People are more willing to use sustainable travel options that offer better value and are more convenient. Integrated public transport ticketing and fair tariffs can help to overcome perceived and objective barriers. Facilitating the combination of modes by making ticketing systems as easy to use as possible is proven to increase the attractiveness of public transport.
Integrated ticketing and payment facilitates public transport access

Integrated ticketing can be defined as the purchase of a single ticket that allows passengers to travel on one or more modes of transport provided by one or more operators. It is an important component of the broader concept of integrated transport, which aims to make interchanges between modes and operators as effortless as possible. This would not only provide travellers with a wide range of travel options but also make transport systems more efficient and interconnected as a whole. Consequently, integrated ticketing can make better use of existing capacity to reduce over-investment in competitive modes of transport.¹

This overarching idea is closely connected to the European Union’s goal to increase sustainable intermodal passenger transport. For over a decade integrated ticketing has been on the EU transport policy agenda and there seems to be considerable potential for intermodal transport within Europe. In its 2011 White Paper² on transport the European Commission sets out the vision that ‘new transport patterns must emerge, according to which (...) greater numbers of travellers are carried jointly to their destination by the most efficient (combination of) modes.’

Combination and integration gives the opportunity to use the entire public transport system across a local or regional area independently of transport modes, tariffs, fares, schedules, or ticket systems. Disparate public transport systems tend to neglect the needs of customers, which ultimately results in decreasing ridership. In particular, the absence of an integrated public transport system can cause problems and inconveniences for customers and authorities, such as lacking comfort and information, and increased travel time and costs.³

Besides network and timetable integration, a further important step in implementing an integrated public transport system is the integration of tariffs and fares. Tariff integration usually follows network and timetable integration as a second step. However, tariff and fare integration is a milestone for reducing access barriers to public transport. Ideally, tariff and fare integration should be implemented in parallel with the network and timetable integration. The benefits of network and timetable integration are significantly reduced if the customer needs several tickets and tariffs for his trip depending on transport mode and operator. The customer prefers to use the public transport system if they can use one ticket inside a transparent and easy tariff and fare system. Network and timetable integration is complemented by tariff and fare integration, as both issues have to be resolved in order to enjoy their full benefit.

The EU-funded SPUTNIC⁴ project provided an overview of different levels of implementation of tariff and fare integration within Europe:

- Mutual acceptance of tickets on the same route: This occurs when operators with services on the same route mutually accept tickets issued by others as valid for travel. This is often feasible without complex revenue allocation, especially if both operators have approximately the same share of public transport supply, number of tickets sold and number of passengers. However, if one operator sells many more tickets than the other (thereby earning all the respective revenues) or provides far more services than the other on a common route, compensation payment will be needed. With this level of tariff integration, network integration is less important because a customer’s trip with an integrated ticket is limited to one route, usually without changing. This integration level is suitable in cases where national and regional legislation is weak. Often operators initiate the mutual acceptance of tickets on the same route by themselves.

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¹ Study for the European Parliament’s Committee on Transport and Tourism on integrated ticketing on long distance passenger transport services, 2012.
Mutual acceptance of tickets within the same network: This is an expansion of the previous case where there is mutual acceptance of tickets not only on the same route but across the whole network of two or more operators. Depending on the area covered by the network and the number of participating operators, adequate revenue allocation may be required. Furthermore, network and timetable integration becomes more relevant because a larger number of customers will use several transport modes and operators for the same trip. This integration level is also suitable in cases where national and regional legislation is weak and politicians are insufficiently interested in the issue of public transport integration. Operators often initiate the mutual acceptance of tickets within the same network by themselves.

