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The sustainability business case for a South West smart card

contents

Executive Summary	2
1. Introduction	5
2. Method	5
3. Review of existing smart cards	6
4. Impacts of the smart card	6
5. Overall assessment	7
6. Implementation issues	9
7. Delivering Against National, Regional and Local Objectives	10
8. Mitigating climate change	11
9. Monitoring a South West Scheme	14
Appendix 1 – Supporting Data	15
Appendix 2 - Modal Shift Data Calculation	18
Appendix 3 - Data Assumptions	19
Appendix 4 - Smartcard Scheme Summary	22
International Smartcard Schemes	30
Appendix 5 – Joint Local Transport Plan Targets	33
Appendix 6 - South Yorkshire PTE ‘Yorcard’ Data	35

Executive Summary

Study objectives

The South West Smartcard Forum has commissioned a report to review the business case for encouraging smart card delivery within South West England. This will look at the economic and technical viability of such a scheme, with some reference to wider social and environmental benefits. Forum for the Future believes that it is important to look at the wider business case to establish the potential sustainability benefits and how a smartcard may help deliver on regional and local objectives in the South West region¹.

We take the view that, in the long-term, a smart card should encompass a wide variety of modes beyond bus and train (e.g. bicycle and car hire) and can be used as a mechanism to deliver seamless, integrated services and induce modal shift. We have assessed the smart card with this in mind.

Method

We have reviewed existing schemes in the UK and internationally to assess what impact they have had and the lessons learnt, using available data and anecdotal evidence to estimate potential impacts in the South West. We have described these in both qualitative and quantitative terms.

Evidence

There is limited publicly available evaluation of Smart Card schemes both in the UK and internationally. Schemes have not been directly monitored and little to no evaluation made of their impact. However, we have been able to obtain qualitative evidence and sufficient data to calculate estimates of potential benefits.

Application of schemes

Except for the London Oyster, the schemes implemented to date in the UK have mainly been applied to buses with the objective to implement the UK Concessionary Fare Scheme for the elderly and disabled. Thus the majority of schemes are still in early development and lack both anecdotal evidence and a robust time-series of data to measure the relative success of schemes. Only South Yorkshire 'Yorcard' has built in multi-modal interoperability as core to their planned objective. International schemes have been applied successfully across a wide range of transport modes.

Observed trends

However, schemes have noted significant increases in public transport use with smart card schemes, for example:

- a 9.3% increase in the average daily use of public transport occurred in London since introduction of the oyster card in 2003 with 123,000 less daily car journeys on average in London over the same period. TfL attribute a 5% modal shift to the Oyster scheme
- the Paris 'Navigo' scheme which has gradually expanded across the city network since 2001, has shown an increase in public transport use of 12% from 2001, with 11% increases shown in bus and rail services across the period
- a 2% increase in bus use and 21% increase in rail from 2000 to 2007 since the introduction of the Octopus scheme in Hong Kong.
- an increase in annual public transport journeys from 12.2 million in 2002 to 26 million in 2008 in Nottingham, with over 60% of all journeys in the region 'being smart'.

¹The South West region covers Bristol, South Gloucestershire, North Somerset, Bath and North East Somerset, Swindon, Bournemouth, Poole, Torbay and Plymouth

The sustainability business case for a smart card

It is difficult to directly attribute these increases to the smart cards relative to decreases in car use given a range of other factors that are introduced alongside a smart card e.g. congestion charging.

Potential benefits for the South West

We have modelled the potential benefits on the assumption that a smart card could reasonably lead to a modal shift of at least 5% away from private cars, with the potential for more in line with the scope of scheme and complimentary initiatives. Coupled with the assumption that 1) a 5% reduction in car travel would lead to people travelling the same distance by bus or train; 2) this increase in public travel would be met by existing services; and 3) people would not travel further - this would lead to a series of benefits, namely:

- A reduction in CO₂ emissions of 360,000 tonnes (this equates to 0.85% of the South West's entire carbon footprint)
- 5% plus reduction in NOx and PM10 from cars
- Up to 4% reduction in NOx and PM10 from buses
- Further reductions arising from less congestion that have not been calculated
- A reduction in road-related deaths and accident casualties – a possible 45 less people killed or seriously injured in roads against a target of about 580 (20% reduction) by 2010
- A reduction in noise from reduced bus dwell times
- Reduced stress for drivers and passengers
- Less use of cash should reduce security risk
- Reduced journey times and reliability for bus journeys, leading to considerable cost savings for bus operators
- Journey cost could also reduce for journeys using more than one service as well as concessionary public transport fares or targeted lower cost fares
- Improved reliability on roads through reduced congestion
- Improved interchange between services could increase labour market catchments for particular areas
- An integrated ticketing system would help reduce perceived barriers between transport modes and enable selected targeting of groups for discounts/concessions to facilitate social inclusion

Passenger benefits

The main impact of the smart card from the users perspective is to make travelling by public transport more convenient, easier and therefore more desirable. Therefore, we expect to see more people making more journeys by public transport with an associated social, economic and environmental value from these journeys. The extent of this depends on how the smart card is applied and therefore affects the level of potential impact.

Operator benefits

The key to a successful smartcard scheme is acceptability across the complete network, and for First Group signing up to the scheme as the dominant player in the Bus and Rail network in Bristol. It does hold clear benefits for operators in reducing dwell times, therefore improving punctuality, reliability and overall journey times - all of which has an associated cost saving. Savings studies have shown a 3-second saving per passenger journey, and an average time saving to the passenger of 26p per journey or £4 million for all journeys (section 5.3).

Public benefits

There are multiple goals, objectives and targets that public authorities and transport operators are committed to that a smart card is likely to contribute towards meeting namely: reducing CO₂, air pollution, death and accident casualties, congestion

The sustainability business case for a smart card

increasing security, reliable end-to-end journeys, and promoting greater equality of opportunity.

The smart card does not currently fall into any one organisation's remit. Yet it can deliver a range of public benefits that will directly contribute towards public policy goals, most of which are contained within DfT's "Towards a Sustainable Transport System" and reflected in regional and local policies. These include:

1. Maximise the competitiveness and productivity of the economy....improve the performance of the existing network, focusing on the most unreliable, congested and crowded sections in order to improve 'predictable end-to-end journey time' for travel to work"
2. Address climate change, by cutting emissions of CO₂ and other greenhouse gases and reducing barriers "which prevent people from making informed decisions" on the form of transport available, in order to reduce transport-related emissions.
3. Protect people's safety, security and health which includes safety on the roads as well and the need to reduce air pollution
4. Improve quality of life
5. Promote greater equality of opportunity where effective access for everyone... to jobs, services and social networks" forms a core aim of transport policy.

Making sure benefits are realised

A smart card potentially benefits all by making better use of existing transport networks by allowing passengers to use one card to access a multitude of different transport modes and service providers. The benefits won't (always) deliver themselves. Having identified areas of potential benefit these need to be optimised by, for example, linking to bicycle hire and improved integrated transport information. To maximise full value for investment, a scheme for the South West needs to plan for wide scale application in the long-term and be used as a focal point to integrate services to deliver door to door seamless journeys for those living and working in the South West.

Monitoring

If the smart card system is implemented, there are a number of areas that could be tracked to demonstrate how the smart card is contributing to the various targets and objectives outlined in section 5. This could prove very valuable in demonstrating the level of impact of smart cards, especially given that no monitoring towards such targets has been undertaken in other schemes. Some of immediate benefits that could be monitored include:

- Number of journeys made by public transport, by what mode
- Reductions in (school-related) car use (see JLTP Local Authority Target 'LTP4')
- The avoided carbon dioxide, nitrogen oxides and particulate emissions. This could be calculated from monitoring actual change in car traffic. An increase in public transport traffic would need to be included (existing JLTP targets)
- The reliability of buses, which may improve due to improved congestion (existing JLTP target))
- Any initiatives that has been made possible by financial savings, such as improved concessionary fares
- Journey ambience e.g. by surveying consumers

As and when other schemes are brought under the smart card, relative effects should be monitored such as increase in cycling.

1. Introduction

The South West Smartcard Forum has commissioned a report to review the business case for encouraging smart card delivery within South West England. This will look at the economic and technical viability of such a scheme, with some reference to wider social and environmental benefits. Forum for the Future believes that it is important to look at the wider business case to establish the potential sustainability benefits and how a smartcard may help deliver on regional and local objectives in the South West region.

We set out to:

- Demonstrate what the key sustainability benefits are and its potential value to the region
- Demonstrate how a smart card can help deliver other key targets e.g. CO₂ reduction, LAA and MAAs
- Demonstrate the link to DfT's goals in Towards a Sustainable Transport System and how a smart card will help deliver against Delivering a Sustainable Transport requirements
- Make recommendations on how sustainability benefits should be captured if a smart card is implemented

We have only looked at the benefits arising from applying smart card to mobility systems and have not assessed any benefits from other applications such as school dinners.

