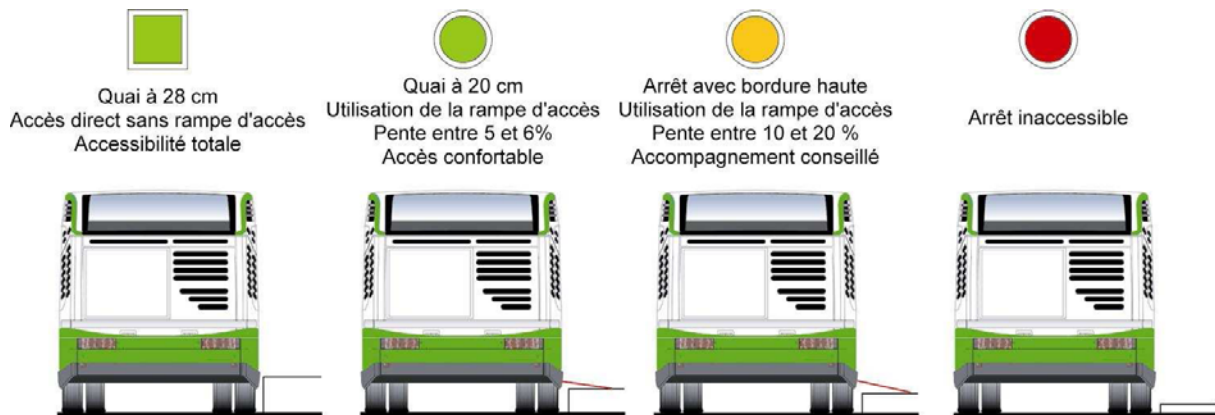- Identification of problem areas in cooperation with key stakeholders

Collaborations with local disabled people's associations, as in the city of Venice, can be helpful in terms of getting suggestions of improvements and feedback on the suitability of vehicles etc. A diagnostic audit of the accessibility of the public transport network should be combined with the analysis of inconvenient access at streets and buildings in general as well as of information for public transport users. It is recommended to set up regular meetings of a steering committee with political decision makers to assure political and legal approval. In La Rochelle, four working groups were set up to respond to the distinct needs of people with visual, hearing, mental and physical disabilities. Many of the design issues have been tackled in these projects, so that other cities can follow the demonstration projects with less intensive design input.

- Adaption of the vehicles and stations

Buses, stops, hubs and information were redesigned to offer better access. Easy access should be guaranteed, e.g. by ramps installed at stops or on vehicles. Street access is a key part of the system, so that people in wheelchairs or with sight and hearing difficulties can reach the stop safely. The adjustment of the level of accessibility could be conducted by focusing on those

public transport stations most frequently used first, or by other needs-based assessments, such as routes serving hospitals, etc.

La Rochelle defined a hierarchy of stops with different levels of access and comfort (pictured, below). The implementation programme was agreed with local authorities and with the disability associations.

Quai à 28 cm
Accès direct sans rampe d'accès
Accessibilité totale

Quai à 20 cm
Utilisation de la rampe d'accès
Pente entre 5 et 6%
Accès confortable

Arrêt avec bordure haute
Utilisation de la rampe d'accès
Pente entre 10 et 20 %
Accompagnement conseillé

Arrêt inaccessible

•   Information provision
The careful design of information, both at-stops and transport hubs and on-board vehicles, can enhance the confidence of disabled users. It also benefits many people without a visible disability. The image (right) shows in-vehicle information in Burgos, which is supplemented by voice announcements.

2.4 Public transport infrastructure

This type of measure includes reserved bus lanes and a bus lane control system (Genoa), traffic lights with bus and with tram priority systems (Debrecen), new railway station (Norwich, Preston, Toulouse) and P&R infrastructure (La Rochelle). In Ploiesti, the new infrastructure at stops is also linked with the topic above concerning infrastructure for mobility impaired people. Note: some of the indicated measures coincide with measures listed under cluster 6, sub-cluster "public transport priority". There are significant overlaps between this group of measures and the information measures, since many of the infrastructure improvements also incorporate new real-time and static information.

The following implementation steps are identified:

•   Identification of problem areas in cooperation with key stakeholders
Depending on the intended goal of the project, workshops can be held to allow key stakeholders such as the public transport authority, public transport operators and associations of public transport users to express their opinions and preferred options. The general public can be consulted by questionnaires, brochures or leaflets to inform them about the proposals and to obtain views on the importance of the proposed measures. In addition, an origin-destination survey of public transport users and specific traffic analysis could be made.

- Adaptation of the vehicles and stations and stops

There are several adjustments possible concerning new infrastructure on the vehicles and at the stations. These images from Norwich show the 'before' and 'after' provision of facilities for people travelling by bus from the main railway station to the city centre. An holistic redesign of access and provision was made.

Oral and visual devices on the bus such as LCD information displays can provide real-time information based on an automatic vehicle location and electronic schedule system. There can also be automatic measurement and analysis systems for route times and passenger numbers (Toulouse).

- Public transport information systems (compare chapter 2.1)
  Electronic real-time information display systems at the stations should indicate the remaining waiting time by using dark print on a light background or vice versa.
- Public transport ticketing (compare chapter 2.2)
  Offering attractive use of mobile phones for ticket sales and information can attract young users and is very cost efficient.
- Enhanced service for public transport users
  Interactive information points with wireless internet can give real time information to passengers, travellers and commuters. There is also the possibility of offering real time SMS services. Passengers can use WAP to download the actual time tables e.g. dialling a number posted at the transport stop.
  It is important to assure fully accessible ticket and information desks at stations (La Rochelle) as well as to install automatic doors. Furthermore it is essential to make relevant websites and all timetables accessible for blind people (through HTML language and decoder).

> Checklist for bus stops site review (Preston):
> • Is the stop still in the optimum location or should it move to suit a change of situation in the environment, such as a new housing estate or health centre, or because of a closure of a school for example?
> • Is it in a safe location, or have traffic conditions or highway functionality changed? Is there a historic reason for the location which still applies?
> • Can the bus stop be moved to minimise loss of residential parking or improve privacy issues for local residents?
> • Should the bus stop have a shelter? Boarding potential should be considered against the loss of privacy and loss of parking and the effect of a shelter minimised where possible, whilst improving the public transport offer to the travelling public.
> • Is the bus stop approach accessible by mobility-impaired people?
> • Is the bus stop approach safe?

- Complementary infrastructure measures

Public transport quality measures can be combined with measures enhancing other transport modes, such as the installation of cycling parking facilities at key interchanges. The development of proximity services at important passenger transport hubs, such as shops, can raise their attractiveness and gain passengers (Toulouse).

The comprehensive overview and strategy for public transport access in Preston shows the implementation steps necessary to change the general image and approachability of public transport. Alongside measures for on- and off-system information, bus priority, etc., this measure included a security audit and a 'Safer Routes to Bus Stops' programme, with management systems introduced for the monitoring and maintenance of cleaner stops and quality shelters.

The Preston measure included bus stop location, design, maintenance; easy walking routes; junction improvements to resolve traffic flow issues, as well as more high-profile measures. These fundamentals are very important to passenger confidence. Such measures are painstaking and time consuming, but they are low cost with high returns.

The ticketing equipment of a P&R facility can be fully integrated into the public transport network (La Rochelle). The smartcard for public transport use can also work as the access card to the P&R facility, which also offers an information stand, a security system with camera and a bike-sharing station.

Monitoring is critical to show both what future developments are needed and the return on investment.

2.5 Public transport network

This type of measure includes the creation of demand responsive public transport solutions for low demand areas (Krakow, Potenza, Preston, Toulouse) as well as reorganisation of the whole network (La Rochelle) or a specific type of service for a target group (Burgos).

Promotion and marketing is regarded as a most important step in implementation of a redeveloped public transport network. An awareness raising campaign can be supported by free vouchers for testing a P&R facility (La Rochelle) as well as meetings with companies to convince commuters to use the P&R facilities. Exhibitions and events on mobility (e.g. A day without my car, European mobility week, etc.) and press articles in local newspapers can support the measure by gaining awareness and support. Marketing agencies can help to develop an innovative marketing concept, such as handing out gimmicks (umbrellas when it is raining and water bottles in summer).Marketing measures can include a new brand, logo and vehicle livery as well as leaflets, posters, business cards and network maps or mini-pocket versions of it. Postcards and posters can be used to encourage people using public transport.

2.6 Safety and security of Public transport

This concerns security for passengers at stations and on vehicles, improvement of technical hardware such as video and sound systems for better information and surveillance (Debrecen, Krakow, Malmö and Stuttgart.

The implementation steps are as follows:

- Adaption of the vehicles and stations

The installation of cameras on board the vehicles as well as the provision of bus shelters and satisfying lighting conditions can contribute to the passengers' security and convenience.

- Training of public transport drivers and controllers

The training of the drivers and controllers focuses on training dealing with passengers in certain situations (behaviour communication, de-escalation training), training especially for night-bus and train drivers and training concerning safety and energy-efficient driving.
Communication training can prepare and advise the staff in situations of conflicts to have basic knowledge and a special action approach. The de-escalation training should teach the drivers and controllers how to behave in extreme situations such as emergencies and to know the legal component and liability as well as intervention possibilities. There is also special training about drug and alcohol abuse and their effects. The staff are taught how to behave towards intoxicated or angry passengers and which factors improve the situation.