Tariff unions: In a tariff union all operators in a specific network aim to integrate several tariffs of different operators within the same region to create a transparent tariff and fare system that provides one ticket for all transport modes. Tariff unions are also suitable where there is no supporting national or regional legislation. Revenue distribution is undoubtedly necessary within a tariff union involving several operators covering a large network area. Similar to the mutual acceptance of tickets, tariff unions can also be distinguished according to their level of ticket acceptance. Firstly, a season pass tariff union offers a monthly or yearly pass for all modes of public transport and all operators within the whole union area. Only regular public transport users benefit from a season pass tariff union. This can lead to a shift in ticket sales, with fewer single tickets bought by irregular customers to more season passes bought by regular customers, thereby increasing customer retention. Season pass tariff unions are often implemented as an intermediate step on the path to an integrated tariff union, in which all ticket types (passes, single and multi-trip tickets) are valid for all modes of public transport and all operators in the respective union area. Occasional customers or tourists as well as regular customers can also benefit from an integrated tariff union.

Transport associations: The creation of transport associations, which are formal entities dealing with the management of tickets and fares, is the highest level of integration for different transport services and modes. There is no difference between tariff union and transport association from the perspective of tariff integration, but the service integration is much more developed. If the public authority (local, regional, or national government) aims to improve public transport for the benefit of passengers, the authority can set frameworks for legislation and financing, and establish a responsible public transport authority.

To enhance the use of public transport, cities should aim to make the ticketing system attractive and easy to use for everyone. The pricing system should be coherent and simple with sufficient variety of ticket options to take users’ needs into account. The basis for fares should be transparent and easy to understand. Tickets and payment facilities should be widely available, for example at sales points distributed throughout the city, at ticket vending machines near public transport stops, via the internet, or with smartphone applications.
CIVITAS stimulates ticket integration of public transport

By making improvements to ticketing and tariff systems, the ease and convenience of purchase attract more public transport passengers, resulting in fewer private cars entering the urban area and greater traveller satisfaction. CIVITAS encourages new ways to maximise the potential of local public transport systems, and has realised numerous measures since 2002. The CIVITAS Initiative’s Thematic Group on Collective Passenger Transport provides a number of resources, such as training and guidance material, policy recommendations, and learning opportunities such as trainings, study tours or workshops. The group also offers the possibility to network with the city officials and experts involved in examples of best practice.

CIVITAS I | Stockholm (Sweden): Introducing a smartcard system and integrated ticketing

As part of a long-term project begun in 1993 to modernise Stockholm’s public transport system and better serve passengers’ needs, Stockholm Transport realised that a smartcard system would be an important part of the solution. A prototype smartcard was tested in 2000. Ticket validation machines were installed in all buses operating on one of the city’s routes and card readers were installed in automatic barriers in two metro stations. The aim was to gauge the reactions of passengers and transport personnel to using a card that had to be validated by machine, rather than simply shown to a bus driver or ticket conductor. Furthermore, the smartcard used in the system had to correspond to the standards of Resekortsföreningen i Norden, an association of transport operators in Sweden and Denmark. This meant that passengers had to be able to use the card throughout Sweden and also when using the Öresund Bridge between the southern Sweden and Zealand in Denmark. With the possibility of internet purchase, the focus moved to self-service sales, although the new system also featured a higher number of easily accessible sales points. The new smartcard system, Stockholm Transport Access, was introduced to the public in 2009 and the old system was gradually replaced. By the end of 2010 a total of 2.9 million cards had been distributed, with 850,000 in use on a regular basis.

CIVITAS II | Kraków (Poland): Integrated ticketing and tariffs

Kraków aimed to create seamless intermodal connections in the city through the use of common tickets and tariffs for national railway and local public transportation services. Prior to the measure’s implementation, there were no integrated tickets for the national railway service and other modes of transportation. To promote the use of public transportation and improve passenger flows, the city decided to test an integrated ticket and tariff solution. Due to budget constraints, the pilot application was limited to one transport corridor (Krzeszowice – Kraków). According to a feasibility study, the introduction of integrated tariffs and tickets in Kraków could be based on the experience of Wrocław, where an agglomeration ticket can be purchased by means of a surcharge on the public transport season ticket, allowing an unlimited number of journeys on rail and bus lines. Meetings between the city of Kraków and the Polish Federal Railways resulted in the preparation of a contract on integrated tariffs and ticketing. The trial project, integrating tickets for the railway line between Krzeszowice and Kraków with one line of the city’s public transport system, was launched in March 2008. The integrated ticket achieved a 10 percent market share, and on the basis of this success the system was extended to four additional corridors. The trial became a commercial service, with all stakeholders being very confident about the success of the partnership.