This report explains our methodology, presents the key findings in qualitative and quantitative format, provides an overview of relevant policy drivers and substantiates findings with supporting case studies and data that has been found to inform this research.

2. Method

To achieve the above we undertook a mixture of desk research into existing schemes and policy drivers and conducted interviews with public transport providers to gather data, learn lessons and assess a mixture of actual and potential quantitative and qualitative impacts.

Specifically, we reviewed several UK and International smartcard-based, multi-modal transport schemes, including the Transport for London 'Oyster' scheme, the Hong Kong-Kowloon 'Octopus' scheme and the Paris / STIF 'Navigo' scheme amongst others for trends, lessons learnt and evidence of potential modal shift. We also looked at the Local Transport Act, Carbon Reduction Commitment and key local authority and regional objectives and targets for their relevance to a smart card scheme.

We analysed published transport and passenger data from public transport providers that operate established smartcard schemes, as well as local and national government sources responsible for auditing and providing data analysis on public transport.

Where possible we contacted the relevant public transport providers to request data as well as source anecdotal evidence on schemes to highlight any lessons learnt regarding design, funding and implementation.

The sustainability business case for a smart card

Trends and data from existing schemes have been used to form the basis of a quantitative analysis of a similar scheme in the South West. A full explanation of our assumptions and calculations are outlined in Appendix 1, 2 and 3.

We assessed the scheme according to the NATA framework in line with the 'smartcard business case efficiency options'. A summary of our findings is presented in the assessment table in section 4.2.

3. Review of existing smart cards

In the UK, existing schemes have been applied predominantly to bus only services with little or no thought for multi-modal interoperability. Only the Oyster scheme and South Yorkshire 'Yorcard' have built in multi-model application into their objectives. Schemes have been primarily concerned with implementing government requirements for the UK Concessionary Fare scheme for the elderly and disabled, which started in April 2008.

Numerous contacts have been established with UK schemes that have been helpful in both data provision, and in extending an invitation to interested parties in the south-west to visit and view their operations. We have been unable to establish contacts to provide analysis for international schemes above and beyond the little data that is publicly available. A summary of each scheme is available in appendix 4.

4. Impacts of the smart card

A smart card has been shown to deliver the following:

Revenue apportionment: a smart card allow for a more precise measurement of the exact use of concessionary fares. Accurate data collection on concessions is becoming increasingly important to local and regional authorities, as is the take-up of UK concessionary fare schemes by the public. An example of this growth has been observed in South Yorkshire, where the transport executive has noted an increase in the amount of money being credited annually to the operators in the region from £10 million per annum to £35 million over the last three years.

Administration savings: a savings case study on the Nottingham 'Citycard' scheme showed potential efficiency savings of £200k p.a. on the administration of the scheme. Savings came from the need to only issue one lifetime card per user (rather than periodical reissues); the reduction in customer survey costs due to efficient sourcing of data; and a more accurate level of reimbursement payment to the operator, by stopping a manual over-recording of concessionary card use by bus drivers.

Passenger data: before smartcard technology, the actual amount of public transport use by eligible residents has been estimated based on limited surveying of passengers, however it is anticipated that the new technology will allow a greater audit of use, and the potential for a more accurate negotiation of new contracts with the individual operators at the time of renewal. This will also prove valuable to public bodies that can use the data to target interventions much more accurately. There could be issues around infringement of privacy from journey data storage and there is the possibility that with increased revenue protection people who previously travelled for 'free' may chose not to travel.

The sustainability business case for a smart card

Social inclusion: targeted interventions can be made by authorities to increase public transport access for disadvantaged groups e.g. those in unemployment. Several smartcard providers are now sufficiently confident in the robustness of the software and hardware infrastructure to begin considering further programmes to encourage greater social inclusion. The NowCard (in the North West) is starting a pilot of discounted fares for 16-23 year olds who use the smartcard, a factor which NowCard believes will aid modal shift through encouraging young people to increase use of public transport by softening the blow of higher adult fares as young people turn 16. The Welsh Assembly is also piloting a scheme using smartcards where 16-18 year olds would receive reduced fares on a similar discounted basis. In addition, a smart card can be used for other facilities e.g. leisure and library services thereby increasing overall benefit. This aspect of Nottingham's 'Easyrider' is perceived by NCT as having been very well received by local residents.

Punctuality and reduced dwell-times: The South Yorkshire 'Yorcard' business case estimates the potential time savings to buses and passengers through the scheme. Monitoring indicated reduce dwell time of 3 seconds (falling from 8 seconds to 5 seconds) per bus passenger - assuming correct recording by the driver. The projected savings on this were two-fold:

Reduced dwell time / greater punctuality: Yorcard estimated that, across 300m journeys per annum, this would add over 202,000 hours back to the executive in saved time, as a contribution towards greater punctuality (see Appendix 6). Passenger time savings: using DfT's 2002 Transport Analysis Guide guide Yorcard estimated that, with 300m bus journeys per annum, this would equate to a total passenger savings of £4m p.a (using the rate of £5.04 per hour for commuters and £4.46 per hour for non-commuter travel).

In terms of other studies on smartcard punctuality improvements, data is limited.

5. Overall assessment

We have calculated the following impacts using the NATA appraisal framework. The NATA framework does not easily lend itself to soft schemes; however, we have used this to be consistent with standard Department for Transport Requirements and the methodology used in the 'smartcard business case efficiency options.'

Whilst it has proven difficult to draw a direct relationship between the implementation of a smart card scheme and a resulting change in the modal shift, that is, the linked increase in public transport use and a reduction in private car use, a common trend within the review has been an observed increase in the use of public transport where a smartcard approach has been adopted. The principle assumptions behind these calculations are:

- Smart card scheme would reduce car travel by 5%
- A smart card scheme would not increase public transport traffic, it would only increase the occupancy of public transport therefore:
- Carbon dioxide, pollution etc would not increase from public transport
- People would not travel further
- Motorcycle use is unaffected by the smart card scheme
- It was assumed that that the 5% reduction in vehicle traffic led to people travelling the same distance by bus therefore incident rates from Regional Transport Statistics 2007 were used to consider the impact of the card scheme on safety
- Fuel use of buses would reduce by between 0.5- 4% due to reduced dwell time

The sustainability business case for a smart card

5.1. Summary

Category	Issue	Impact	Qualitative	Quantitative
Environment	Noise	Slight +ve	If car traffic decreased and there was no increase in public transport traffic, noise near roads would be reduced. A decrease in the time buses spent at stops would also reduce noise.	
	Local Air Quality	Slight +ve	Modal Shift will reduce emissions from cars. Reduced dwell time could reduce emissions due to buses. Any reduced congestion would also reduce emissions, but this has not been included in the quantitative assessment.	5% reduction in NOx and PM10 from cars. Up to 4% reduction in NOx and PM10 from buses.
	Greenhouse Gases	Slight +ve	Modal Shift will reduce emissions from cars. Reduced dwell time could reduce emissions due to buses. Any reduced congestion would also reduce emissions, but this has not been included in the quantitative assessment.	Up to 360,000 tonnes or 0.87% reduction to the total CO ₂ emitted by the South West.
	Landscape	Neutral	No new building will take place, so should be unaffected.	
	Townscape	Neutral	No new building will take place, so should be unaffected.	
	Heritage of Historic Resources	Neutral	No new building will take place, so should be unaffected.	
	Biodiversity	Neutral	No new building will take place, so should be unaffected.	
	Water Environment	Neutral	No new building will take place, so should be unaffected.	
	Physical Fitness	Slight +ve	Public Health benefits from increased bicycle use as smartcard allows incorporation of bicycle hire system into public transport network. Although main benefit is from having bicycles, not using smart card.	
	Journey Ambience	Slight +ve	Smart cards can potentially reduce stress for bus drivers and passengers.	
Safety	Accidents	Slight +ve	Modal shift from cars to public transport could lead to a reduction in accidents	A possible 45 fewer people killed or seriously injured on roads against a target reduction of about 580 (20%) by 2010.
	Security	Neutral	If the scheme includes park and ride this could lead to increased security risk to private vehicles. Increased occupancy on public transport could improve security on public transport. Less cash could reduce risk.	
Economy	Public Accounts	-	This is being done as part of the financial business case	