- Promotion and marketing

Brochures and flyers can also be produced for special target groups such as young people, women and elderly people to give common information about safety and security. They can provide good orientation within the network and advise amicable behaviour with other passengers, comportment in critical situations and operational disturbances including practical advice.

3 Drivers and Strategies to overcome barriers

The tables below show, by sub-cluster, the drivers (Table 3.1.1-6) and barriers (Table 3.2.1-6) encountered, as reported by the individual project teams.

3.1 Drivers

Drivers were asked about in an open question format. They were asked to be reported only if they were recognized as being more than what would normally be expected. To give a better overview and to compare the different measures with each other, categories have been created. A tick mark indicates that the specific driver was indicated at least once in the evaluation for the measure.

3.1.1 Public transport information

There are several drivers that foster the realisation of public transport information. As shown in table 3.1.1 the measure was particularly supported by the awareness of existing needs resulting in the engagement and commitment of the stakeholders and public.

- Stakeholder commitment

The concept of widespread traffic information is generally well received. There is a powerful driver in the commitment of all stakeholders to reliable real-time traffic information. There are increasing expectations among all the players for continuous development and integration of systems.

- Public support

In CIVITAS cities the public has responded positively to the measures and expressed a demand for greater access to a wide range of information, provided it is accurate, reliable and accessible.

3.1.2 Public transport ticketing and tariffs

As shown in table 3.1.2 this measure was particularly supported by the awareness of existing interests and the need to modernise the ticketing and tariff scheme.

- Overall interests and current needs

For transport operators it is an overall goal to enhance the quality of service and comfort for users, to have control of earnings and to prevent fare dodging. Measures taken within the CIVITAS II initiative gave cities the opportunity of developing a vast source of data allowing the control of cash flow as well as the analysis of the customers' behaviour and needs.

- Image and attractiveness

The use of smartcards gives a modern image to the network and makes fare payment easy and boarding the system fast, thus contributing to its attractiveness. The use of mobile phone for validating a ticket allows facilitates access and therefore favours use (Toulouse).

3.1.3 Public transport quality (sub-clusters 3 – 6)

Measures concerning accessibility, the infrastructure and safety and security of public transport as well as the public transport network in general were essentially supported by the awareness of existing needs and plans as shown in tables 3.1.3 to 3.1.6. In addition, the active support of political stakeholders expedited the measures' success.

- Public demand and political support

The public and political awareness for public transport improvements in cities is usually very high, so positive developments are demanded and supported e.g. when offering services to less populated areas. Usually there is also a strong political commitment to improve the quality of life for mobility impaired people.

- Current developments and existing plans

Ongoing public transport means can support the project as there might be a political willingness for action already. If there have been an increasing number of passengers, complaints or incidences of vandalism and robbery, the need for measures for ensuring accessibility, safety and security is accepted.

- Legal obligations and external pressure

The legal obligation to adapt public transport means and stops, e.g. to prove access for mobility impaired people, will support the measure strongly. Such measures include the installation of tactile pavement at the stops to mark the access spaces to the entrance door of the vehicles or the provision of information, for example by fitting appropriate display boards (big letters and contrasting colours).

Table 3.1.1: Public Transport information: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Burgos	Infomobility tools (12.02)		✓	✓		✓
Genoa	Intermodal infomobility platform (12.01)				✓	
Krakow	Intermodal infomobility platform (12.03)			✓	✓	
La Rochelle	Real time information systems (12.03)				✓	
Malmö	Marketing of new bus route system (08.01)	✓		✓	✓	✓
Malmö	Use of real time applications for traveller (12.01)	✓	✓			
Malmö	Mobile internet services in connection to bus information (12.03)		✓	✓		
Norwich	Linking individual passenger transport info with healthcare appointments (08.06)			✓	✓	
Norwich	Provision of real time passenger info (12.09)			✓		
Ploiesti	Implementation of a real time information system for PT (12.13)				✓	
Preston	Information and promotion for PT (08.10)					✓
Suceava	Improved public transport information (08.09)	✓		✓		
Tallinn	Automatic stop calls & info sign in bus (12.06)	✓				
Toulouse	Development of an integrated multimodal traveller information system (12.03)	✓		✓		

Table 3.1.2: Public Transport ticketing and tariff measures: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Krakow	Integrated ticketing & tariffs (08.10)			✓		
La Rochelle	Implement further integration of ticketing system (07.01)	✓			✓	
La Rochelle	Strategies for integrated pricing (07.02)	✓	✓		✓	
La Rochelle	Development of an integrated pricing system (12.05)				✓	
Norwich	On street ticket vending machines (08.05)			✓	✓	
Preston	Implement integrated transport ticketing system (12.09)			✓		
Toulouse	Innovative multimodal PT contracts, services and electronic ticketing (07.01)				✓	

Table 3.1.3: Accessibility of Public Transport measures: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Burgos	Access for mobility impaired people (11.11)	✓				
La Rochelle	Infrastructure improvement for collective transport (08.06)				✓	
Toulouse	Improving the accessibility of PT services (08.03)	✓				
Venice	Introduction of low impact, access-for-all waterbuses (08.08)				✓	

Table 3.1.4: Public Transport infrastructure measures: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Debrecen	Tramway priority scheme and real time passenger information system (12.04)	✓				
Genoa	Clean high mobility corridor (08.01)	✓				
La Rochelle	Implementation of a second P&R (08.01)	✓				
Norwich	Rail station interchange (08.04)	✓			✓	
Ploiesti	Improved infrastructure for collective transport (08.11)				✓	
Preston	Creation of an overground network for PT services (08.07)	no driving force recorded, as market changes delayed the measure				
Preston	Improved infrastructure for collective transport (08.09)	✓			✓	
Toulouse	Development of proximity services at important passenger transport hubs (08.02)	✓				

Table 3.1.5: Public Transport network measures: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Burgos	Clean high mobility services (08.02)	✓				
Burgos	Collective mobility services for target users in Burgos (08.05)				✓	
La Rochelle	Reorganisation of the bus network (08.03)	✓			✓	
Krakow	Demand-responsive transport services (08.06)	✓			✓	
Odense	Integration and quality improvements of sustainable modes (08.07)			✓		
Potenza	Demand responsive transport system (08.07)		✓			✓
Preston	Demand responsive and feeder services (08.08)	✓				
Toulouse	Improving quality and structure of PT services (08.01)	✓			✓	
Toulouse	Integration of the demand responsive transport as a complementary service to PT (08.04)	✓			✓	

Table 3.1.6: Safety and security of Public Transport measures: Drivers

City	Measure	Driver related to above expected…				
		engagement / commitment of organisation or persons involved	experience and know-how of persons involved	support from outside the project team to implement measure	good structures / cooperation / management within project team	unsatisfying situation before and/or need to improve the situation
Debrecen	Safety and security training for PT drivers (08.05)	✓				
Krakow	Security action plan for PT (08.11)	✓				
Malmö	Improved security & safety on buses (08.02)			✓		
Stuttgart	Security action plan for suburban railway (08.12)			✓		

3.2 Strategies to overcome barriers

3.2.1 Public transport information

This type of measure particularly struggled with barriers concerning technical and financial issues as shown in table 3.2.1.

- Permanent maintenance and immediate repair

Immediate repair of damaged boards and terminals avoids acts of (further) vandalism (such as graffiti).

- Real-time passenger information via SMS and/or e-mail

A barrier exists because not all travellers have access to the latest technology mobile phones with internet tools needed to be able to fully use SMS and/or e-mail service.

- Costs for services

Costs for the services burden the budget of the municipality. In CIVITAS cities, the customers only pay a small amount for the personalised information, whereas the municipality pays the large part of the costs. However it is expected that technological development will ease the situation over time.

3.2.2 Public transport ticketing and tariffs

Measures dealing with public transport ticketing and tariffs mainly dealt with technical and organisational barriers which lead to delays during the project (compare table 3.2.2).

- Integration with existing ticketing systems

It can be a long procedure to introduce a new ticketing system or change an existing one. It is necessary to consult the commercial department, various inspection bodies, other departments using data produced for accounting purposes, network analyses or statistics and finally managers and policy makers who are acting according to their social and economical objectives. The integration with an already existing ticketing system can profit from existing knowledge and experiences with the system. It is then the goal to harmonise the system functions and the commercial procedures to create integrated products.

- Clear communication to avoid misunderstandings in operational changes

The communication between the public transport operators and the technical operators is important to guarantee that changes of ticket prices are updated on every ticket machine in time.

- Multilingual information for tourism

The information provided must be clear, comprehensive, user-friendly and overall accessible. Therefore it may be appropriate to produce multilingual information material for ticketing systems dealing with tourism and regular public transport services.

- Combined transport pass and attractive prices

As tourists might only come for one day or two they usually have very specific places of interest to visit, so a combined ticket or pass for transport usage and tourist facilities is very convenient. Ticket and pass prices have to be established complying with passenger demand.

3.2.3 Public transport quality (subclusters 3- 6)

Measures concerning accessibility, infrastructure and safety and security of public transport as well as the public transport network in general faced barriers in terms of organisational and technical difficulties as well as financial problems (compare tables 3.2.3 to 3.2.6).