Bologna introduced a new integrated fare and ticketing system that foresees season tickets as contactless smartcards. One of the key aspects for the success of such a system is the creation of a widespread network allowing cardholders to top up the cards with money. The measure implemented a service to top up cards at bank ATMs that are already used in everyday life and familiar to citizens. The main objectives of this measure were to increase the service quality of public transport and the rate of its use. The measure started with making contact with banks in order to evaluate the feasibility of the system, which received a great deal of interest from the banks themselves. After a feasibility study was conducted, the system was implemented and started in September 2011, coinciding with time at which most season tickets are renewed. Season tickets can now be recharged at any time at more than 300 ATMs in Bologna and the surrounding province. From September 2012 the service was also available through the public transport company website, thus allowing customers to renew their season tickets online using their credit card. An intensive public information campaign was carried out to promote the new system and evaluation activities based on the data collected through the system were carried out, as well as a telephone survey of 500 season ticket holders regarding customer satisfaction and the accessibility of the service. The survey demonstrated that season ticket holders appreciate the new service and consider it convenient and practical. From August 2011 to September 2012, 5,636 season tickets were renewed through ATMs, and the new system had a positive impact on the operational costs of the ticket offices. This included a saving of 4,360 man hours per year, which is equivalent to approximately EUR 100,000, or around 12 percent of the total personnel costs in ticket offices.

Private transport usually provides ‘door-to-door’ transport and while this is not always a realistic possibility for public transport, transport integration seeks to make journeys as simple and pleasant as possible. This can be achieved by planning services so that where a change of vehicle is required, passengers can enjoy pleasant and sheltered interchange facilities and short waiting times for the next service. Furthermore, the passenger should benefit from ‘one purchase’ ticketing for the whole journey, which is the essence of multi-modality. The advantages for passengers of not having to buy several individual tickets are saved time, more convenience, and the impression of a smooth and journey - even though there may be one or more changes required. Transport operators benefit from multi-modal ticketing too. This can take the form of less time spent handling money and shorter queues, implying lower demand on staff and an overall saving in the cost of maintaining ticketing facilities.

Apart from the CIVITAS examples mentioned above, there are plenty of further examples of integrating ticketing and its smart technology in European cities. In this context, three case studies from CIVITAS Forum Network member cities Bolzano and its Province (Italy), Turku (Finland), Zurich (Switzerland), and one from The Netherlands offer insights in the field of integrated ticketing and fare policies for public transport.

In 2012 the Province of Bolzano introduced an electronic ticketing system on its public transport network. With the same contactless card people can travel on almost all buses, trains and cablecars in the Province and the more they travel on public transport, the less they pay. The AltoAdige Pass project started with the aim of improving the quality of public transport in the Province of Bolzano, with a particular emphasis on attracting new passengers. Although the public transport system was already of high quality, both in terms of infrastructure and vehicles, a further investment was made in ticketing technology. Thanks to the AltoAdige Pass all trips made by individuals are registered and counted on an annual basis. Different fares are then
applied, with a cost per kilometre which diminishes as the total kilometres travelled increases. Kilometres travelled are counted from the check-in at the beginning of the trip to the check-out at the end of the trip. Commuters are granted an initial credit of 500 km. Discounted rates (by about 25 percent) are available for families, while people aged over 60 only pay a fixed annual price of EUR 150.00. Primary school students, those over the age of 70, and other qualifying groups such as those with certain disabilities can access the system for free. The incentive mechanism of decreasing fares as kilometres travelled increase was conceived in order to encourage people to use public transport more intensively, with a great deal of success. In the first year of operation of the new ticketing system over 120,000 passes were distributed, with a 75 percent increase in season tickets in circulation. Passengers are also encouraged to use public transport, as the system includes a user-friendly interface with a personal online account, the availability of multiple options for recharging the card, and a convenient fare structure. The system is an example of best practice for further exploitation and application by other cities.9