The sustainability business case for a smart card

Category	Issue	Impact	Qualitative	Quantitative
	Transport Economic Efficiency: Business Users & Transport Providers	Moderate +ve	<p>Transport providers: The system may lead to better fare collection. There will be a cost associated with installing and maintaining system. Efficient smartcard back-office system increased concessionary fare rebate in Nottingham City Transport case study²</p> <p>Business Users: This intervention could provide more seamless interchange between services and therefore reduced journey times. Journey cost could also reduce for journeys using more than one service.</p>	
	Transport Economic Efficiency: Consumers	Slight +ve	Benefits as for business users. Concessionary public transport fares or lower cost fares for those who use more than one mode on one trip.	
	Reliability	Slight +ve	Reliability of trains should be unaffected. Reliability on roads should be improved by reduced congestion.	
	Wider Economic Impacts	Slight +ve	Job creation from installing and maintaining system. Improved interchange between services could increase labour market catchments for particular areas.	
Accessibility	Option values	Slight +ve	This intervention would benefit a wide range of people, especially those who use more than one mode of transport or service on their trip.	
	Severance	Neutral/Slight +ve	If the overall number of cars are reduced, this should have a marginal positive increase	
	Access to the Transport System	Moderate +ve	An integrated ticketing system would help reduce perceived barriers between transport modes and enable selected targeting of groups for discounts/concessions to facilitate social inclusion.	
Integration	Transport Interchange	Major +ve	Reduced interchange time between services and provide common ticketing for all modes and services.	
	Land-Use Policy	Neutral	No direct impact on land-use but might assist in improving links from some developments.	
	Other Government Policies		See section 5.	

6. Implementation issues

6.1 Incorporating rail

Rail operators run services that stretch across multiple passenger transport executives and regions. This can lead to significant hardware and training challenges, where an executive has attempted to include a section of rail service into a smartcard initiative. For example South Yorkshire 'Yorcard' multi-modal pilot scheme includes a section of rail from Sheffield to Doncaster within the scheme. One of the Train Operating Companies (TOC) that services this route includes a service that stretches from Liverpool to Norwich, and so is being required to install a Yorcard reader machine to cover smartcard tickets for only a fraction of the overall services. This has considerable implications for TOCs and in fact, TOCs that provide services

² <http://www.localgov.co.uk/view/pdf/mjwards2007/Efficiency/Finalists/Nottingham.pdf>

into central London have only recently signed agreements with Transport for London to accept pay-as-you-go Oyster cards on services, 4 years after its' introduction.

6.2 Technology

ITSO is the platform that the UK government is stipulating for all future smart card schemes. Two of the most successful schemes in the UK, Nottingham 'Easyrider' and the north-west England-based NowCard, have evolved from early pre-ITSO smartcard schemes, the result being that they have needed significant expenditure to accommodate subsequent smartcard standards and systems. However, as all future schemes will be ITSO compliant such issues should automatically be avoided. Other schemes have had long roll-out lead-times - partly attributed to ensuring that the IT infrastructure is sufficiently-robust.

The VDV in Germany, who have successfully rolled out a public transport smartcard across several regions on a multi-modal basis, are piloting a mobile phone-based scheme alongside standard smartcards. Installed with the secure 'VDV Core Application', the mobile phone can be scanned and used as a smartcard³. The mobile phone smartcard technology is being tested by DB AG (Deutsche Bahn), where the mobile phone acts as both the smartcard and the means of communication with the back-office infrastructure, allowing the option to use passive non-powered terminals instead of active, powered terminals (e.g. in rural areas).

A hampered roll-out of the 'OV-clipart' scheme in the Netherlands led to public confidence in the scheme being undermined at an early stage. The scheme suffered from technical difficulties with entrance machines and back office system issues e.g. incorrect amounts debited from user bank accounts and inferior security technology of card. Smartcard use is currently restricted to the original pilot roll-out area in Rotterdam and limited use in Amsterdam. A lack of central government co-ordination in the management of roll-out has been cited as a key fall-down to the scheme who gave overall responsibility for the OV-clipart to a private company, Trans Link Systems (TLS).

7. Delivering Against National, Regional and Local Objectives

The smart card does not currently fall into any one organisation's remit. Yet it can deliver a range of public benefits that will directly contribute towards public policy goals, most of which are contained within DfT's "Towards a Sustainable Transport System" and reflected in regional and local policies. These include:

- Maximise the competitiveness and productivity of the economy....improve the performance of the existing network, focusing on the most unreliable, congested and crowded sections in order to improve 'predictable end-to-end journey time' for travel to work"
- Address climate change, by cutting emissions of CO₂ and other greenhouse gases and reducing barriers "which prevent people from making informed decisions" on the form of transport available, in order to reduce transport-related emissions.
- Protect people's safety, security and health which includes safety on the roads as well and the need to reduce air pollution
- Improve quality of life
- Promote greater equality of opportunity where effective access for everyone... to jobs, services and social networks" forms a core aim of transport policy.

³ http://www.vdv-ka.org/01/load/08/ic_cards.pdf

The Eddington recommendations that underpin the policy objectives point to the need to move away from a legacy by transport planners managing supply to a long-term focus on managing the demand-side of transport more effectively with a greater emphasis on inter-modal transport planning.

8. Mitigating climate change

One of the key potential benefits is to help reduce CO² emissions. The UK government has committed to reducing UK emissions of greenhouse gases by 'at least 80% by 2050' following recommendations by the Committee on Climate Change who also recommend interim targets of a 42% reduction from 1990 levels by 2020 if other countries come on board; and 34% if they don't. It is anticipated that these targets will be cascaded to regions and local authorities following on from the Climate Change Act. Local Authorities within the South West have already set their own voluntary CO² reduction targets e.g. Bath & North-East Somerset Council aim to reduce 15-18% reduction by 2010, and Devon County Council have set a 6.0% per capita reduction in emissions by 2010 (all against 2005 baseline).

The Regional Spatial Strategy (RSS), as it stands, supports the UK Government target of a 20% CO² emissions cut by 2020, and a 60% cut by 2050 which translates to a 28% cut in CO² by 2026 and this is being reviewed following the 2008 Climate Change Act.

The RSS targets reducing car use, through improved public transport services and effective transport demand management, as a major factor in contributing to the target of a 28% reduction in CO² emissions. It is anticipated that reduced car use should account for over half of the 28% target.

8.1 Carbon Reduction Commitment (CRC)

CRC is a mandatory auction based "Cap and Trade" scheme in which participants will be required to purchase and surrender allowances corresponding to their annual energy use (which is converted into an equivalent number of tonnes of CO²). Its aim is to incentivise significant carbon abatement in non-energy intensive sectors. Whilst the focus of the CRC is primarily on electricity and gas use, emissions from other fuels such as petrol and diesel from business travel will be included. Therefore actions to reduce the organisations footprint in this area (e.g. by encouraging staff to travel on trains or buses for work related activities, or using more fuel efficient vehicle fleets) will help to improve performance under the CRC.

8.2 Local transport bill

Local Transport Authorities have an expanded duty under the Local Transport Act (which came into effect on 9th February 2009) to take into account any policies relating to the protection and improvement of the environment – including climate change mitigation and adaptation⁴. This aligns with the government's provisions in the Climate Change Act 2008 which will require local transport authorities to consider the impacts of their proposals on greenhouse gas emissions and to seek to reduce (and minimise) those emissions in preparing their Local Transport Plans (LTP).⁵

There has also been a notable shift in the Act towards improving the use of existing networks through giving local authorities a range of powers to improve the quality of local bus services. Through the introduction of Integrated Transport Strategies and Implementation Plans, it encourages authorities to consider a wide range of options for delivering better transport outcomes, not only options that involve new infrastructure, but those that make better use of existing infrastructure, or manage demand for transport services.

⁴ http://www.opsi.gov.uk/acts/acts2008/en/ukpgaen_20080026_en_1

⁵ <http://www.dft.gov.uk/consultations/open/draftguidanceltp/ltpmainconsult?page=3#a1010>

The criteria for funding transport schemes supports this by a range of criteria including 'delivering through-ticketing, 'seamless journeys, and a better experience of public transport, through the development of smartcard systems; and other innovative uses of information technology'⁶ The 'value for money principles' behind LTPs also include:

- propose solutions that are evidence based
- aim to make the best use of existing infrastructure
- include innovative solutions, not just those that rely on capital investment alone and
- be underpinned by careful analysis of problems and opportunities.

Amendments to the 2008 Act change the way that competition law applies to voluntary partnership schemes and 'qualifying agreements' to encourage more such agreements, particularly those involving more than one bus operator. It also reforms legislation that relates to quality partnership schemes, enabling them to cover frequencies, timings and maximum fares and to prevent disruptive competition from non-partnership operators⁷.

Finally, mandatory targets are set that a smart card can contribute directly towards e.g. at least one accessibility target such as % of a) people of working age (16-74); b) people in receipt of Jobseekers' allowance within 20 and 40 minutes of work by public transport⁸; changes in peak period traffic flows to urban centres, for authorities with urban centres populated by more than 100,000 people; congestion vehicle delay for the plans covering the former metropolitan counties, and the plans covering Bristol, Nottingham and Leicester and bus punctuality.