- Consultation of political decision makers and stakeholders

An early consultation of political decision makers is essential to assure legal approval (e.g. concerning national heritage, conservation areas or the environmental protection) and political support. Elections during the project's runtime should be considered as possible political support to overcome barriers. As public transport operators may face high costs for the intended changes their consultation and support are important to assure the project's success. The project partners and the involved stakeholders need to state their goals and future plans, so they can be taken into account. Along with the enhancement of public transport, other transport modes should be considered as well. Some cities have a policy which does not discriminate against them but instead have long-term goals of enhancing all traffic modes.

- Regulation of the budget

A regular review of the cost estimates against the measure budget and the inclusion of a contingency plan within cost estimates should be done.

- Adjustment and flexibility of the time schedule

As tendering procedures might be longer than expected and delivery delays by sub-contractors might occur it is necessary to be flexible making adjustments to the time schedule without risking the project's success as a whole.

- Widespread promotion and marketing

The project's goals as well as stakeholder opinions can be supported by local media such as newspapers and TV as facts can be stated clearly and support and awareness can be gained. The transport company could provide a constant communication of the service offered by using its own website.

Table 3.2.1: Public Transport information: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Burgos	Infomobility tools (12.02)			✓							✓		✓
Genoa	Intermodal infomobility platform (12.01)			✓						✓			
Krakow	Intermodal infomobility platform (12.03)									✓			
La Rochelle	Real time information systems (12.03)			✓				✓				✓	✓
Malmö	Marketing of new bus route system (08.01)	✓											
Malmö	Use of real time applications for travellers (12.01)									✓			
Malmö	Mobile internet services in connection to bus information (12.03)												✓
Norwich	Linking individual passenger transport info with healthcare appointments (08.06)			✓	✓			✓		✓			✓
Norwich	Provision of real time passenger info (12.09)	✓					✓			✓			✓
Ploiesti	Implementation of a real time information system for PT (12.13)												✓
Preston	Information and promotion for PT (08.10)			✓									✓
Suceava	Improved public transport information (08.09)	✓		✓									✓
Tallinn	Automatic stop calls & info sign in bus (12.06)						✓						
Toulouse	Development of an integrated multimodal traveller information system (12.03)		✓			✓				✓			✓

Table 3.2.2: Public Transport ticketing and tariff measures: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Krakow	Integrated ticketing & tariffs (08.10)			✓	✓					✓	✓		
La Rochelle	Implement further integration of ticketing system (07.01)	✓		✓						✓			
La Rochelle	Strategies for integrated pricing (07.02)			✓				✓				✓	✓
La Rochelle	Development of an integrated pricing system (12.05)		✓										✓
Norwich	On street ticket vending machines (08.05)	✓		✓									✓
Preston	Implement integrated transport ticketing system (12.09)	✓			✓								✓
Toulouse	Innovative multimodal PT contracts, services and electronic ticketing (07.01)		✓		✓					✓	✓	✓	✓

Table 3.2.3: Accessibility of Public Transport measures: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Burgos	Access for mobility impaired people (11.11)				✓			✓		✓			
La Rochelle	Infrastructure improvement for collective transport (08.06)									✓			
Toulouse	Improving the accessibility of PT services (08.03)							✓		✓			
Venice	Introduction of low impact, access-for-all waterbuses (08.08)		✓										

Table 3.2.4: Public Transport infrastructure measures: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Debrecen	Tramway priority scheme and real time passenger information system (12.04)											✓	✓
Genoa	Clean high mobility corridor (08.01)	✓					✓						
La Rochelle	Implementation of a second P&R (08.01)			✓						✓	✓		✓
Norwich	Rail station interchange (08.04)	✓		✓	✓	✓	✓				✓		
Ploiesti	Improved infrastructure for collective transport (08.11)						✓						✓
Preston	Creation of an overground network for PT services (08.07)	No barrier described, because the measure was affected by bus market changes
Preston	Improved infrastructure for collective transport (08.09)			✓									✓
Toulouse	Development of proximity services at important passenger transport hubs (08.02)						✓			✓✓			

Table 3.2.5: Public Transport network measures: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Burgos	Clean high mobility services (08.02)			✓	✓					✓	✓		✓
Burgos	Collective mobility services for target users in Burgos (08.05)		✓										
Krakow	Demand-responsive transport services (08.06)			✓	✓		✓			✓	✓	✓	✓
La Rochelle	Reorganisation of the bus network (08.03)		✓	✓				✓					
Odense	Integration and quality improvements of sustainable modes (08.07)		✓							✓			✓
Potenza	Demand responsive transport system (08.07)							✓					✓
Preston	Demand responsive and feeder services (08.08)												✓
Toulouse	Improving quality and structure of PT services (08.01)		✓							✓	✓		
Toulouse	Integration of demand responsive transport as a complementary service to PT (08.04)				✓					✓			

Table 3.2.6: Safety and security of Public Transport measures: Barriers

City	Measure	acceptance barrier	delays during the project	financial barrier	institutional barrier	lack of labour resources	legal barrier	management barrier	market barrier	organisational barrier	political barrier	spatial barrier	technical barrier
Debrecen	Safety and security training for PT drivers (08.05)									✓			
Krakow	Security action plan for PT (08.11)	✓			✓								✓
Malmö	Improved security & safety on buses (08.02)												
Stuttgart	Security action plan for suburban railway (08.12)				✓					✓			

4 Impacts

4.1 Measures on Public Transport information

Most measures in this subset relate to real-time information. Various media have been used, as is shown in Table 4.1.1

Table 4.1.1: Information media used in the Public Transport information measures

Site	Measure numbers	SMS (6)	In vehicle (3)	Panels at stops (8)	Website (7)	Other (5)	Remarks
Burgos	12.02/ 08.02			X	X	Parking panels	● 08.02 in subset Infrastructure
Genoa	12.01	X			X	Radio	● As well as information for all, special information for disabled people
Krakow	12.03				X		
La Rochelle	12.03	X		X			
Malmö	8.01		X			By post; at events	● Marketing campaign; ● Method for obtaining statistical information
Malmö	12.01/03	X		X	X		
Norwich	8.06					Leaflets; radio	● Targeted at hospital visitors; ● Electronic info not implemented
Norwich	12.09	X		X	X		
Ploiesti	12.13			X			
Preston	8.10	X					
Suceava	8.09		X	X	X		● Combined with measures on clean buses and PT priority
Tallinn	12.06		X				● Combined with other measures
Toulouse	12.03			X			● Results not separately measured
Sub-measures from other clusters							
Debrecen (subset PT infrastructure)	12.4			X			
Odense (subset PT network)	8.7	X			X		● Information touch screens

In Table 4.1.2 a summary of impacts from these measures is presented.

Table 4.1.2: Impact of Information measures

Site	Specific measure	Society Acceptance	Transport Quality	Transport Use info	Transport Use PT	Comments
Burgos 12.02 8.02	Electronic integral information at stops and on	● 80% of citizens stated info-tools are useful	● 98% citizens stated info panels improved	● Website use 959/month	● At big events, panels do influence PT use;	● Panels about parking were found useful; ● Results of package with

Site	Specific measure	Society Acceptance	Transport Quality	Transport Use info	Transport Use PT	Comments
	website		Quality PT; ● Due to teething problems assessment of quality of the panels went down after 1 year		● General rise of PT use 5.6% in 3 years	other measures
Genoa 12.01	Information through SMS and web, with specific information for disabled people	Not assessed	Not assessed	● Website use average 5.000/ month with peaks of over 1000/ day at special occasions		● Objective of 2500 visits/ day not yet achieved;
Krakow 12.03	Renewed website on integrated transport	● 76% of web users agree on creating new website	● 85% of web users state planning system as sufficient	● Website use 190.000/ month		● Number of regular users below target
La Rochelle 12.03	Message services on disturbances by SMS or email and real time info at panels at stops and by SMS	● 8 out of 13 users were satisfied on the SMS services; -% of bus users satisfied on info at stops raised from 74% to 87%	● 90% of population stated that real time information at stops improved PT	● In 6 months 181 people signed up for SMS/email messages; ● A further 150 requests a month for sms-messages on waiting times are received		● Awareness SMS services 35%; ● Awareness real time info at stops 70% of bus users and 31% of non-users
Malmö 12.01 12.03	Real time info by SMS, in vehicle, at stops and on website	● 74% of PT users state that real time info can replace timetables; ● 20% state that SMS can replace timetables	● 75% of PT users state that real time info increases quality of PT; ● 19% state that SMS increases quality of PT	● Website use 1.600.000/ month; ● Mobile services use 45.000/ month	● Goal 2% rise total PT use fully achieved; ● 24% of users of mobile internet services state that they travel more than before	● Awareness of real time systems risen from 64% to 77% ● Willingness to pay for WAP/SMS services expressed in SP surveys
Norwich 8.06	Real time info by SMS, at stops and on website	● The percentage of hospital visitors rating PT info as sufficient raised from 35% in before survey to 49% in after survey	● Hospital visitors stated a better perception of PT services in after survey	● 70% of visitors used electronic displays; ● 79% of bus passengers did		● Survey was made at the hospital entries near the bus station; by this the % of PT users in the sample (33%) is higher than the actual modal share
Norwich 12.09	Linking information on PT to health care appointments					● Not implemented
Ploiesti 12.13	Real time info at stops	-● 67% of PT users satisfied with measure	● Over 50% of citizens state that real time information is	● 70% of PT users used the info		● Awareness of the measure over 50%