Turku, a city of 180,000 inhabitants, is planning to expand its bus network and lay the foundations for the possible redevelopment of its tram network. Around 25 million journeys take place in Turku every year, on a network that includes 300 buses owned by seven bus operators and travelling on routes with a total of around 2,000 stops. Turku’s local public transport system is one of most modern and innovative in Finland. In July 2014 a new regional public transport system was launched covering Turku and five neighbouring municipalities, with a total of 280,000 inhabitants. As part of this, the transport authorities in Turku expanded and modernised the bus network. Turku also chose a new integrated telematics, passenger information and electronic fare collection system to control its local public transport that involves three technological innovations. The first is a touchscreen terminal in public transport vehicles that provides the ability to buy and validate tickets and communicates with the head office. This ensures that passengers get reliable and real time information on all channels, such as displays via the internet and on smartphones, as well as a fast printer for paper tickets. In autumn 2015 Turku introduced barcode scanners to validate tickets on paper and smartphones. A self-service ticketing machine allows passengers to buy an appropriate ticket or swipe their smartcard or barcode tickets when they board. The innovative software has now been implemented in all of Turku’s 300 buses. The key achievement of this technology is the ID-based ticketing, enabling new ticket products for travellers. Turku previously only had two cards valid for set periods (30 and 90 days). With the new system, Turku launched a new ticketing possibility in September 2015 allowing customers buy a wider range of ticketing options covering periods from 10 to 235 days.10

Zurich is one of Europe’s most prosperous cities with a very high rate of car ownership. Despite this, over 50 percent of all travel is carried out by public transport, making the city the owner of one of the most successful public transport systems in Europe. As such it is living proof that where there is high-quality, closely integrated and reliable public transport even wealthy car-owners will choose to use it. Although part of this success is based on the types of transports used (electric trains, trams and trolleybuses) what binds everything together is the ticketing system. The overriding aim is to encourage passengers to buy tickets valid for longer periods and multiple trips by heavily subsiding them when compared to the cost of a single ticket for immediate travel. This is primarily because once a person has a ticket which is valid for a longer period, they are more inclined to use it again and again, instead of going by car. Offering these tickets is also cheaper for the transport operator through savings on time spent handling cash and use of materials for tickets, and the savings are passed back to the ticket holder. In Zurich most tickets function as entitlements to travel and can be shared between friends and family, as long as only one person is using it at a time. Once validated even standard single fare tickets allow the holder to make multiple journeys. This means that it is possible to break a journey and even make a return trip for no extra cost, providing all travelling is completed

within a time limit. The only exception is with the short journey ticket which is designed for a single journey of only a couple of stops. Zurich has not forgotten the needs of less frequent passengers, and to encourage this group to use public transport there are several types of multiple fare tickets that can be bought in advance and provide the equivalent of six individual tickets more cheaply than if bought individually. To encourage young adults who might also be thinking of buying cars to continue using the public transports, people aged under 25 can buy certain ticket types at reduced rates. This is because Zurich wants to encourage young adults to develop the habit of using public transport and continue doing so throughout their lives.11

The OV-chipkaart system is a public transport smart card system used in The Netherlands. Trans Link Systems was established in 2002 by the five largest Dutch public transport companies to implement a single payment system for public transport, and works in partnership with the carriers involved to ensure the OV-chipkaart is made available to people using public transport in The Netherlands. The OV-chipkaart can be used on the bus, metro, tram and train, and can be loaded with credit in Euros with which one can travel anywhere within The Netherlands, or with a travel product such as a single, round-trip, one day pass, monthly pass for a certain stretch or season ticket. This payment system for the Dutch public transport system provides several additional advantages for the passengers, such as the fact that they do not need to queue to buy their tickets. The system, moreover, is built in such a way that the passengers can find it easy to pay for their journeys, and the e-ticketing system offers secondary application possibilities, like compiling transport data and further optimising customer management.12

Innovative ticketing systems are the future of integrated ticketing

The concept of integrated transport has broad political support but developing effective policies that deliver the desired outcome has proved difficult. The key factor for success is the development of a simple and user-friendly system. For example, new ticket vending machines should be designed in a self-explanatory manner so that no outside help is necessary. They should offer a multilingual service for inhabitants who don’t speak the native language and for foreign tourists and visitors.