8.3 Local Authority Targets

There are multiple targets that Local Authorities are committed to that a smart card is likely to contribute towards meeting. A prime example are those embodied within the Joint Local Transport Plan (JLTP) which covers the local and regional transport agreements for the four Local Authorities Bristol City Council, South Gloucestershire Council, Bath & North-East Somerset Council and North Somerset Council.

The JLTP is based on four shared priority areas: congestion, road safety, air quality and accessibility. The overarching aim is of improving the quality of life through the priorities areas and includes: enhancement of public spaces and community safety; healthier communities tackling noise; protecting landscape and biodiversity. A list of targets is included in appendix 4.

8.4 Regional Objectives

The 2006 South-West England Regional Spatial Strategy (RSS) sets out the 20-year transport policy objectives for the South West region. Focus is on "proper planning of transport" as a key path towards achieving the primary RSS goal of increasing economic growth and activity in the region, whilst meeting wider environmental targets relating to CO² emissions.

Bristol and Bath are central to the regional strategy as 'Core Cities' within the region, with emphasis on investment in critical transport infrastructure, in order to achieve the required level of economic growth in region.

⁶ Full Guidance on Developing Local Transport Plans – Second Edition - Dft

⁷ <http://www.dft.gov.uk/pgr/regional/localtransportbill/vpaguidance.pdf>

⁸

<http://www.dft.gov.uk/pgr/regional/ltp/accessibility/guidance/gap/accessibilityplanningguidanc3633?page=11#a1072>

The sustainability business case for a smart card

The RSS emphasises the need for investment in encouraging behavioural change and modal shift, through well-planned urban environments and transport systems. Relevant measures for encouraging modal shift include:

- Measures to improve travel choice
- Travel plans and travel awareness
- School and Education Travel Planning
- Public Transport Information systems

Finally, it emphasises the need to promote social inclusion via modal shift and increases in private transport and falling public transport is cited as a primary source of social exclusion.

8.5 Bus Operators

Bus operators are committed to working with the local authorities in supporting JLTP targets and objectives relating to increases in public transport use, increases in cycling and reduction in car journeys per week. The bus operators wish to build on the success of the Greater Bristol 'Showcase Bus Route 76/7' where improvements in the 3 key JLTP focus areas was observed (as highlighted in the JLTP.11)

The Regional Transport Authorities and bus operator First Bristol and First Avon and Somerset Ltd have signed the 'Greater Bristol Quality Bus Network Partnership', where "...the [regional transport] Authorities and the bus operator acknowledge the need to deliver a high quality public transport network... in order to retain existing passengers and encourage modal shift from the private car"

The 'Greater Bristol Bus Network' (GBBN) initiative is an integral part of the JLTP and has incorporated a series of objectives and targets set by the Department of Transport in exchange for a DfT contribution of £42m towards the GBBN. First Group are also financially committed to the scheme and have contributed £20m in funding towards the scheme which includes reduction targets for CO², NOx and noise.

8.6 Train Operators

All Train Operating Companies (TOCs) sign individual Franchise Agreements (FA) with the Department of Transport, and contain performance targets for punctuality and reliability of service, including train cancellations. Performance benchmarks are variable across a rolling 12-month period, with service level commitments becoming progressively tighter, the longer that the operator retains the contract. First Group currently maintain a FA with the Department of Transport, with the last renewal being made in 2006. As the targets are on a rolling basis it is difficult to specifically state the given targets; authorities will need to be referred to the latest FA14.

In addition to the service level commitments as per the franchise agreements, the TOCs must maintain a certain standard of punctuality and reliability in accordance with a 'Passenger's Charter'. While smartcards would reduce queuing times for passengers, train scheduling times would remain unaltered by these benefits.

9 Monitoring a South West Scheme

If the smart card system is implemented, there are a number of areas that could be tracked to demonstrate how the smart card is contributing to the various targets and objectives outlined in section 5. This could prove very valuable in demonstrating the level of impact of smart cards, especially given that no monitoring towards such targets has been undertaken in other schemes.

Some immediate benefits that could be monitored include:

- Number of journeys made by public transport, by what mode
- Reductions in (school-related) car use (see JLTP Local Authority Target 'LTP4')
- The avoided carbon dioxide, nitrogen oxides and particulate emissions. This could be calculated from monitoring actual change in car traffic. An increase in public transport traffic would need to be included (existing JLTP targets)
- The reliability of buses, which may improve due to improved congestion (existing JLTP target)
- Any initiatives that has been made possible by financial savings, such as improved concessionary fares
- Journey ambience e.g. by surveying consumers

As and when other schemes are brought under the smart card, relative effects should be monitored such as increase in cycling.

Appendices

Appendix 1 – Supporting Data

London Transport Data

Daily average number of journey stages (millions)

	Avge Daily Stages	Car			Bus / Tram			U/G			Rail / DLR			Pub Trans %		
		No.	%	% Chg	No.	%	% Chg	No.	%	% Chg	No.	%	% Chg			
2000	25.5	11.004	43.2		3.711	14.6		2.635	10.4		1.929	7.6		32.5		
2001	25.8	11.03	42.7	0.2	3.925	15.2	5.8	2.629	10.2	-0.2	1.956	7.6	1.4	33.0		
2002	26.2	11.115	42.4	0.8	4.195	16.0	6.9	2.596	9.9	-1.3	1.992	7.6	1.8	33.5		
2003	26.7	11.047	41.4	-0.6	4.614	17.3	10.0	2.6	9.8	0.2	2.063	7.7	3.6	34.8		
2004	27.1	10.97	40.5	-0.7	4.985	18.4	8.0	2.687	9.9	3.3	2.052	7.6	-0.5	35.9		
2005	27.2	10.915	40.1	-0.5	4.964	18.3	-0.4	2.646	9.7	-1.5	2.171	8.0	5.8	36.0		
2006	27.6	10.881	39.5	-0.3	5.153	18.7	3.8	2.741	9.9	3.6	2.248	8.2	3.5	36.8		
% Chg Since 2003				-1.5				11.7				5.4			9.0	9.3

Feb-03 Congestion Charge zone introduced

Apr-03 Introduction of Oyster Cards

(source: Transport For London www.tfl.org.uk)

The sustainability business case for a smart card

Hong Kong Transport Data

Total Annual Journeys (thousands)

1.1.

Year	Buses					Ferries	Railways				Taxis	Total
	Franchised Buses	Public Light Buses	MTR Light Rail Feeder	Residents Services	Total Bus		MTR Railways	HK Tramways	Peak Tram	Total Rail		
2000	1,511,765	587,995	15,510	48,195	2,163,465	56,140	1,185,207	86,106	3,476	1,274,789	357,588	3,851,982
2001	1,547,966	596,495	20,106	56,000	2,220,567	55,431	1,176,755	87,439	3,504	1,267,698	355,447	3,899,143
2002	1,579,450	604,080	25,535	61,987	2,271,052	54,990	1,196,568	87,123	3,714	1,287,405	357,479	3,970,926
2003	1,477,322	593,331	25,920	63,461	2,160,034	53,381	1,163,560	81,667	3,092	1,248,319	356,002	3,817,736
2004	1,493,644	625,609	20,062	64,924	2,204,239	56,717	1,315,133	84,923	4,107	1,404,163	377,152	4,042,271
2005	1,430,144	642,166	27,181	64,811	2,164,302	56,079	1,394,346	84,221	3,924	1,482,491	374,478	4,077,350
2006	1,439,267	657,050	30,090	66,056	2,192,463	56,292	1,421,522	83,942	4,434	1,509,898	389,505	4,148,158
2007	1,446,780	662,409	32,452	65,603	2,207,244	54,067	1,455,965	82,009	4,929	1,542,903	400,516	4,204,730
% Change since 2000					2.02					21.03		9.16

(Source: Hong Kong Government Transport Department www.td.gov.hk)

The sustainability business case for a smart card

Paris Transport Data

Total Annual (millions)

Owners	RAPT	RAPT	SNCF	RAPT				
Year	RER (Overland)	Metro (U/G)	SNCF	Total Rail	Tramways	Total Bus	Total	Average Daily
2000	-	-	547.0	-	-	0.0	-	
2001	-	-	559.0	-	-	0.0	-	
2002	410.0	1,283.0	575.0	2,268.0	39.7	2,118.5	4,426.2	12.13
2003	400.0	1,248.0	572.0	2,220.0	39.7	2,108.5	4,368.2	11.97
2004	437.8	1,335.7	614.0	2,387.5	44.1	2,179.3	4,610.9	12.63
2005	444.5	1,372.7	632.0	2,449.2	47.6	2,166.3	4,663.1	12.78
2006	452.0	1,409.5	655.0	2,516.5	64.1	2,281.8	4,862.4	13.32
2007	446.6	1,388.3	680.0	2,514.9	94.8	2,355.8	4,965.5	13.60
% Change since 2002				10.89%		11.20%		12.19%