Site	Specific measure	Society Acceptance	Transport Quality	Transport Use info	Transport Use PT	Comments
			useful for the city; positive view highest (over 60%) amongst young people			
Preston 8.10	SMS next bus services; better info at stops	● Acceptance of general information on PT did not change much	● % users that stated PT is easy to find has risen from 85% to over 90%; ● Satisfaction on info at stops raised on one route; on one other constant	Not reported	●Confidential due to the competition regime; impression is that the ongoing decline not has been reversed	● A parallel measure was the introduction of a new map; this influenced the evaluation results
Suceava 8.09	Integrated information systems together with other measures	● Over 20% of citizens state that on street electronic boards are their preferred info source (the highest scoring out of 7 sources)	● In the before survey, info was regarded as the worst from 8 quality aspects; in the after survey it was ranked 2nd best (behind accessibility)	● 18% state website as main source for PT info; ● 22% state real time information at stops as main source	● Increase in use (objective fully achieved)	● Results achieved in combination with other pro PT measures
Tallinn 12.06	Displays in vehicles	● % passengers Satisfied with information rose from 35% to 60%; ● 71% of passengers were aware of the measure			● Declining trend of use stopped	● Result achieved together with measures to create priority to PT
Toulouse 12.03	Real time information panels at metro interchange with other modes	● Strong feedback on the design and distribution of RTI ● positive feedback on other information				● No quantitative Results
Sub-measures from other clusters						
Debrecen 12.4	Real time info at stops	-Over 50% of users think the displays contribute to better information		● 32% of passengers use the displays every time; 26% often		
Odense 8.7	SMS info, website and information touch screens	-87% of website users are happy with accessibility		● Website visits 28.000/ month; ● SMS use 3379/ month ● Info screens used 5588/ month		

Generally the public is very satisfied with the new information systems and it contributes to the perception of the quality of PT. However a direct impact on the number of passengers can not always be shown. It is expected that the effects occur over a longer time. Moreover it is supposed to help achieve and enforce the effect of other measures. Favourable results on ridership can be seen in Malmö and Suceava, where information was part of a larger set of measures.

The picture below shows the information for the buses in Suceava, which was complemented by maps inside buses. A comprehensive information scheme in shelters, in vehicles, at stops and through VMS was developed, which supported the already positive image of the improved public transport in Suceava.
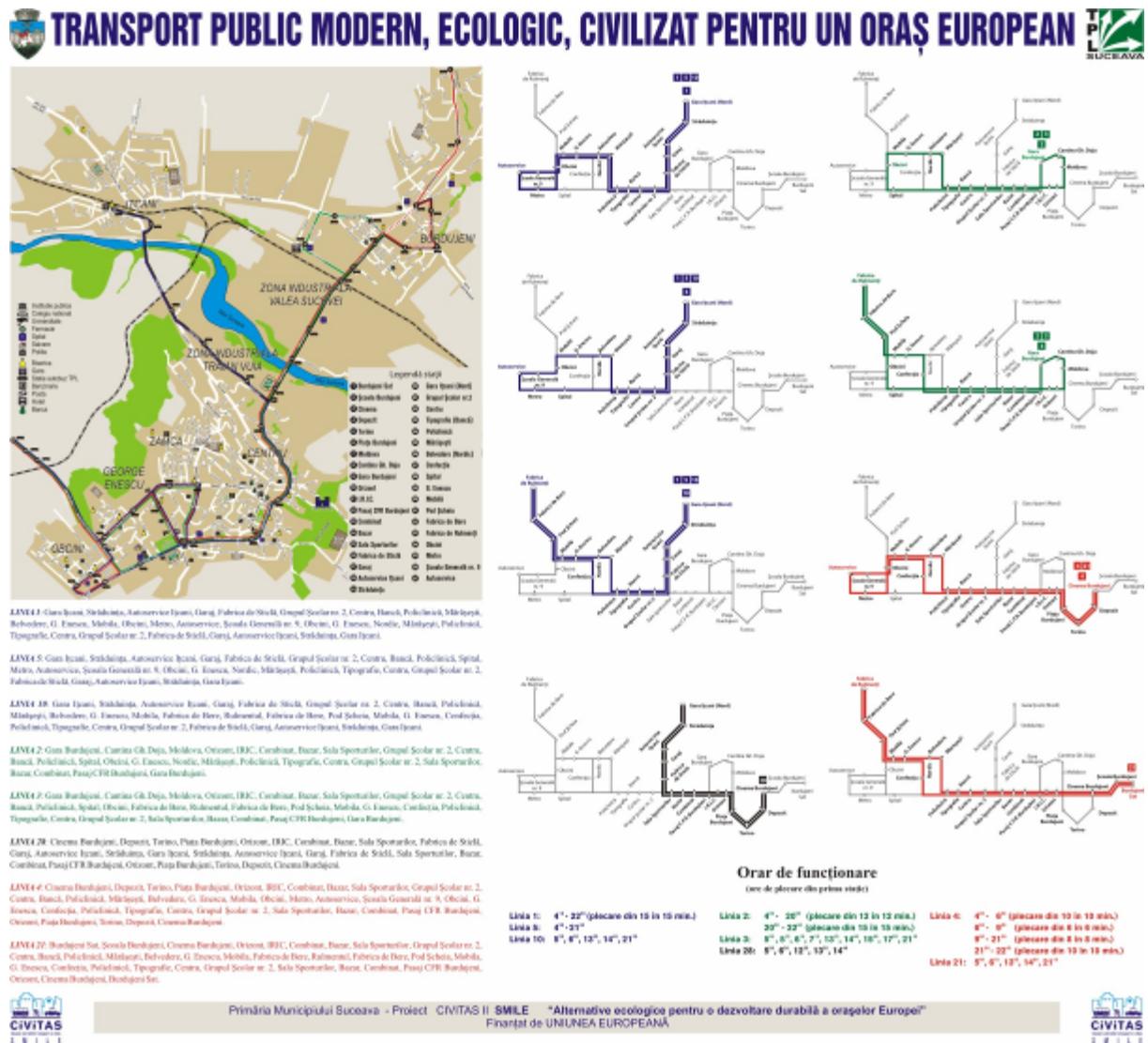
Real time information at stops is noticed by almost all passengers who are generally very satisfied. It reaches a high percentage of users and contributes strongly to positive opinions on the quality of information. Ploiesti and Debrecen are examples here. Also the real time information in vehicles is highly appreciated (Malmö, Suceava, Tallinn)

Before going to the stop, the website is a popular medium to achieve travel information at home or in the office. Malmö shows the strength of the web-medium with 1.600.000 visits a month. The use of the website in Krakow is lower, but still considerable (190.000/month); Burgos reports a much lower use (under 1000/month); however this website was at the time of reporting just launched and only

three months in operation. Panels for car users pointing out transfer possibilities at big events have been successfully applied in Burgos; they were found useful by the general public.

SMS services are attracting smaller groups of users; a specific application is the subscription for messages on disruptions. SMS services can be considered as a cost effective solution for information at stops in cases where numbers boarding are too low to justify investment in electronic devices at the stops. They also provide an extra dimension of off-route real time information and even ticket purchasing for users who are confident with mobile phone technology. Genoa, Malmö, Norwich, Preston, La Rochelle and Odense have introduced SMS services in one form or another; generally the service attracted a limited number of (satisfied) users – for example, Malmö's SMS service has 45,000 hits a month by contrast with 1.6 million on the website.

The mobile phone service in Malmö has wide functionality:

- Show all departures from the location where a traveller is at present
- Maps with route information
- Presentation of timetables for the journeys
- Statistical information system for analysing usage of Mobile Internet services
- Purchase of bus ticket on a mobile phone. Linked to measure 8.2 'Improved security and safety on buses', aiming to minimise handling of cash on board buses. The four steps below illustrate how "Biljett i mobilen" ("Bus ticket in mobile") works:

1. Send a text message to 72040, write "bim" (bus ticket in mobile") in the message
2. Open the link in the reply text message, download and install the programme "Biljett i mobilen". This only needs to be done the first time.
3. Open the programme, choose city and ticket type, buy ticket.
4. The ticket is sent to the mobile and is shown to the driver when you get on the bus

All the systems in this subset do cost money, which is not earned back immediately. In most cases the authority takes the initiative and compensates the operator for additional costs.

4.2 Measures on Public Transport ticketing and tariffs

Topics in this subset are integration and the introduction of modern ticketing techniques. The basic form of integration is ticket integration: the use of the same ticket on several services each having its own tariff structure. Ticket integration can be extended towards related services such as P&R or bicycle hire. The next step after ticket integration is tariff integration, creating through tariffs covering several operators or modes.

Table 4.2.1 presents the nature of the ticketing and tariffs measures.

Table 4.2.1: Measures on ticketing and tariffs

Site	Measure numbers	Integrated ticketing (4)	Chip card (4)	SMS and/or Web tickets (2)	Vending machines (1)
Krakow	8.10	X			
La Rochelle	7.01/7.02/ 12.05	X	X	X	
Norwich	8.05				X
Preston	7.04/12.9	X	X		
Toulouse	7.01	X	X		
Sub-measures from other subset					
Odense (subset PT network)	8.7		X	X	

Most of the measures contain new technologies, with experiments or pilot projects. The impacts are shown in table 4.2.2.

