



what works centre for  
local economic growth

Toolkit

Transport

Integrated ticketing

## What is it and what does it aim to do?

Integrated ticketing provides users with transferability across different modes, operators or geographies. Integrated ticketing is often implemented as a 'smart ticket', where information is stored electronically rather than being printed on a paper ticket. UK examples include London's Oyster Card, Birmingham's Swift Card and the ITSO Card. Benefits to users include ease of access and the ability to treat a public transport system as one single integrated system. In most cases, an integrated ticketing system will also involve integrated tariffs, whereby common pricing structures exist across different transport modes and operators. This may have the additional benefit to users of reducing costs, as multiple tickets are not required for travel.

This toolkit considers what the evaluation evidence tells us about the impact of integrated ticketing on local economic growth. As none of the available studies examine local economic growth effects directly, we focus on ridership effects. Increased ridership may reduce congestion, which acts as a barrier to growth. Some of the additional journeys, e.g. if they are work-related, may also directly generate economic benefits. Furthermore, whilst user benefits are not the focus of our toolkit, increased ridership may be a sign of improved service experience for public transport passengers.

The toolkit does not attempt a full assessment of the overall costs and benefits of integrated ticketing. Instead, it is intended to inform discussions about potential wider economic benefits that may be used to justify investment.

## How effective is it at increasing ridership?

The available evaluations suggest that integrated ticketing may increase ridership on public transport services. All four studies that consider the impact of integrated ticketing on overall ridership find positive effects.

The evidence suggests that the ridership effects from integrated ticketing may be significant, even in comparison with other ridership determinants such as service quality and economic growth.

Different features of integrated ticketing systems may have different impacts on ridership. For example, on the basis of the available evaluations, transferability across modes and operators (single ticketing) usually has a positive impact, whereas the ability to transfer the ticket between people appears to be less important.

## How secure is the evidence?

This toolkit summarises the available ex-post (i.e. after introduction) evaluations of the effect of integrated ticketing on ridership. We focus on evaluations that identify effects which can be attributed, with some degree of certainty, to the introduction of integrated ticketing. More details and discussion of our inclusion criteria are covered in the annex.

The evaluations provide some guidance on possible impacts on ridership. But given that results are likely to be scheme specific, additional sources of evidence (e.g. bespoke surveys, ex-ante modelling, etc.) should play an important role in making decisions around integrated ticketing in any specific context.

Generally, the evaluation evidence base on the wider economic benefits of integrated ticketing is quite weak, and focussed only on ridership, meaning that the conclusions are based on a limited number of studies. We found no evaluations which directly explore the effects of integrated ticketing on wider economic factors such as employment or growth. More rigorous studies, which look at a wider range of economic benefits, are required. We found no systematic reviews and no meta-analysis.

We found five studies that evaluated the effectiveness of integrated ticketing on ridership. Two studies use panel data methods to deal with selection. The other three studies provide before and after comparisons using reasonable control variables, but no control group.

Four studies look at the overall levels of ridership, while one study looked at the impact of an integrated ticket on additional ridership by customers using standard (i.e. non-integrated) tickets.

All of the studies come from countries in Europe, however only one is from the UK.

Oyster is widely cited as an example of a case where integrated ticketing has boosted ridership, but we have not been able to find any evidence of the impact of Oyster on demand (and discussions with TfL suggest that they do not have such evidence).

For a full list of studies and summaries of their findings, please see the Annex.

## Is integrated ticketing cost-effective?

None of the five studies provide a detailed analysis of the wider economic benefits of integrated ticketing (e.g. in terms of congestion, employment or productivity) so we cannot assess these benefits relative to costs.

The annex briefly summarises the findings from the five evaluations in terms of operator revenues. But it is important to note that cost-effectiveness in terms of operator revenues and costs was not the focus of our review. A much wider evidence base is available that could inform assessments of possible effects on operator revenues and costs.