(Source: Paris / Ile-de-France Public Transport Authority www.stif.info)

Appendix 2 - Modal Shift Data Calculation

Modal Shift		Unit	Min	Max
Total due to cars in a year for baseline	CO2	tonnes	7235506.24	7235506.24
	NOx	tonnes	19179.73	19179.73
	PM10	tonnes	570.93	570.93
% reduction in car km travelled		5%		
Tonnes saved by reduction in car km travelled	CO2	tonnes	361775.31	361775.31
	NOx	tonnes	958.99	958.99
	PM10	tonnes	28.55	28.55
Reduction in total CO2 South West emissions due to Modal shift		0.85%		
Reduction in dwell time of buses			Min	Max
Assumed % fuel reduction due to reduction in dwell time		%	0.50	4.00
Total tonnes due to buses in SW	CO2	tonnes	168418	147183
	NOx	tonnes	993	1119
	PM10	tonnes	15	24
Tonnes saved due to reduction in dwell time of buses	CO2	tonnes	842	5887
	NOx	tonnes	4.96	44.74
	PM10	tonnes	0.08	0.94
Reduction in total CO2 South West emissions due to reduced dwell time		%	0.0020	0.0139
Total Reduction in total CO2 South West emissions		%	0.86	0.87

Appendix 3 - Data Assumptions

Based on the trends from existing schemes we have made the following assumptions to estimate quantitative impacts:

- A smart card scheme would reduce car travel by 5%
- A smart card scheme would not increase public transport traffic, it would only increase the occupancy of public transport therefore:
- Carbon dioxide, pollution etc would not increase from public transport
- People would not travel further
- Motorcycle use is unaffected by the smart card scheme
- It was assumed that that the 5% reduction in vehicle traffic led to people travelling the same distance by bus therefore incident rates from Regional Transport Statistics 2007 were used to consider the impact of the card scheme on safety
- Fuel use of buses would reduce by between 0.5-04% due to reduced dwell time

We have calculated a decrease in carbon dioxide, particulates and Nitrogen oxides, traffic accidents that would arise from a 5% decrease in traffic in the South West.

The sustainability business case for a smart card

	Unit	Min	Max
<u>Cars</u>	Number of people in South west in 2006	5,124,000.00	5,124,000.00
	1 mile is equal to	1.61	1.61 km
	Car Miles per person per year in SW	6,832.07	6,832.07
	Car km per person per year in SW	10,995.15	10,995.15
	Total car passenger km per year in SW	56,339,152,412.92	56,339,152,412.92
	Average car occupancy	1.59	1.59
<u>Bus</u>	Total vehicle km per year for cars in SW	35,433,429,190.52	35,433,429,190.52
	Total vehicle km per year for buses in SW	180,544,000.00	225,680,000.00
	Total vehicle fuel consumption Average Km/l	2.68	4.60
	Total vehicle fuel use litres	67,367,164.18	49,060,869.57
<u>Carbon and Air Pollution for cars</u>	Total CO2 emitted in South West (not just from transport)	42,369.00	42,369.00
	2005 total passenger car km for UK	397.20	397.20
	2005 Total UK NOx emissions	215.00	215.00
	2005 Total UK PM10 emissions	6.40	6.40
	Average Car CO2	204.20	204.20
	Average Car NOx	0.54	0.54
	Average Car PM10	0.02	0.02
<u>Carbon and Air Pollution for buses</u>	Bus CO2	2,500.00	3,000.00
	NOx	20.00	24.00
	PM10	0.31	0.51
	NOx	20.00	24.00
	PM10	0.31	0.51
	Density of petrol	737.22	737.22
	Density of diesel	820.00	950.00
	Approx density fuel	737.22	950.00
	Approx density fuel	0.74	0.95
	NOx	14.74	22.80
	PM10	0.23	0.48

The sustainability business case for a smart card

<u>Safety</u>		Number of incidences per billion passenger km	Killed	KSI	All	
	Car			2.60	23.00	275
	Bus or Coach			0.20	7.00	149
	South West Accident Statistics					
			Killed	KSI		All
	South West 2001				3,010.00	25,584
	South West 2002				3,113.00	24,847
	South West 2003				2,918.00	24,122
	South West 2004				2,619.00	24,071
	South West 2001-2004 average				2,915.00	24,656
<u>Modal shift assumption</u>	Modal shift from car to public transport	%		5.00		
	Dwell time reduction	%	Min	0.50	Max	4.00

Appendix 4 - Smartcard Scheme Summary

Easyrider - Nottingham

The Nottingham 'Easyrider' scheme is operated by Nottingham City Transport (NCT), and covers both the city bus and tram networks. NCT is the largest municipal bus operator in the UK, with 87% ownership in the hands of Nottingham City Council (the remainder is owned by Arrow Consortium, created in 2001 to create the 'Nottingham Express Transit' tram network). NCT have created a network of regional 'Easyrider' card users including schools, the city universities, employees of the local council authorities and Healthcare Trusts.

Due to a requirement of the 2008 UK Concessionary Fare scheme to be ITSO-compliant, the City Council were required to develop a separate back-office system for the concessionary fare scheme, as NCT were reluctant to move from their established (albeit non-ITSO) back office scheme. NCT did, however, allow Easyrider schemes to be loaded onto the Citycard, which was sent to all registered voters in 2008. This card also acts as a 'citizen card', which includes access to council leisure and library facilities. The 'social inclusion' aspect of the schemes is perceived by NCT as having been very well received by local residents, and highlights the interoperability possibilities of such a scheme.

There has been an increase in annual public transport journeys from 12.2 million in 2002 to 26 million in 2008 in Nottingham, with over 60% of all journeys in the region 'being smart'. Both schemes now have over 300,000 cards currently in use. Unfortunately the propensity for modal shift has not been measured by either NCT or Nottingham City Council in any meaningful manner, although Anthony Carver-Smith of NCT reports strong anecdotal evidence of car owners in Nottingham using public transport in greater numbers due to the increased access to public transport and additional services via smartcard.

NowCard – North West

The NowCard scheme is currently a bus-only scheme that incorporates all of the county councils in north-west England. In effect since 2004 as a concessionary card scheme for the elderly and disabled, the long process of incorporating all regional bus operators into the scheme is almost complete, with an anticipated '100% coverage' being expected to be achieved by mid-2009. A reoccurring theme of the long lead-times of roll-out is ensuring that the IT infrastructure is sufficiently-robust.

There are a substantial number of bus operators within the NowCard catchment area, and the roll-out has been an extensive undertaking with software and IT network issues being an ongoing issue for the organising authority. Capital funding for the smartcard infrastructure has been provided primarily by the Department of Transport (with a small contribution by the individual councils and operators into NowCard), and the result is an average of 1.7 million NowCard transactions per month, as per the end of 2008. Customers can renew tickets via telephone or the Internet. There are no additional 'citizen card'-style local authority benefits associated with the NowCard.

NowCard streamlined the passenger boarding process, whilst simultaneously preventing fraudulent card use and maximising revenue reappointment. A review found that flash card schemes - traditional paper travelcards with accompanying ID -

caused inaccuracies in revenue reappointment between operators and authorities due to the reliance on manual data being collected by bus operators which are “supplemented by costly periodic surveys by the Local Authorities.”⁹ Counterfeit cards and fraudulent use also caused considerable cost to operators and transport authorities over time and tended to cause delays through slow boarding times, where drivers had correctly checked cards.

Oyster - London

By far the most significant scheme in the UK is the Oyster scheme, which allows access to Bus, Underground, light rail and overland rail (season ticket only). Since its start in 2003, the Oyster has been extremely successful in providing a multi-modal solution within London, with over 10 million cards issued up to 2007. Over half of those are now being used on a PAYG basis, with future growth of Oyster being in the PAYG stored-value aspect of the card. Before 2003, London was suffered significant traffic congestion and a straining public transport system. Five years into the Oyster scheme, Transport For London have been able to demonstrate a 5% modal shift from private car to public transport across the period, represented by a 9% increase in the daily use of public transport combined with a 1.5% fall in car use since 2003. It should be noted that 2003 also saw the introduction of congestion charging in areas of central London.