When the Flash Eurobarometer 31213 was carried out in 2011, one in every two respondents in the EU-27 said they would use public transport more often if a single ticket for all means of transport was available. This shows the positive attitude Europeans have towards integrated ticketing solutions, and the increasing use of smartphones means that they will become an important way for people to pay and validate tickets for public transport in the future. Most experts agree that near field communication (NFC) technology will become increasingly important for smartphone applications for ticketing. NFC applications can integrate several independent services and hold the promise of freeing single operators from the need to set up a high-cost infrastructure of check-in/check-out devices. However, customers still want to have a choice of different payment options, and smartphone applications will not appeal to everyone. Therefore, different payment options should remain available. A change in the ticketing environment must be accompanied by a communication strategy explaining the change in detail, and emphasising its benefits for all, for example reduced fare evasion and more convenience.14

CIVITAS cities that have implemented information measures also monitored their impacts on behaviour, society and economy, while measures on ticketing and tariffs have been mainly evaluated in terms of user awareness, user acceptance and transport quality. The public responded well generally to public transport information measures. Most respondents liked the information provided at public transport stops and in vehicles and the two measures on which cost-benefit analysis was carried out yielded positive results. Public transport users were generally accepting of and satisfied with ticketing measures, especially passengers who had no previous experience with vending machines and e-ticketing systems. While new transport ticketing systems usually involve substantial financial outlay, each of these measures demonstrated that the benefits outweighed the costs.15

It is both desirable and feasible that these measures become more widespread. Most of CIVITAS cities plan to implement information measures in all public transport vehicles and stops. Installing integrated ticketing and use of modern technology across a whole public transport system is not only technically possible, but is appreciated by users as well. The general trend is that more cities and regions are implementing integrated ticketing. While there is high transferability potential for these kinds of measures, thorough research, co-operation between stakeholders, realistic financial planning and a reasonable time schedule is required for ticketing systems to be integrated.

The main barriers are technological in nature. Making ticketing systems integrated and standardised and problems with hardware, software, and real-time data can hamper overall ticket integration. Another barrier occurs when multiple operators are involved, as various co-operative arrangements between operators and authorities need to be made. Properly involving all relevant stakeholders and planning interactive stages well are crucial factors for success.

Many potential benefits from public transport ticketing measures were explored during CIVITAS.16

- For the public: The ease and convenience of purchase afforded by innovative ticketing systems in a city should attract more public transport passengers, resulting in fewer private cars entering the urban area and greater passenger satisfaction. The accessibility of public transport in general is enhanced with the introduction of a ticket valid for all services and vehicle types.

- For individuals: Every public transport user can benefit from a new ticketing system as the new offers are adapted to a variety of needs and travel patterns. When using a smart card or smartphone application, public transport passengers can save money because the best price for the trips is often calculated automatically (for example after a certain amount of trips passengers get a price reduction). If ticket vending machines are provided at bus stops or in vehicles the time for boarding diminishes and the reliability and efficiency of public transport services increases due to the fact that tickets are not bought from the driver. An important issue is also the availability of sales points for different user groups (e.g. elderly people or people with reduced mobility).

- For companies: Private companies and their employees can profit from the new systems when sale and subsidy of public transport fares for employees are simplified. Public transport companies especially benefit from this measure through the increased number of passengers generated by the service. By offering tailor-made tickets for specific user groups, new markets can be developed.

15 CIVITAS PLUS, 2012, Policy Recommendations for EU Sustainable Mobility Concepts based on CIVITAS Experience
16 See also: Röder, Dettke, CIVITAS II Policy Advice Note: Innovative ticketing systems for public transport
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