Table 4.2.2: Impact of ticketing and tariffs measures

Site	Specific measure	Society Acceptance	Transport Use tickets	Transport Use PT	Comments
Krakow 8.10	Integrated ticket on rail-city transport journeys introduced	● 72% of relevant users favoured integrated ticketing; ● 86% of relevant users found the accessibility of ticket purchase convenient	● Share of integrated ticket 9% Of sales on rail	● Rise of 15% in linked rail-city transport journeys	● No impact on car use measured; ● some shift from (not-integrated) regional bus
La Rochelle 7.01	Introduction of smartcards; also integrated with P&R	● >95% of population supports smartcard			● Introduction of smart card cancelled due to procedural reasons
La Rochelle 7.02	Strategies for integrated pricing systems	● 54% of users state they would be prepared to pay more for improved services		●Improvements forecast to raise PT use in 2020 by 60% (together with measure 8.03; see 4.5: reorganisation of network)	●Implementation did not start during CIVITAS project
La Rochelle 12.05	E-ticketing for passes; extension of use of the smart card	● 86% of population supported e-ticketing (83% of bus users); ● smart card has very high satisfaction (over 95%) by the user groups school children and P&R	● 671 passes for schoolchildren loaded by internet in one month (10% of total passes for this group)		● Sales results of e-ticketing to school children after only 3 months Of introduction
Norwich 8.05	On-street vending machines	● In a survey, 52% aware of the machines but only 8% had used them	● 4000 tickets/ month through 15 machines -over 100,000 tickets sold		● Reduction in average boarding time from 8.0 to 6.4 seconds
Preston 7.04 12.09	Trial with integrated smartcard for	● Stated preference showed that people were in favour of	● 72 users in test		● Problems from test now solved;

Site	Specific measure	Society Acceptance	Transport Use tickets	Transport Use PT	Comments
	schoolchildren	smartcards; ● 61% of test users rejected the cards after trial due to low quality			● wider introduction in progress
Toulouse 7.01	Creating a new mobility card as a smartcard	● Highly appreciated by the users	● Share of card holders rose from 25% to 33% of trips		● Market study delivered input for new tariff and ticket system
Odense 8.7	Introduction of SMS-tickets	● 87% of users satisfied with website (including other functions)	● 7000 sms tickets/month (5% of total Sales)		

Integrated ticketing, smart cards and e-ticketing are quality elements of public transport networks and will be introduced on a wide scale. Within the CIVITAS-II program several cities started introducing pilots using new technologies. In several cases, integration is extended to other services, such as Park & Ride and tourist attractions. Expectations from the public are generally high and the measures have initially a high acceptance level. Teething problems can however lower acceptance amongst users (Preston). Marketing campaigns can support a high acceptance level, as in Krakow, La Rochelle, Toulouse and Odense.

Tariff integration leads to higher use (Krakow, La Rochelle); however this does not always create higher ticket revenues, as integrated tariffs have the tendency to be below the sum of the original tariffs.

The influence of smart cards and e-ticketing on total public transport use could not be proven during the measure period (Odense). In Preston, La Rochelle and Toulouse the introduction was delayed beyond the CIVITAS period, but it is expected that given the high acceptance there will be a positive long term effect on ridership.

New ticket systems cost money and there may be no direct revenue from higher ridership in the short term. However the example of the market study in Toulouse and the example in La Rochelle show that new ticket systems can be used to steer revenues through tariff differentiation by target group. This is a challenge especially in the new member states, where the one trip, one ticket system without transfer tickets and without differentiation by distance class is still common.

4.3 Measures on Accessibility of Public Transport

The measures in this subset all have the objective to improve accessibility for elderly and disabled people. Measures can include improvements at stops and in the design of vehicles. The implementation of this type of measure is encouraged by legal obligations. Many cities and operators have an objective to make Public Transport 100% accessible in the near future.

Table 4.3.1: Impact Public Transport Quality measures (access for disabled people)

Site	Specific measure	Society/ Transport Quality Access	Transport Overall Quality	Transport Use PT	Comment
Burgos 11.11	Improve accessibility on buses	● Perception that access is good or very good raised from 38% in 2007 to 56% in 2008	● Perception that PT is good or very good raised from 72% in 2007 to 95% in 2008	● General use of PT raised 5.6% in 3 years	● Results of package with other measures

Site	Specific measure	Society/ Transport Quality Access	Transport Overall Quality	Transport Use PT	Comment
La Rochelle 8.06	Improvement of accessibility on buses	● 98% of population regarded the measure as useful; ● 83% of passengers perceived the improvements	● Contributes to overall user satisfaction	● % passengers with reduced mobility raised from 7% to 17% (outcome of small survey)	● Ten year investment plan for 1.4M€
Toulouse 8.03	Improve accessibility through master plan with various measures	● Accessibility of buses for disabled people risen from 35% in 2007 to 55% in 2008			● Budget to make the entire network accessible estimated as 45-50M€
Venice 8.08	Improve accessibility of PT waterbuses	● Customer satisfaction on services for disabled raised, but is still lower than satisfaction in general on PT	● Overall satisfaction did not change		● It is expected that after a longer period satisfaction with services for disabled people will rise further

Services for disabled people and improved accessibility are targeted at a small part of the users, but can be designed to bring benefits to all, as in Burgos (pictured), where the access on streets and the information and increased space inside buses "increased the accessibility for all the citizens".

Legal requirements and specific demands from authorities help to raise standards for accessibility. That is, where national or local policies require disabled access, there is an impetus for transport operators and authorities to co-operate in providing it.

The projects focused on working with disabled people's representative groups to understand the problems, design solutions and agree the roll-out of the solutions. Even in cities which target 100% accessibility, this cannot be achieved immediately, so certain stops and routes are prioritised, according to use by disabled people.

The picture, left, shows a bus stop before and after accessibility improvements.

La Rochelle reports a considerable rise in use from disabled people. The measures are very important for the people for whom they are intended and all the reports note that they bring benefits to other users as well and make the system more attractive overall. It is difficult to quantify the impact of these measures on the attraction and retention of other passengers, especially in the light of the wide programme of improvement and promotion in CIVTAS. Nonetheless, the measures focused on improving access are perceived as increasing the confidence and comfort of all passengers and therefore making the system more attractive.

Budgets differ between cities, but are often related to the size of the network. In La Rochelle and Toulouse, a long term budget plan has been approved spreading out the investment costs to achieve a

good level of accessibility on the major part of the network over time. The picture (below) shows the significant infrastructure investment under way to provide level boarding platforms for the highest quality tier of accessible bus routes in Toulouse.

4.4 Measures on Public Transport infrastructure

In 7 cities, a total of 8 measures concerned transport infrastructure. Infrastructure measures can be divided into three topics

− Measures at lanes (bus lanes, separated tracks in tramway lanes); the main aim is to increase speed and reliability
− Measure at stops/ stations; aims can be enlarging capacity, improving attractiveness and comfort and improving safety and security
− Systems to improve PT priority; where these services can be regarded as measures on Traffic management these are reported in the separate report on this subject (Cluster 6).

The impacts of the measures in this subset are given in Table 4.4.1.

Table 4.4.1: Impact Public transport infrastructure measures

Site	Specific measure	Awareness	Transport Quality PT	Transport PT use	Comment
Debrecen 12.04	Real time information; tram priority; automatic vehicle location; driver training		● Improvement in user satisfaction achieved; ● No quantitative info available except on info system (see 4.1)		● See also section 4.1 on information systems
Genoa 8.01	High mobility corridor: several measures		● Speed and punctuality improved on corridor	● Overall network 3.5% passenger growth in 2 years; ● higher passenger growth on corridor of measure	● 917 hours passenger time savings a day realised
La Rochelle 8.01	Implementation of a second P & R	● 84% of citizens believe that P&R at entry of city is a satisfactory initiative	● First results on use are poor		● Poor results partly because of availability of alternative (free) parking areas
Norwich 8.04	Improve rail station interchange by better bus frequency, waiting comfort and information	● Only 34% of users were aware that frequency had been improved	● 98% of passengers satisfied or very satisfied with new	●Passenger bus trips between the city and the station	

			station facilities; ● 80% thought accessibility better; ● 68% stated security had improved	raised 10%	
Ploiesti 8.11	New shelters, information at shelters, facilities for disabled people	● -Only 23% of population could not mention at least 1 aspect of improvement	● 37% of passengers stated that quality of stops was improved		● See also 4.1 information
Preston 8.07/8.10, 8.09	Shelters at stops; better info; improving station environment; safety and security; bus priority; reorganisation of network		● Progress on satisfaction of stop facilities, but level of satisfaction still lower than on other aspects; ● satisfaction on frequencies raised on lines where frequencies were improved	● General decline in patronage not reversed; ● on one new orbital route 10% were former car passengers ● market changes in the same period had a severe impact	● See also section 4.1 on information systems
Toulouse 8.02	Development of proximity services on a metro station	● 81% of users of the station are satisfied with the shops; ● 46% favour upgrading other hubs in the same way; ● Use of shops best when at a location that people pass on their regular route			

Infrastructure related measures can stimulate PT use, as is shown in Genoa and Norwich; here higher ridership numbers could be reported, as well as higher perceived quality and improved customer satisfaction. In other cases at the time of reporting a rise in customer satisfaction could be measured, but not (yet) a rise in PT use (Debrecen, Ploiesti and Preston).

To achieve a higher number of passengers it is a condition that potential demand has to be there; in case demand has to be developed from zero, as in P & R, initial results can be poor, as in La Rochelle. Also in other cities in Europe the experience on P & R is that it takes a long time before people use it. Several examples can be given from sites that were empty at the start and are so well used after 10 years that they have to be expanded. From the CIVITAS-1 cities the example of Rotterdam can be given here.