Navigo - Paris

The Paris transport system has operated a PAYG card since 1997 in the form of the Carte Orange. Since 2001, the STIF (association of Public Transport) has been gradually phasing-in the Navigo card, a contactless multi-modal scheme across the major modes of transport, including ‘RER’ bus network and the ‘SNCF’ overland network. The public transport system in Paris is government-controlled via the STIF, that has allowed for comprehensive planning of the smartcard roll-out. At present over 50% of ticket validations on the entire RAPT network are smart, and since 2002 there has been a corresponding increase in bus and train use of 12% and 11% respectively. The aim of the STIF is to induce modal shift, however the corresponding figures are not available at this time, and the city continues to have considerable congestion issues. The STIF does, however, see the Navigo smartcard as a vital part of a package of sustainable transport measures that will allow greater modal integration, a particular note being the introduction of the popular ‘Velib’ PAYG bicycle hire scheme (a scheme that TfL in London are looking to incorporate soon into the Oyster scheme).

⁹ source

UK Schemes

1.	YorCard – South Yorkshire
Region	South Yorkshire (pilot; extending to Yorkshire and Humberside)
Scope	Bus, Rail
Started	April 2008 (Pilot Scheme)
Cards Issued	Data not available
Summary	<ul style="list-style-type: none"> • Pilot scheme by South Yorkshire PTE • Planned multi-modal transport scheme, centrally-funded with £8.6m DfT grant • Funding following 2007 'Northern Way' transport and infrastructure plan for North of England (see link) • Scheme is in two phases <ul style="list-style-type: none"> ○ Pilot scheme (commenced April 2008) in South Yorks; 6 bus operators covered plus Sheffield to Doncaster rail line ○ Wider roll-out to Yorkshire and Humberside area following review of initial pilot scheme in 2009
What impact has the scheme had?	<ul style="list-style-type: none"> • Impact analysis for area is limited due to scheme still being piloted. • Yorcard scheme is being treated as pilot for future multi-modal schemes
Lessons learned	<ul style="list-style-type: none"> • Unique nature of scheme in UK means that SYPTE are treating pilot scheme as precedent for wider roll-out • Complexity of scheme is high due to: <ul style="list-style-type: none"> ○ Bus - 60 operators in Sheffield alone; this has implications for fare tables in back-office ○ Rail – Sheffield to Doncaster line has 6 different operators (including one which links Liverpool and Norwich). Therefore complexities over staff training and equipment provision • Social Inclusion potential - Pilot Scheme in Barnsley to offer a range of additional services <ul style="list-style-type: none"> ○ Free travel for under 18, soon to be incorporated into ITSO infra ○ Full transport and leisure access once smart (incl. library, free swim) ○ Expansion into school ID and attendance, as per NCT) • English National Concessionary Travel Scheme includes approx £100m in concessionary rebate to the individual operators (6 in question in S.Yorks, rebate last year was £35m in region) <ul style="list-style-type: none"> ○ Keen to use smartcard data to have complete consensus on amount of rebate, and ability to renegotiate rebate deals with operators ○ Originally budgeted for £10m per year, following ENCTS this has increased to the £35m
Data Gaps	<ul style="list-style-type: none"> • No data available at present (business case is on request from scheme manager (SYPTE CFO John Smart))
Current Status	<ul style="list-style-type: none"> • Yorcard scheme is in final stages of pilot scheme, expecting data to be available mid-2009 (including analysis on boarding times changes pre- and post- smart) <ul style="list-style-type: none"> ○ Includes roll-out to Stagecoach and First Group • Next phase of pilot is loading of operators own products onto cards
Contact	John Smart, CFO, SYPTE John.Smart.Office@sypte.co.uk (t: +44 114 221 1205)
Links	http://www.sypte.co.uk/policies_plans_and_statistics/ http://www.yorcard.com/default.asp?pageid=11&groupid=4 http://www.thenorthernway.co.uk/document.asp?id=432

The sustainability business case for a smart card

2.	Transport Scotland
Region	Scotland
Scope	Bus
Started	April 2006
Cards Issued	1.1 million
Summary	<ul style="list-style-type: none"> • Scottish Executive Citizen Card scheme; introduced for Scottish National Concessionary Travel Scheme (SNCTS) • ITSO-compliant • Centrally-funded £1m project • Bus operator hardware and implementation capital costs covered by central government
What impact has the scheme had?	<ul style="list-style-type: none"> • 70 of approx 300 bus operators now live on scheme • Remaining operators will be live by summer 2009 • Operator roll-out assisted by Transport Scotland, who are covering capital costs of back-office HOPS and bus smartcard hardware / equipment • Scheme well-received by general public (A. McFadyen)
Lessons learned	<ul style="list-style-type: none"> • Phased roll-out of scheme enabled time to allow education literature and advertising, word-of-mouth effects to set in.
Data Gaps	<ul style="list-style-type: none"> • Scheme has narrow objective of covering the Bus, OAP ONLY scheme in line with SNCTS. No plans to roll this scheme out further (pending completion of 'Integrated Ticketing' consultation phase) • Due to narrow nature and aim of scheme, analysis of modal shift / increased transport use is unavailable
Current Status	<ul style="list-style-type: none"> • Current scheme is bus-only, concessional scheme only • Consultation process is in progress with local businesses and travel operators on feasibility of nationwide roll-out of scheme to cover all users and transport modes. Expected to be completed mid-2009
Contact	Allan McFadyen Manager, Concessionary Fare and Integrated Ticketing dept 0141 272 7170
Links	www.transportscotland.gov.uk/reports/consultation-papers-and-responses/j9651-00.htm http://www.transportscotland.gov.uk/reports/publications-and-guidance/research-and-statistics/contribution-made-by-traveline-scotland-to-modal-shift-research-report

3.	NowCard
Region	4 NW England councils; Blackburn, Blackpool Unitary, Lancashire CC, Cumbria CC.
Scope	Bus
Started	Sept 2004
Cards Issued	320,000
Summary	<ul style="list-style-type: none"> • ITSO-compliant Concessionary smartcard scheme across several NW England councils • System encourages interoperability opportunities and access to NowCard IHOPS back office system • NowCard receive central funding from DfT towards capital cost of smartcard machines for operators • Nowcard in turn pay majority share of capital cost; large regional operators are free to insert own products and fare schemes onto cards • Estimated DfT cost of set-up £7m

The sustainability business case for a smart card

3.	NowCard
What impact has the scheme had?	<ul style="list-style-type: none"> • Scheme supported by 65 bus operators • 100% bus operator coverage by mid-2009 • 1.7m transactions per month • 67% take-up of eligible citizens to the NowCard scheme • Anecdotal evidence – Free scheme has attracted elderly car-holders out of cars and onto public transport due to cost of petrol and parking
Lessons learned	<ul style="list-style-type: none"> • NowCard is an early developer of smartcard scheme (pre-ITSO) therefore software and HOPS systems have been developed from fresh • Scheme has been hampered by software problems, particularly regarding reliability of fares data coming back into HOPS (for subsequent revenue distribution) • A dedicated project manager to work with the individual operators to ensure seamless roll-out has proved invaluable • Had the scheme been developed now, greater access to off-the-shelf software and support would have been available, especially with introduction of concessionary card scheme into an existing infrastructure • Department of Transport case study on NowCard highlighted additional scheme benefits <ul style="list-style-type: none"> ○ Eradicating problems caused by fraudulent use and counterfeit of existing non-smart concessionary card schemes ○ Reducing delays with boarding times (where flash cards were properly checked by driver)
Data Gaps	<ul style="list-style-type: none"> • Current concessionary card scheme basis means limited analysis of card use / journeys at present
Current Status	<ul style="list-style-type: none"> • Scheme will have software problems resolved within couple of months, this is put down to NowCard being a leading developer of public transport smartcard systems since 1999 • NowCard are piloting reduced fare schemes for 16-25 on smartcard and anticipate a roll-out for young persons across the numerous operators later on this year, once HOPS software is sufficiently robust
Contact	Chris Anslow Integrated Transport Policy Manager, Lancashire CC (01772 534 673)
Links	http://www.nowcard.org/news.asp http://www.dft.gov.uk/itstoolkit/CaseStudies/nowcard.htm

4.	Welsh Concessionary Fare Scheme
Region	Wales
Scope	Bus
Started	Jan 2007
Cards Issued	600,000
Summary	<ul style="list-style-type: none"> • UK Concessionary smartcard scheme across deregulated bus companies; ITSO compliant • One-off set-up funding - estimated £6.5m set-up costs • Capital investment in bus smartcard machines for all independent bus franchise operators, all funded by Welsh Assembly Government. • Concessionary fare scheme for elderly and disabled citizens continues on with WAG backing