## Things to consider

- **What type of integrated ticketing system should be adopted?** The available evaluations suggest that transferability across modes and operators is the feature that is more likely to deliver ridership increases.
- **Is integrated ticketing more suitable for urban and intercity travel?** Evidence from one study suggests that certain kinds of integrated ticketing have ridership effects that vary by the type of service e.g. single ticketing may be more beneficial when applied in an urban setting.
- **Could the effect on ridership vary across different transport modes?** For a system implemented in Madrid, one study suggests there are larger ridership effects on the underground network than on buses. This may be inherent to underground as a mode, or it may be because underground travel is longer and more complex (e.g. involves more interchanges).
- **Will operators need to be compensated for lost revenue following the introduction of an integrated ticketing system?** Although integrated ticketing schemes don't necessarily result in discounted or reduced fares, the studies highlight the concern that where this is the case, (especially when heavily discounted) integrated tickets can impact negatively on revenues. However, the studies suggest that the increase in ridership eventually makes up for the fall in price and operator revenue increases in the long run. Once again, it is important to note that a much wider evidence base is available that could inform assessments of possible effects on operator revenues and costs.
- **What kind of evidence will be used to inform decision making?** Results are likely to be scheme specific: changes in fare structures (including new products and discounts, concessions, special offers, zoning) the number of operators and modes covered in schemes, retail systems, marketing, etc. may all have a direct impact on ridership. The evaluation evidence provides some guidance, but additional sources of evidence (e.g. bespoke surveys, ex-ante modelling, etc.) should play an important role in making decisions around integrated ticketing in any specific context.

# Annex: Evidence on Integrated Ticketing for Transport

## What kind of evidence do we consider?

The aim of our toolkits is to summarise the available ex-post (i.e. after introduction) evaluation evidence on particular aspects of policy design – in this case integrated ticketing. We consider a wider range of evaluations than for our evidence reviews. But we continue to focus on finding and summarising evaluations that identify effects which can be attributed, with some degree of certainty, to the introduction of integrated ticketing.

Our objective is to assess the quality of, and summarise the lessons from, the available evaluation evidence in a way that can help inform local decisions. Wholesale changes in ticketing tend to be accompanied by other large changes in the public transport system, including new infrastructure, new customer service systems, new branding, improved quality, etc. Even when this is not the case, integrated ticketing tends to be introduced ‘system-wide’ which makes it hard to generate suitable control groups. These complications make ex-post evaluation of the impacts of integrated ticketing hard. We focus on summarising the findings from available evaluations, while recognising that additional sources of evidence (e.g. bespoke surveys, ex-ante modelling, etc) may play an important role in making good decisions around integrated ticketing in any specific context.

We initially looked for ex-post (i.e. after introduction) evaluations that investigate the impact on local economic growth. We found no studies that do this and that also meet our criteria for inclusion. Instead we focus on studies which evaluate the impact on: a) ridership levels; and b) operator revenue. We only found suitably robust evidence on the former of these.

We looked for evaluations of programmes which involved an element of integrated ticketing within them. We included interventions such as smart cards and mobile ticketing (i.e. tickets on mobile phones), as well as more traditional season ticketing etc. where they cross geographic, mode or operator boundaries.

We focused on evaluation evidence from the OECD, in English. We considered any study that provided before and after evidence; or cross-sectional studies that compared across different systems. We also included more robust studies that compared changes to participants with a control group. That is, we included evidence that scored 2 or higher on the [Maryland Scale](#). Using these criteria, we found five studies that looked at the effect of integrated ticketing.

## The evidence

**The evidence suggests that integrated ticketing may increase ridership on public transport services.**

Four of the five studies find positive effects of integrated ticketing on overall ridership.

Study TT28 (SMS 3) explores the impact on public transport ridership as a result of various Integrated Tariff Systems (ITS) interventions across Italy between 1991 and 2002. By the end of this period, 42% of urban transport systems in Italy were fully or partially integrated.

The study finds that introduction of ITS in Italy increased ridership by 2.2% in the short term, and by 12.0% in the long term.