The measure in Toulouse concerns the development of a shopping centre around (within) a metro station; travellers are satisfied with the shops but (up to now) no influence on the use of public transport could be measured here.

4.5 Measures on the Public Transport network

Measures around demand responsive services

Four measures developed demand responsive transport (DRT). The main impacts are presented in Table 4.5.1.

Table 4.5.1: Impact Public Transport Quality measures (demand responsive transport)

Site	Specific measure	Economy	Society Acceptance	DRT use	Transport PT use	Comment
Krakow 8.06	Introduction of DRT	● Cost coverage (that is, fare revenue contribution to the costs of running the scheme) 1%	● 74% of population in favour of additional DRT services ● Acceptance of reducing regular PT low	● 1700/ month	● Small rise due to improvement of services (DRT + regular services at the same time)	● DRT were additional; this enlarges acceptance but is expensive
Potenza 8.07	Introduction of DRT planned	● Cost coverage DRT calculated as below 15%			● Desk research showed expectation of 18% rise on routes involved	● Not implemented during CIVITAS period
Preston 8.08	Introduction of DRT	● Cost coverage DRT 15%	● 100% of users satisfied	● 500/ month		
Toulouse 8.04	Improvement of DRT	● Savings DRT 1,6 M€ /year compared to regular bus services	● 95% of users satisfied	● Use DRT raised 250% in 3 years	● Raise of DRT use due to better service has positive impact on total PT use	

Demand responsive services are an alternative for low used regular services. The example in Toulouse shows the potential savings. DRT by itself does not cover costs; it needs high subsidies per passenger. But it is an alternative to closing services which would create social exclusion. Experiences in the Netherlands with DRT have shown that several potential passengers have barriers to using DRT services; where a regular service is replaced by DRT the number of passengers generally drops. The (remaining) users are very satisfied, as is also the case in all CIVITAS cities were the measure has been implemented. A specific case of DRT can be found in Burgos, where DRT taxi services are offered to tourists; as this does not involve regular PT directly, this measure is reported in cluster 53 (mobility plans).

Other network related measures

The two measures in this subset in La Rochelle did not create impact, as one was not implemented yet (network reorganisation) and one was cancelled (night taxi services). Also the improved measurement system on the quality and structure of PT in Toulouse did not report impacts yet (Table 4.5.2). The improvements in Burgos on clean mobility services were part of a larger package; this has lead to a better knowledge of the system and increased satisfaction of citizens. The measure on organising collective transport for workers from different companies in Burgos was successful in terms of participation, satisfaction amongst companies and cost per passenger due to better loading factors. However a substantial and growing part of the companies shows no interest in participating in the scheme preferring exclusive arrangements for their own workers.
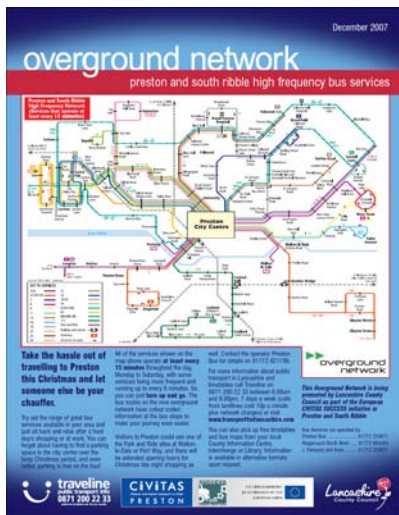
In Preston the network has been revised with a strong marketing concept (see picture). There are mixed results, largely because CIVITAS took place during a period of upheaval in Preston's bus market, with a new commercial operator taking over from the incumbent with whom Preston had been planning the projects. Although most projects went ahead, it takes time for relationships with a new operator to develop and monitoring information was not always made available. Nonetheless, there were some clear benefits from some of the public transport improvements.

Both in Burgos and in La Rochelle the full reorganisation of the network that is planned after CIVITAS will be based on an integral strategic plan and in both cases considerable growth of PT use is expected.

Table 4.5.2 Impact of other Public Transport network measures

Site	Measure	Impact	Remark
Burgos 8.02	Clean high mobility services	● In 2008 better knowledge of the system than in 2007; ● Perception good or very good raised from 72% to 95% in one year	● Combined with 12.02, see section 4.1
Burgos 8.05	Collective mobility services for target users in Burgos	● In 2008, 97% of the companies in the area stated quality of collective transport was suitable against 81% in 2005 ● Cost per passenger reduced by 35% due to better loadings	
Odense 8.07	Integration and quality improvements of PT services	● Integrated with impacts from ticketing and information	● See 4.1 and 4.2
La Rochelle 8.03	Reorganisation of the bus network	● Foreseen impact rise of PT use by 60% in 2020 (together with measure 7.2); this will also have an impact on the environment	● Delayed until 2009
Toulouse 8.01	Improving quality and structure of PT services		● No impact reported
Preston 8.07 (subset PT infrastructure)	Creation of an Overground network	● General decline in patronage not reversed; ● On one new orbital route 10% were former car passengers	● Part of this measure is reported under 4.4

4.6 Measures on safety and security of Public Transport

In four cities, security was the subject of a measure. Safety and security are unfortunately a hot item in Public Transport, as insecurity has a negative influence on the image and use of public transport. Measures to improve both perceived safety and actual safety are useful to reverse a trend here. Impacts of the measures are shown in Table 4.6.1

Table 4.6.1 Impact Public Transport Quality measures (safety and security)

Site	Specific measure	Society Improvement Security level by the measure/ in time	Transport General perception of safety and security	Transport PT use	Comment
Debrecen 8.05	Safety and security training for PT drivers	● Drivers got better focus on safety and security			● Also better focus from drivers on energy use
Krakow 8.11	Security plan and implementation at selected tram stops	● Best scores on improvement of security feelings were amongst tram drivers	● 28% of passengers do not regard PT as safe		
Malmö 8.02	Improved security and safety on buses through cameras	● Over 60% of passengers stated that cameras affect security	● 38% of passengers had experience with frightening situations	● 7% growth in 1 year; ● 13% of passengers stated they travel more due to the cameras	● The growth of PT use is from various measures
Stuttgart 8.12	Improved security and safety in buses, trains and at stations	● Slight improvement of safety and security over time	● In 2003 46% of women felt unsafe at stations at night		

Lack of perceived safety and security is a barrier for PT use. The perception of passengers on safety and security is a cause for concern. The surveys above, however, are with existing passengers, so there may be some survey bias: if people are saying that fear is a deterrent but they are on the system then it remains important to tackle the safety perception but the data may not be a valid reflection of the deterrent level. The percentages shown in the table above on the perception in Krakow, Malmö and Stuttgart do illustrate this. Especially at night the perception of risk is described as a barrier to PT use, particularly amongst women. Cameras can contribute to the feeling of security; however an integrated approach is needed. Security and safety are problems both for authorities and operators.

In Malmö only 13% of passengers stated that they use public transport more because of the safety measures (cameras).

5 Upscaling and Transferability

5.1 Public Transport and information measures

Upscaling

The new technological opportunities in information systems can be upgraded to network level; further upgrade is possible through integration with information on other modes and related services (such as P&R). Economic arguments do lead to less than full scale implementations, as the costs of the systems may not be directly recovered by additional revenues. In particular, panels at stops are regarded as not cost effective at stops with low numbers boarding, although several cities have implemented or plan to implement a system network wide. A cost effective solution could be the introduction of SMS information at low-use stops. An agreement between operators based on a financial plan is the common practice for planning the introduction and extension of information systems. One of the barriers to upscaling can be that the different stakeholders and operators are reluctant to share information out of commercial interest and reasons of competition. This is especially the case in areas with competition on the road. A "win-win" situation for all actors could foster a wider upscaling.

Transferability

As the systems based on new information technology can be delivered by several suppliers there are hardly technical barriers for implementation. Modern information systems are regarded as improving the image of PT, to make it more accessible and eventually to generate higher ridership. They can be implemented in every city and system where a solution can be found for the additional costs.