The sustainability business case for a smart card

4.	Welsh Concessionary Fare Scheme
What impact has the scheme had?	<ul style="list-style-type: none"> • Gradual increase in concessionary scheme since April 2002 scheme introduction • Following comprehensive local and regional media campaign across 22 LAs, the scheme has 600,000 users to date • Policy manager HT at WAG states that introduction of smartcard arrested a long-term public transport decline in Wales. • Whilst he acknowledges that causal link is difficult to prove, the smartcard scheme is accepted within WAG as having caused turnaround in public transport use • Software issues have been a constant issue in confidence in the reliability of fare data from cards, however this not hindered take-up of concessionary scheme • Pilot schemes for young persons and disabled access to community transport have been cancelled due to refocus of attention on expanding scheme on non-concessionary basis
Lessons learned	<ul style="list-style-type: none"> • Successful roll-out would not have been possible without a combination of <ul style="list-style-type: none"> ○ Government provision of hardware and cover of capital costs ○ Comprehensive marketing of the scheme
Data Gaps	<ul style="list-style-type: none"> • No passenger journey or car use data available within relevant authorities
Current Status	<ul style="list-style-type: none"> • Organisers are negotiating with NoWCard operators to share ownership of IHOPS back office support system • WAG currently undertaking feasibility study on further expansion of scheme on a non-concessionary basis (across wider public)
Contact	Hugh Thomas, WAG Transport Policy Manager (02920) 826 517
Links	http://new.wales.gov.uk/docrepos/40382/4038231141/403821125/TransportPublications/635887/WTF44_annexA.pdf?lang=en http://new.wales.gov.uk/docrepos/40382/4038231141/403821125/TransportPublications/635887/WTF44.pdf?lang=en http://cymrugydnerth.com/publications/accessinfo/drnewhomepage/1925469/Informationdrs2008/wlshctznsmrctrcdcbc/?skip=1&lang=en&ts=4

5.	Easyrider / Citycard - Nottingham
Region	Nottingham City Transport (NCT)
Scope	Bus, Tram
Started	2002
Cards Issued	Estimated - 300,000 Easyrider, 300,000 Citycard
Summary	<ul style="list-style-type: none"> • NCT operate Easyrider smartcard for Bus and Tram (since 2004) <ul style="list-style-type: none"> ○ Season ticket (monthly) since inception, PAYG cards since 2004 ○ Non-ITSO due to scheme having been developed since 1999; developed by NCT separate to the Notts City Council ○ Easyrider issue approx 35,000 cards per annum, and 300,000 separate top-up / renewals per annum • Nottingham City Council operate Citycard; includes ability to 'load' EasyRider onto Citycard <ul style="list-style-type: none"> ○ Citycard scheme incorporated UK Concessionary fare scheme (2008), however similar free concessionary fare schemes have existed on NCT smartcards since 2004
What impact has the scheme had?	<ul style="list-style-type: none"> • Annual journeys using both schemes has increased from 12.2m (2002/3) to 26m (2007/8) • 60% of all journeys in Nottingham are smartcard • Anecdotal evidence exists of modal shift, mainly via customer satisfaction surveys (not publically available where car-owning customers opt to use public transport).

The sustainability business case for a smart card

5.	Easyrider / Citycard - Nottingham
	<ul style="list-style-type: none"> • Central government involvement in Citycard issue <ul style="list-style-type: none"> ○ Cards sent to all adults on electoral register • Card includes transport, leisure and library card • Parking scheme in Nottingham city centre is believed to have assisted public transport growth <ul style="list-style-type: none"> ○ Parking rates in city centre zones are set at deliberately-prohibitive levels to encourage public transport and park-and-ride schemes (which are also available on EasyRider card schemes)
Lessons learned	<ul style="list-style-type: none"> • NCT are dominant in area, due to dual-role as the local transport executive and dominant bus service provider, therefore smartcard scheme development was more simple to expand <ul style="list-style-type: none"> ○ Few bus franchise operators meant a simpler back-office model for fare collection and revenue distribution • Majority of increase in smartcard use attributed to non-concessionary card growth, including the issuing of university and schools ID cards; • Key to growth and public perception is through creating suitable travel products, which are designed as part of extensive passenger consultation <ul style="list-style-type: none"> ○ Schools relationships e.g. parents evenings attendance ○ University relationships (Easyrider card also doubles at University ID card) ○ Local employer relationships (relationships with Nottingham City Council and Nottinghamshire Healthcare Trusts developed; travel planning programmes developed to increase public transport and smartcard awareness) • Non-ITSO Easyrider platform due to pre-ITSO development of Easyrider scheme. <ul style="list-style-type: none"> ○ This was a reason for a separate Citycard issue, plans are to run two back-office schemes in parallel due to internal logistical difficulties of transferring existing to new ITSO system
Data Gaps	<ul style="list-style-type: none"> • No analysis on GHG and air pollution impact, though increases in public transport can reflect positive environmental effects • No further car data is available
Current Status	<ul style="list-style-type: none"> • Plans to merge separate card schemes to a single 'Citycard' for marketing simplicity • Functionality is there for local rail operators, however NCT do not have plans to work with train companies as it remains focussed on the services under its own remit
Contact	Anthony Carver-Smith Easyrider Marketing Manager (0115) 9766 742 Anthony.carver-smith@nctx.co.uk
Links	http://www.ukbusawards.org.uk/content/index.php?option=com_content&task=view&id=151&Itemid=78 http://citycardnottingham.co.uk/Citycard.html

6.	Oyster
Region	London
Scope	Bus, Tube, LR, Rail
Started	April 2003
Cards Issued	10 million
Summary	<ul style="list-style-type: none"> • PFI initiative contract between TfL and TransSys, £100m 8-year contract to supply cards and hardware, plus day-to-day management (renegotiated in 2010) • Introduced April 2003; based on Octopus system in Hong Kong • Currently over 15m Oyster cards issued since inception

The sustainability business case for a smart card

6.	Oyster
	<ul style="list-style-type: none"> • Originally offered as monthly subscription ticket • Oyster pay-As-You-Go introduced in late 2004 <ul style="list-style-type: none"> ○ PAYG / stored value is currently most popular oyster issue; • Social Inclusion <ul style="list-style-type: none"> ○ Free travel for all school children within London boroughs ○ Student discounts • Reduced single fares for Oyster card holders on London Buses • Oyster allows £90 stored value on card • TfL have also innovated stored value smartcard with Barclaycard OnePlus Oyster Card (2006) (Oyster, credit plus cashless) • Daily price capping on journeys in London • Back-office system allows auto PAYG top-up via debit / credit card
What impact has the scheme had?	<ul style="list-style-type: none"> • As of March 2007, over 80% of Bus and LU journeys are Oyster <ul style="list-style-type: none"> ○ 4% are cash journeys • Currently over 100m PAYG bus journeys annually on Oyster • TFL data show significant modal shift since Oyster introduction in 2003; 5% modal shift up to 2006 (cited by TfL Chairman Peter Hendy) <ul style="list-style-type: none"> ○ 9.3% increase in public transport use ○ 1.5% fall in private car use ○ 11.7% increase in bus patronage ○ 5.4% increase in London Underground patronage • Train Operators have been slow to accept Oyster at Overground stations due to problems with fare tables, and subsequent issues with correctly apportioning fares to operators by TfL • Deals now signed with 10 major TOC operators, PAYG expected to be accepted by end 2009
Lessons learned	<ul style="list-style-type: none"> • Gradual phase-in of oyster card has meant few teething errors
Data Gaps	<ul style="list-style-type: none"> • Oyster Card introduced at same time as Congestion Charge Zoning in central London, therefore issue over attributing public transport impact solely to Oyster
Current Status	<ul style="list-style-type: none"> • Oyster continues to be most successful multi-modal smartcard scheme in Europe • Plans to replicate Paris 'Velib' bicycle hire system into Oyster scheme for central London
Contact	Brian Dobson Infrastructure Manager, TfL
Links	http://www.tfl.gov.uk/corporate/about-tfl/publications/1482.aspx http://www.tfl.gov.uk/assets/downloads/london-underground-environment-report-2008.pdf http://www.barclaycard-onepulse.co.uk/