Study TT30 (SMS 3) explores the impact of introducing deeply discounted season tickets in the four Swiss cities of Basel, Bern, Geneva and Zurich in the mid-1980s. All the season tickets were transferable across transport mode. However, whether they were transferable across operators or people (e.g. ‘friends and family’) varied across cities, regions and time periods. The study finds that the tickets led to significant ridership increases across the cities ranging from 4.5%-16.1%. This study controls for lower fare prices (due to transferability across the network) so this is the estimate of the ‘pure’ integration effect.

Study TT31 (SMS2) examines the effect on ridership of a travel card scheme that was introduced in 1987 in Madrid. The most significant feature of the scheme was that the travel card was transferrable across the whole public transport network under an integrated fare system. The study finds that the travel card is associated with a growth in bus and underground ridership of 3.4% and 5.3%, respectively. This study does not control for lower fare prices (due to transferability across the network), so this is the estimate of the combined effect of both price reduction and ‘pure’ integration.

Study TT32 (SMS2) examines the effect on ridership of two new season tickets that were introduced in 1984 and 1991, respectively, in the southern German city of Freiburg. Both tickets were monthly travel cards that were cheaper than existing tickets and were transferrable across modes and transferable between friends and family. The second ticket additionally allowed travel region wide across all operators and transport modes. The study finds a higher ridership of 7%-20% associate with the introduction of new integrated tickets. As with study TT30, this study controls for lower fare prices (due to transferability across the network) so this is the estimate of the ‘pure’ integration effect.

The fifth study TT40 (SMS2) does not consider overall ridership levels. Instead, it looks at the impact of an integrated ticket on additional ridership by customers using standard (i.e. non-integrated) tickets (with results discussed below). The study reports an overall increase in ridership on both tube and bus, but the travelcard user element of ridership is simulated so does not meet our inclusion criteria.

**The evidence suggests that the ridership effects from integrated ticketing are important, even in comparison with other ridership determinants such as service quality and economic growth.**

Study TT31 estimates the relative effect of different variables on underground and bus ridership in Madrid between 1986 and 2001. It finds that in the long run, the introduction of a travel card system accounts for 14.9% of the increase in underground ridership. The factors that led to the largest increases in underground ridership were employment growth (29.3%) and route length (27.1%) and GDP growth (18.7%). For the bus network, the travel card system accounted for 7.1% of the increase, and the biggest factors were with route length (16.3%) suburbanisation (15.4%) and GDP growth (12.8%). The effects of the travel card are almost comparable to the impacts on ridership from GDP growth.

Study TT32 find that once the two season tickets are introduced into the model, the effect of improvements to service quality (frequency and length of routes) on ridership become largely insignificant, suggesting that the transferrable tickets introduced in 1984 and 1991 played a greater role in explaining the increase in ridership than service quality (which the study suggests varied considerably over the time period).

**The different features of integrated ticketing systems may have different impacts on ridership. For example, transferability across modes and operators (single ticketing) usually has a positive impact whereas the ability to transfer the ticket between people appear to be less important.**

Three of the studies (TT28, TT30 and TT32) are able to identify the separate effect of different elements of ITS schemes due to the staggered implementation of each feature. Study TT30 finds that for Bern there is a 13% increase in demand when the ticket becomes transferable across operators (single ticketing) but for Basel there is no significant increase where the validity of the ticket is extended to the neighbouring region (spatial extension).

Study TT32 estimates the individual effects of two season tickets introduced at different stages in the city of Freiburg. The first ticket type was intermodal and transferable between people but was restricted to one operator within the city of Freiburg. The first ticket led to a ridership increase of 7%-9%. The second ticket expanded the validity of the ticket to the surrounding region (spatial extension) across all transport operators (single ticketing) and was associated with a higher ridership increase of 13%-22%.