Table 5.1.1 Upscaling and transferability possibilities: Public Transport Information measures

Site	Measure	Upscaling	Transferability
Burgos 12.2	Infomobility tools	● New technology can be used to inform citizens in several forms and in several places	● New technology gives easy possibilities for info systems
Genoa 12.1	Intermodal infomobility platform	● System already covers whole city	● Introduction needs business plan to deal with uncovered costs
Krakow 12.3	Intermodal infomobility platform	● System is part of integrated platform with various possibilities for extensions from what is realised now	● Internet is regarded as a strong medium for promoting PT
La Rochelle 12.3	Real time information systems	● Electronic displays at stops on the urban network completely implemented; ● Implementation in suburban network not cost effective	● SMS is a cost effective alternative at stops that are not heavily used
Malmö 8.1	Marketing of new bus route system	● Building on the marketing strategy developed for of the implementation of this measure other parts of the networks could be promoted	● This approach can also be used in other cities in the region
Malmö 12.1	Use of real time applications for travellers	● There are technical possibilities to extend real info to all stops, but the budget does not exist to achieve this	● Implementation in other cities is recommended, as it contributes to the increase of PT use
Malmö 12.3	Mobile internet services in connection to bus information	● System is already operational at network level and accessible for everyone; ● Use could be further promoted ● A marketing strategy should be developed to increase awareness	● A national traffic information strategy is recommended (in Sweden) to encourage similar measures in other cities

Site	Measure	Upscaling	Transferability
Norwich 8.6	Linking individual passenger transport info with healthcare appointments	● Measure not implemented at the time of reporting	
Norwich 12.9	Provision of real time passenger information	● Measure will be geographically extended to other areas in Norfolk; ● Further upscaling is also related to funding: is there a possibility to generate revenues to cover the costs?	● Funding issues should be resolved
Ploiesti 12.13	Implementation of real time information system for PT	● Panels will be installed at all stops of the system	● Implementation should be based on a sound financial plan including costs of installation
Preston 8.10	Information and promotion for PT	● Measure already implemented citywide	● The conditions in the British bus market are perceived as not favourable for investments by the operator in info systems
Suceava 8.9	Improved public transport information	● Information already extended towards (almost) the whole network	● Use of standardised components makes transferability easy
Tallinn 12.6	Automatic stop calls & info sign in bus	● Equipment already to be installed in every new bus	● System available on the market
Toulouse 12.3	Development of an integrated multimodal traveller information system	● Upscaling of the info system on the metro and related to P&R sites is considered; ● The website covers already the whole network	● Information systems are regarded as essential; ● It should eventually be multi-modal and achieved in partnership
Sub-measures from other clusters			
Debrecen 12.4 (subset PT infrastructure)	Tramway priority scheme and real time passenger information system	● Upscaling of the tramway will follow traffic changes; upscaling RTI needs more resources than the city has	● Implementation should be based on agreement between authority and operator
Odense 8.7 (subset PT network)	Integration and quality improvements of sustainable modes	● Measure had several parts including information; ● The info system regarded as fit for upscaling to the entire network	● SMS services had attracted interest from other cities ● Telephone companies are looking for new markets and might be active partners in mobile services around PT

5.2 Public Transport ticketing and tariffs measures

Upscaling

Upscaling of integrated ticketing and the use of modern technology is technically possible and appreciated by the clients. It leads to passenger growth. It is a trend in Europe to expand the territories of integrated ticketing. Where several operators are involved, arrangements between them or between operators and authorities have to be made. Financial aspects often prevent or delay tariff integration and the investments in modern technology. Also, the solution is generally in the hands of the authority and the operators together.

E-ticketing has been recently introduced and is accepted by specific user groups; given the development in the use of internet amongst all groups of citizens this type of ticketing will have a bright future.

Transferability

Integrated ticketing is a matter of organising and can be recommended to all cities. New technology is available. A business plan before introduction should clarify how investment costs will be covered. This plan must take into account both the investment and operational costs of the ticketing technique and the effects of tariff integration on the receipts of the operators.

Table 5.2.1 Upscaling and transferability possibilities: Public Transport Ticketing and Tariffs measures

Site	Measure	Upscaling	Transferability
Krakow 8.10	Integrated ticketing and tariffs in Krakow	● Upscaling to other corridors into Krakow possible	● System is transferred from larger agglomerations
La Rochelle 7.1	Implement further integration of ticketing system	● Range of tourist passes could be extended by passes for 15 days (now range goes from 1-7 days)	● Where local partnership between PT and cultural and leisure sites can be created these passes can be introduced
La Rochelle 7.2	Strategies for integrated pricing system	● Already an integral approach (together with reorganisation of the network)	● Such a study is a basis for introducing a new tariff system
La Rochelle 12.5	Development of an integrated pricing system	● Already maximised within CIVITAS	● Smart card systems are technically complex and require significant investments
Norwich 8.5	On street ticket vending machines	● Upscaling to more busy stops is foreseen; ● Extension of functions by the machine is investigated	● Use is recommended, as on street ticket machines save boarding time
Preston 7.4 12.9	Implement integrated PT ticketing (7.4) and Implement integrated transport ticketing system (12.9)	● Upscale from test on one operator gradually in progress: larger share of riders, more operators; moreover upscaling to other services (library, meal purchases and leisure activities and mobile telephone) is expected	● Technology available
Toulouse 7.1	Innovative multimodal PT contracts, services and electronic ticketing	● Upscaling to agglomeration level possible, but needs additional agreements between authority and operators	● Investments can be paid back by additional revenues

5.3 Accessibility of Public Transport measures

Upscaling

Providing accessibility facilities to 100% is in principle technically possible and desired by the target group, but can be costly. The involvement of the authorities in financing is common practice. A long term (financial) plan can be helpful to achieve a target situation over a reasonable time. Involvement of associations of involved people may help to determine the needed adjustments and to set priorities.

Transferability

Providing accessible facilities to disabled people is easily transferable; where it requires investments it is often supported by politicians. When local awareness is created this can help to identify external sources of funding. As the measure cities pointed out, the accessible measures also increase the comfort and confidence of other users and are believed to increase ridership in the long run, so public transport operators should also be motivated to make these investments.

Table 5.3.1 Upscaling and transferability possibilities: Accessibility of PT measures

Site	Measure	Upscaling	Transferability
Burgos 11.11	Access for mobility impaired people	● Several additional measures to improve accessibility are planned	● Solving accessibility problems should be a priority, as this target group frequently uses PT and the measures benefit other users also
La Rochelle 8.6	Infrastructure improvement for collective transport	● Upscaling share of accessible stops to 100% and of comfortable stops to 70% planned as target for 2015	● Easily possible; ● It is important to have political support
Toulouse	Improving the	● Accessibility master plan	● Accessibility is crucial;

8.3	accessibility of PT services	foresees implementation of full accessibility on the whole network	● 100% accessibility is costly and can be reached only with political support ● The measures also benefit and attract other users
Venice 8.8	Introduction of low impact, access-for-all waterbuses	● Measure already on network scale	● Introduction of accessible facilities should be based on insight into travel patterns of disabled people

5.4 Public Transport infrastructure measures

Upscaling

Improving infrastructure by bus lanes and priority systems can attract new passengers but investments are needed; involvement and support from the authority can facilitate upscaling. In several cases funding can be achieved through institutional organisations as the European Investment Bank.

Transferability

Also in other cities, involvement of politicians is needed to upgrade the role of PT (compared to the private car) and to achieve the necessary funding. Separate lanes and priority systems are introduced everywhere in Europe as the interaction between the car system and the Public Transport system creates speed and reliability problems in almost all cities. Improving the attractiveness of stops and stations is also a way to raise the image of the system. As mentioned under the heading of upscaling funding can include the involvement of international institutions.

Table 5.4.1 Upscaling and transferability possibilities: Public transport infrastructure measures)

Site	Measure	Upscaling	Transferability
Debrecen 12.4 (see also table 5.1.1)	Tramway priority scheme and real time passenger information system	● For the moment priority will be restricted to 2 junctions due to influence on general traffic; ● A new traffic system is planned and further implementation may be carried out then	● Technically easy to implement ● Introduction should be based on financial and technical agreements between operator and authority ● Recommended that local authorities favour PT ● Priority systems need to be flexible to be adjusted to the local context
Genoa 8.1	Clean high mobility corridor	● Further bus lanes are foreseen	● Introduction should be according to the role of private and public transport and take into account the local laws
La Rochelle 8.1	Implementation of a second P&R	● More P&R sites planned, both in short run and long run	● P&R services should be accessible and have a fast service to the city centre to make them attractive for commuters
Norwich 8.4	Rail station interchange	● 3 other sites specified in the area which are fit for similar approach	● Highly recommended to cities at locations with a lot of interchanges
Ploiesti 8.11	Improved infrastructure for collective transport	● Upscaling requires funding	● Condition of infrastructure has to be evaluated before improving stops
Preston 8.7 8.9	Creation of an overground network for PT services (8.7)/ Improved infrastructure for collective transport (8.9)	● Infrastructure at stops could be improved at more routes ● Although there are no clear positive results from the measure 8.9 (due to the Preston bus competition) more measures are foreseen in the long run	● Easily possible; ● Political support is needed ● Operator support is also important

Site	Measure	Upscaling	Transferability
Toulouse 8.2	Development of proximity services at important passenger transport hubs	● There is potential for other (non transport) services in the busiest metro stations	● Scheme is attractive for operators willing to use commercial proximity services as a tool to increase attractiveness of PT

5.5 Public Transport network measures

Upscaling

Demand responsive transport systems (DRT), as introduced in Krakow, Potenza, Preston, and Toulouse, are basically fit for upscaling to other areas and times with low demand. The network reorganisation measures as in Burgos, Preston and La Rochelle do cover the entire network, so upscaling is not relevant here. The collective transport approach in Burgos could be extended to other industrial areas.

The reorganisation and redesign of networks can be done on any scale. In one case (Burgos) it was related to one industrial area and the approach can be repeated in other areas. In other cases the reorganisation was already planned at a network wide level, leaving no space for upscaling.

Transferability

DRT services can be transferred to other cities in areas or at times with low transport demand; these services are not covering costs but it can be cost effective to replace regular services by DRT. As shown in Krakow, however, there may be a lack of social acceptance for replacing regular services by DRT.

Reorganisation of networks should be carefully planned and supported by the authority. They can be carried out even in a competitive environment (Preston). Restructuring networks faces various difficulties, both from technical and of political nature. This is illustrated by the fact that all measures concerning the whole network have been delayed until the time after the CIVITAS-II project. The concept of a joint collective transport involving workers from different companies is transferable; however it needs a party that starts organising it.