International Smartcard Schemes

7.	Hong Kong
Region	Hong Kong
Scope	Rail, Light Rail, Bus, Rapid Transit, Ferry
Started	1997
Cards Issued	18m
Summary	<ul style="list-style-type: none"> • Fully-integrated and interoperable, multi-modal smartcard scheme across all Hong Kong transport modes • Covers Metro Transport Rail (MTR), Kowloon-Canton Railway (KCR), plus airport and feeder bus links, all services across Hong Kong and Star Ferry • Card scheme expanded into a contactless retail micropayments scheme, accepted in 2,000 retail outlets across Hong Kong • Stored value offers use across numerous commercial vendors, also used by schools for meals, monitoring attendance etc (see Octopus Card website) • Card scheme benefits from public ownership of scheme and ability to roll out across all operators in the region; while Octopus Holdings is a separate entity to the major transport operators and the Hong Kong Government,. Octopus Holdings Ltd ownership structure is: <ul style="list-style-type: none"> ○ MTR is 57% owner of Octopus, remainder is split between remaining 4 service operators ○ Hong Kong Government is 77% owner of MTR, the remainder is traded on HK Stock Exchange
What impact has the scheme had?	<ul style="list-style-type: none"> • Currently over 18 million cards currently in operation (2007) • 7 million transactions per day across over 80 operators • Over 95% of HK residents aged 16-65 use Octopus; therefore assumed that all transport payments are made using smartcard. • HK Transport Department data shows <ul style="list-style-type: none"> ○ 9% increase in PT use since 2000 ○ 7% increase in car ownership per 1000 population • 21% increase in rail use across network since 2000 • 2% increase in bus use across same period • Road accident figures show 3% decline across period
Lessons learned	<ul style="list-style-type: none"> • Central planning and card ownership enables multi-modal transport systems and applicability • Central funding of capital cost of roll-out
Data Gaps	<ul style="list-style-type: none"> • Due to multi-vendor use of Octopus card, data for specifically transport-related Octopus card use is problematic •
Lack of evidence / challenge	<ul style="list-style-type: none"> • Air quality stats unavailable
Current Status	<ul style="list-style-type: none"> • One of the most successful integrated, multi-modal smartcard schemes in the world today – has formed the basis for TfL Oyster scheme in London
Links	<p>http://www.td.gov.hk/transport_in_hong_kong/transport_figures/monthly_traffic_and_transport_digest/index.htm</p> <p>http://www.octopuscards.com/consumer/payment/use/en/index.jsp</p> <p>http://www.mtr.com.hk/eng/useful_links/corp_index.html</p>

The sustainability business case for a smart card

8.	Paris – Navigo
Region	Paris and surrounding Ile-de-France
Scope	Metro, Rail, Light Rail, Tramway, Cycle hire
Started	2006
Cards Issued	2,500,000
Summary	<ul style="list-style-type: none"> Covers all RATP, SNCF, STIF-affiliated public firms, Optile (suburban bus) and Velib bicycle rental system Smartcard project organised and funded by STIF (association of regional, local and municipal authorities across region; majority held by Ile-de-France regional council)
What impact has the scheme had?	<ul style="list-style-type: none"> 12% increase in public transport since 2001/2 11% increase in Bus and Train Autumn 2007 RAPT push to move remaining 2m Carte Orange travelcards onto Navigo smartcards Bicycle hire – Navigo card allows access to Paris ‘Velib’ cycle hire scheme STIF-RATP is initiating Sustainable Mobility infrastructure changes in Paris with the Smartcard at centre, incl. Orbital metro system connecting Paris inner suburbs (aim to reduce car use by 160,000 cars per day)
Lessons learned	<ul style="list-style-type: none"> The Navigo card is central to the aim of STIF to incorporate the cycle hire scheme into the public transport network, as well as attempting to create better orbital links between the surrounding suburbs of the Ile-de-France around Paris. More info?
Data Gaps	<ul style="list-style-type: none"> Car use figures unavailable; no STIF research has been conducted into the use of cars Air quality stats are unavailable prior to 2006
Current Status	<ul style="list-style-type: none"> Over 50% of ticket validations on RAPT network done with smartcard Autumn 2007 RAPT push to move remaining 2m Carte Orange travelcards onto Navigo / CO smartcards
Links	http://www.stif.info/information-communication/documents-langues-etrangeres/english/documents-anglais-1241.html http://www.ratp.fr/corpo/references/pdf/anglais/RATP_RA_2007_GB.pdf

9.	Netherlands - RET
Region	Netherlands
Scope	Bus, Metro, Tram, Train
Started	2006
Cards Issued	Unavailable
Summary	<ul style="list-style-type: none"> Scheme created by ‘Trans Link Systems’ (TLS), a consortium of five Dutch public transport service providers: Connexion, GVB (Amsterdam), HTM (Hague), the NS (Dutch Railway Company) and the RET (Rotterdam) Five providers cover 80% of Dutch public transport provision OV-chip is based on Hong Kong ‘Octopus’ smartcard scheme Responsibility for implementation rolled-out to TLS by Dutch Ministry of Transport

The sustainability business case for a smart card

9.	Netherlands - RET
What impact has the scheme had?	<ul style="list-style-type: none"> • RET successfully rolled-out scheme in Rotterdam; 75% of Netherlands is now set-up to use OV-Chipkaart • Combination of several factors have hampered success of roll-out: <ul style="list-style-type: none"> ○ Card undermined by inferior security technology of card caused political issues, mainly over data protection and the security of personal information ○ Technical difficulties with entrance machines and back office system issues e.g. incorrect amounts debited from user bank accounts ○ Public confidence in system undermined ○ Current use – Original pilot scheme remains in Rotterdam (2004, prior to national roll-out), limited use in Amsterdam.
Lessons learned	<ul style="list-style-type: none"> • Lack of government co-ordination in management of roll-out cited as key reason for further delay of roll-out • Total budget since original roll-out in 2003 estimated at €1bn (Jan 2009)
Data Gaps	<ul style="list-style-type: none"> • Data on use unavailable
Current Status	<ul style="list-style-type: none"> • Rotterdam RET is now 100% OV-chipkaart only (Jan 2009)
Links	http://www.translink.nl/content.asp?languageID=UK&pageID=1 http://www.railwaygazette.com/news_view/article/2009/01/9219/ov_chipkaart_roll_out_creeps_forward.html

Appendix 5 – Joint Local Transport Plan Targets

Congestion		
Objective	Method	Target
<ul style="list-style-type: none"> Promote the use of alternatives to private car 	<ul style="list-style-type: none"> Promotion of public transport, travel plans, cycling, ferries. Increase punctuality / reliability of buses 	<ul style="list-style-type: none"> BVPI102 - Increase bus patronage by 3% by 2010/11 LTP3 - Increase no of cycling trips by 30% by 2010/11 LTP5 – Increase proportion of buses running on time to 90% by 2014/15 Local1- Increase no of rail trips by 15% by 2010/11
<ul style="list-style-type: none"> Manage demand for travel by car 	<ul style="list-style-type: none"> Accelerated delivery through Greater Bristol Bus Network (GBBN) bus-based major scheme Future bids include development of Bus Rapid Transit Network Local regional rail travel vision – work with DfT, Network Rail and train operators 	<ul style="list-style-type: none"> LTP2 - Restrict traffic growth across sub-region to 12% by 2010 LTP6 - To ensure no increase in peak period flow to Bristol City Centre
<ul style="list-style-type: none"> Encouraging more environmentally sustainable patterns of travel behaviour 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> LTP4 - No increase in number of children being driven to school by car
Road Safety		
Objective	Method	Target
<ul style="list-style-type: none"> Careful traffic management / Enhanced environment for pedestrians and cyclists 	<ul style="list-style-type: none"> Speed management and effective enforcement; achieve improvements for road safety for most vulnerable sections of community 	<ul style="list-style-type: none"> BVPI99z - Reduce number of people killed / seriously injured on roads by 20% by 2010 (compared with 2001-04 average)
Air Quality		
Objective	Method	Target
<ul style="list-style-type: none"> Reducing congestion and improving air quality in Bristol Air Quality Management Area 	<ul style="list-style-type: none"> Reduced emissions from vehicles 	<ul style="list-style-type: none"> LTP8 - Reduce NOx concentration in Bristol AQMA by 4% by 2010/11

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Accessibility		
<ul style="list-style-type: none">• Objective	<ul style="list-style-type: none">• Method	<ul style="list-style-type: none">• Target
<ul style="list-style-type: none">• Improving school, healthcare and job accessibility	<ul style="list-style-type: none">• Action plans for tackling accessibility target groups	<ul style="list-style-type: none">• LTP41c- Improved accessibility to education (target TBC)

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Appendix 6 - South Yorkshire PTE 'Yorcard' Data

Punctuality / Dwell-time Savings

Variable	Source	Value
Total Annual Bus Journeys	Statistics – use	328.5 M miles
Total Annual Mileage	Statistics – use	119.7 M miles
Average Journey Length	Calculated from Statistics	3.94 miles
Number of Boarders per average journey	Calculated from Statistics	10.81
Dwell Time benefit per passenger	Statistics – use	2.51 seconds
Total Number of Journeys	Calculated from Statistics	30.3 M
Total Number of Passenger Boardings	Calculated from Statistics	305.9 M
Total Dwell Time Benefit (seconds)	Calculated from Statistics	767.9 M
Total Dwell Time Benefit (hours)	Calculated from Statistics	212303 hours