Study TT28 investigates the separate impact of four distinct features of the Italian integrated ticketing system (ITS) scheme: single ticketing, flexible zoning, spatial extension, and exclusivity of the ITS system (i.e. discontinuing pre-existing ticket types). On average, the overall estimated effects of integrated tariffs on patronage are 2% in the short-run and 12% in the long-run. However, in addition to this, the study also investigates how the different features impact on ridership depending on service type: urban, intercity or mixed (see 'things to consider'). It finds that for both single ticketing and flexible zoning there is a significant effect on ridership on urban services (both have a 7% short run and 26% long run impact) but not for mixed services. For spatial extensions, there is a significant effect for mixed services (5% short run and 25% long run) but not for urban or intercity services. Exclusivity has no effect for urban or mixed services.

**The impact of integrated ticketing systems may have different effects on different modes of transport.**

Study TT40 examines the effect of the introduction of the Travelcard on London Regional Transport in 1983. The Travelcard enabled users to undertake multiple trips with no extra charge, and also allowed for the free interchange between bus and underground services. The study also analyses the impact of 'Capitalcards', introduced in 1985 and offering transferability between British Rail services and London Regional Transport Buses. From 1989, Travelcards also became transferable onto British Rail services, effectively merging with 'Capitalcards'.

In particular, the study examines the effect of the introduction of the Travelcard on 'ordinary' trips on bus and underground services, i.e. single trip tickets without the transferability or multiple-trip benefits of the Travelcard. The results show substantial displacement of underground 'ordinary' trips, of around 19% of the total in 1986 and 1987. However, the reverse effect is found on the bus network, as the Travelcard is found to have resulted in a modest trip generation effect on bus 'ordinary' trips, of around 8%.

The study suggests that the increase in ordinary trips may be the result of people accompanying a Travelcard holder (for example children); or, the Travelcard may generate increased familiarity with the bus network, which encourages travel even when someone no longer has a travelcard for their journey. The results for Capitalcard show that the impact on ordinary bus travel is a decrease of around 10%, whilst there is no effect on underground ordinary ticket sales.

The study uses the effect of Travelcards on ordinary trips to estimate the revenue impacts of the policy interventions. The results indicate that the Travelcard impact on revenue is positive for buses, at around 14%, and negative for the underground of a similar magnitude. The Capitalcard was found to increase underground revenues by around 2.5%, while bus revenues were found to fall by up to 8% as a result of the loss of ordinary ticket revenue.

Study TT31 also finds the ridership effect to vary by transport mode in Madrid. As discussed in more detail above, the study finds an increase of 14.9% for underground and 7.1% on the bus network after the introduction of a travel card system.

## Cost effectiveness

None of the five studies provide a detailed analysis of the wider economic benefits of integrated ticketing (e.g. in terms of congestion, employment or productivity) so we cannot assess these benefits relative to costs.

Four of the five studies do consider cost-effectiveness for the operator, but using secondary data and analysis. Three of these studies find that integrated ticketing interventions initially have a negative impact upon operator revenues, but that this tends to taper, and even reverse in the longer term. The remaining study finds mixed effects on operator revenue depending upon the mode of transport; however this study does not examine whether there is a long term reversal of these trends.

As discussed in the main text, is important to note that cost-effectiveness in terms of operator revenues and costs was not the focus of our review. A much wider evidence base is available that could inform assessments of possible effects on operator revenues and costs.

## References

TT28 – Abrate, G., Piacenza, M., Vannoni, D. (2009), ‘The impact of Integrated Tariff Systems on public transport demand: Evidence from Italy’, *Regional Science and Urban Economics* 39 (2009) 120–127

TT30 – Fitzroy, F. & Smith, I. (1999), ‘Season tickets and the demand for public transport’, *KYKLOS*, Vol. 52 - 1999 - Fasc. 2, 219-238

TT31 – Matas, A., ‘Demand and Revenue Implications of an Integrated Public Transport Policy: The Case of Madrid’, *Demand and Revenue Implications of an Integrated Public Transport Policy: The Case of Madrid*, *Transport Reviews*, 24:2, 195-217

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This work is published by the What Works Centre for Local Economic Growth, which is funded by a grant from the Economic and Social Research Council, the Department for Business, Innovation and Skills and the Department of Communities and Local Government. The support of the Funders is acknowledged. The views expressed are those of the Centre and do not represent the views of the Funders.

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