Table 5.5.1 Upscaling and transferability possibilities: Public Transport network measures on Demand Responsive Transport

Site	Measure	Upscaling	Transferability
Krakow 8.6	Demand-responsive transport services	● Extension of DRT while keeping basic services running is costly	● Should be implemented as an alternative for regular PT and not in addition to regular services at the same time
La Rochelle 8.3	Reorganisation of the bus network	● Already an integral approach (together with pricing strategies)	● Needs integral approach and involvement of city
Potenza 8.7	Demand responsive transport system	● Upgrade planned to other areas with low transport demand as an alternative to regular services	● Suitable for areas with low transport demand as an alternative to regular services
Preston 8.8	Demand responsive and feeder services	● Upgrade planned to other areas with low transport demand	● Services do not cover total costs
Toulouse 8.4	Integration of demand responsive transport as a complementary service to PT	● Strategy is to introduce DRT everywhere where demand for regular PT is too low	● Measure can be used to optimise transport offer

Table 5.5.2 Upscaling and transferability possibilities: other Public Transport network measures

Site	Measure	Upscaling	Transferability
Burgos 8.2	Clean high mobility services including measures on network redesign	● Complete reorganisation of network foreseen in 2010, with new environmental friendly buses	● A strategic plan should form the basis of public transport network measures
Burgos 8.5	Collective mobility services for target users; the target group is workers in an industrial area	● Upscaling to other industrial areas possible	● There should be a party that organises the different stakeholders (companies, operators) to work together
La Rochelle 8.3	Reorganisation of the bus network	● Already an integral approach (together with pricing strategies)	● Needs integral approach and involvement of city
Odense 8.7 (see also table 5.1.1)	Integration and quality improvements of sustainable modes	● Measure had several parts: information, ticketing, bus priority; all of them fit for upscaling	● New technology can be used in many new services
Preston 8.7(subset PT infrastructure)	Creation of a badged "Overground" network; this includes redesign of the network	●Measure already network-wide	● Present the network simply
Toulouse 8.1	Improving quality and structure of PT services	● Quality measurement system is already network wide	● A semi-automatic quality measurement system is recommended to all operators

5.6 Safety and security in Public Transport measures

Upscaling

Measures on safety and security can technically easily be upscaled; however, funding is an important issue.

Transferability

Improvements in the area of safety and security are recommended to be implemented everywhere; the best way forward is a partnership between authority and operator. Both perceived and actual safety should be taken into account. Experience from other cities is useful. A master plan can be helpful in achieving the required funding.

Table 5.6.1: Upscaling and transferability possibilities: Safety and security of PT measures

Site	Measure	Upscaling	Transferability
Debrecen 8.5	Safety and security training for PT drivers	● Measure could be extended to all drivers	● Recommended, as it contributes both to safety/ security and energy use
Krakow 8.11	Security action plan for PT	● Update to other parts of the network is possible and desired	● Best based on a Security Action plan for PT
Malmö 8.2	Improved security & safety on buses	● All city buses are equipped with cameras; ● Measure could be extended to regional buses	● Introduction of cameras should be part of a wider strategy
Stuttgart 8.12	Security action plan for suburban railway	● Authority provided funds for upscaling and additional measures	● Introduction of measures can be incorporated in a security plan between operator and authority

6 Conclusions and Recommendations

6.1 Conclusions

General conclusions

1   Public Transport is of political interest in many cities as a clean mode of transport that can keep the city as an attractive place to be. However, choices are not made in all cases in favour of Public Transport compared to private cars due to (presumed) lack of social acceptance or legal issues. Key words in improving Public Transport on top of physical measures such as dedicated infrastructure and priority systems are information, integration, accessibility and safety/security, leading to an overall better quality. New technologies support these changes.

2   For making Public Transport measures in cities a success, a partnership between operators and authorities is essential; also the involvement of associations of interest groups can be helpful. As successful public transport developments in Europe show the development of the PT network hand in hand and coordinated with developments in city (re)structuring, a positive attitude from the authority towards PT is a precondition for success.

3   As the costs of measures for improvements of Public Transport can not most of the time directly be paid back through additional revenues from ticket sales, funding of the measures is an important issue for agreements between operators and authority.

4   The average size of the measures in Public Transport in CIVTAS was small; based on this only limited influence on the overall use of Public Transport and the modal split could be observed. The best results on growth of Public Transport use could be made in situations where packages of measures are implemented. Successful public transport measures in Europe start with the creation of attractive services (in terms of travel time and comfort) both for captive passengers and passengers who have other options. Infrastructure measures, creating an integrated network with frequent services and access and parking control form the basis here. Measures on ticketing, information, accessibility and safety contribute further to the success; however they can not compensate for poor services.

Conclusions on specific topics:

5   Modern Information systems such as websites, SMS-services and real time information at stops and in vehicles support a positive image of public transport and are appreciated by the users. The Malmö example of the website attracts 1.6 million visitors a month, showing the strength of the medium. Also the use in Krakow is considerable. SMS- information attracts a smaller target group, but 45,000 users a month in Malmö show that this medium is also suitable for use for information purposes.

6   The measures on information systems can be regarded as supporting measures enhancing the effect of other measures, as the direct impact in the short term on ridership is difficult to measure; the success of packages of measures in Suceava and Malmö illustrate this. As the technology is available there should not be large technical barriers to introduction of these types of measures; however, most cities reported to have encountered technical barriers to a certain degree in the implementation phase. Several cities reported financial barriers in relation to this type of measures; involvement of authorities can help to overcome these barriers.

7   Integration of tickets and introduction of modern technology will be introduced in many systems, but a sound financial plan is needed to cover investments and operating costs of a system-wide chip card system. A market study, as in Toulouse, can be helpful here. In several

cases, there was a considerable delay in implementing chip-card systems due to technical barriers. Tariff integration leads to higher ridership (Krakow, La Rochelle); this does not always lead to higher revenues. Introduction of e-ticketing is successfully applied in Malmö and Odense; this form of ticketing is perceived as having a bright future.

8   Measures on accessibility are targeted at a small group, so no high impact on ridership can be expected. However users from the target group do appreciate these measures strongly (Burgos, La Rochelle, Toulouse and Venice); ridership within this group can increase, as is demonstrated in La Rochelle. Accessibility measures are required by law and many cities make long term plan in order to make the system fully accessible within a time period of 5-10 years. As barriers for introduction four out of five cities reported organisational barriers.

9   Infrastructure measures such as separate PT lanes and improved stop facilities can stimulate the use of PT use, as is demonstrated in Genoa, Preston and Norwich. Introduction of P&R facilities does not lead in all cases to immediate success, as is shown in La Rochelle; however, earlier projects have shown that in several cities in Europe success came only in the long run. A positive attitude of authorities is needed for implementation of infrastructure measures, especially where the measure could have an impact on the car system. Four out of seven cities reported legal barriers around this type of measure; also technical barriers were noticed by four cities.

10   Demand responsive transport services (DRT) can prevent social exclusion in cases where a regular service is not cost-effective, as is shown in Toulouse. Also Krakow, Genoa and Potenza prepared or implemented DRT services.

11   Redesign of total networks is not easy to implement; the proposed measures in CIVITAS concerning whole networks were all delayed. Both technical and organisational barriers around this type of measures were reported by several cities Specific services for workers in industrial areas have been successfully implemented in Burgos.

12   Safety and security has become a hot item in PT with a threat to influence in a negative way the attractiveness of the systems. Integrated plans on safety and security have been successfully implemented in Stuttgart and Malmö. This type of measure requires partnership between authorities and operators. Two out of the four cities reported organisational barriers.

6.2   Recommendations

1   Partnership between operators and authorities are contributing both to the implementation and the impact of measures in public transport. Authorities who are making better PT as an integral solution of the transport problems should create an integral approach for city development and transport planning and should create a partnership between authority and PT. The Commission should encourage these partnerships; one of the ways to do this is to show the result of measures where these partnerships were realised.

2   The European legislation with regard to competition in local PT gives the member states various options on how public transport on a local level can be organised. Most of the successful measures in PT have been achieved in local frameworks containing an exclusive right for a limited period for PT operators. These exclusive rights form a good basis for partnerships. PSO contracts form the basis and can include (on top of a description of the service level of PT in quantitative terms) issues as information, ticketing, accessibility, safety and security. It is recommended to apply PSO contracts in this (extended) way.

3   Impacts of several measures could not be measured as some impacts are only on the long term and because the impact of several individual measures was expected to be small. It is recommended to establish an evaluation framework taking on board interested cities from the CIVITAS-2 projects where these long term effects on public transport use can be measured.

4   New technologies with regard to information systems and ticket systems are widely available. A modern image of public transport contributes to ridership and satisfaction. As packages of measures show more impact compared to individual measures, a city's own packaging should be promoted.

5   Accessibility for all has become compulsory by legislation. This requires considerable investments that are needed for a limited group of users. However as PT is an integral part of the living cities the implementation of full accessibility should be high on the agenda.

6   Demand responsive transport services (DRT) can be considered in cases and at times with very low loadings. DRT services are not profitable by themselves; however in cases where regular services are replaced by DRT they might reduce the deficit whilst still offering an acceptable level of service.

7   Safety and security items are having a bad influence on the image and use of PT. An integrated approach here is needed and partnerships between operators and authorities on this area should be encouraged. Authorities should recognise that security and safety problems are joint problems for authority and operators.