



A smart future starts now

Contactless payment, multi-operator tickets, and above all, seamless journeys – we could be on the verge of a revolution, a *Transport Times* conference heard. **David Fowler** reports

Much has been said of the ability of smart technology to transform transport. But are those predictions about to become reality? Many of those at last month's *Transport Times* conference, A Smarter Future for Transport, believed so.

They were encouraged by an upbeat address by transport minister Theresa Villiers. Standing in for Norman Baker, she impressed her audience with her enthusiasm for the subject. "Our options for making transport better aren't confined to new road and rail links, or renewing and upgrading infrastructure," she said. "I believe that technology has huge potential to deliver a smarter, more efficient transport system in the years to come."

She added: "A world of smarter travel is one where demand can be more accurately predicted and capac-

ity can be used more efficiently." A smarter system could make possible seamless connections between operators and modes as well as spreading demand more evenly across the day. And it could empower travellers by giving them much better information flows.

Innovative technology such as intelligent transport systems could provide real-time data from bus and train times to updates on traffic delays. The UK is a leader in the field, with its work on managed motorways and hard shoulder running and urban traffic management and control systems, said Ms Villiers.

Changing behaviour is another building block. Ms Villiers said smarter choices projects, and in particular the sustainable travel towns project, had demonstrated the potential to make a difference to issues from traffic congestion to obesity, while providing good value for money. This was one of the decisive factors in setting up the £560m Local Sustainable Transport Fund, with a mix of revenue and capital funding expressly to make it easier for local authorities to include smarter travel projects in their bids.

The Oyster smart ticketing scheme had helped transform attitudes to public transport in London and the government wanted to see smart ticketing introduced more widely across the country. "Our ambition is to enable most public transport journeys in the country to be made

using smart ticketing by the end of 2014," she said. A growing number of ITSO-compliant ticket schemes were in operation or development.

The government had provided £20m of grant funding to the nine biggest urban areas in England to provide the infrastructure needed. TfL is to install ITSO-compatible smart readers across London's transport networks and investigations are going on to see whether PlusBus can be made available as an ITSO product.

Last month's McNulty report had pointed out that intelligent ticketing could help to make better use of capacity by spreading demand more evenly. Smart technology would also allow the season ticket to be modernised "so that it adapts to the reality of 21st-century working life where many people, especially women, no longer fit the standard nine to five, Monday to Friday stereotype," Ms Villiers said.

Asked in a question and answer session whether the government was concentrating too much on smartcards – particularly in rail franchises, when many train operators saw EMV contactless bank cards and mobile phone ticketing as more appropriate for complex journeys – Ms Villiers said: "Smartcards have their place but it is important to create the conditions for other technologies as well. For the rail industry there's a need to differentiate between different types of product. What might work for a £2.20 fare on

Above, from left: a contactless card on a Stagecoach Merseyside bus; Arriva's mobile phone application; a Barclaycard contactless terminal. Below: all Scottish concessionary fare transactions are now ITSO-based



London Underground isn't going to work for a £75 fare on the West Coast main line."

In future franchise agreements, she said the government "wants to give ITSO that push which it needs to generate the national benefits we've talked about, but we also want to give as much flexibility as we can to train operators to use other technologies as well."

ITSO chief executive Michael Leach talked about progress towards the concept of nationwide integrated smart ticketing. He said that ITSO was now "getting to critical mass very quickly". The ITSO specification, intended to operate seamlessly with different operators and travel modes, was "finally fit for purpose" with changes to meet the needs of the rail system.

The newly-released Part 11 specification, "the critical part of the puzzle that was missing", allows "customer not present" and over the air transactions, making it possible for passengers to download tickets at home, or pick them up from a retail store that is not ITSO equipped.

It potentially makes possible compatibility with EMV contactless bank cards. It will also allow smartphones to display journey data.

Another part of the puzzle is pay as you go. Thinking about the difficulty of being in an unfamiliar town and wanting to catch the bus, but being unsure what it will cost or whether you have enough change, he said: "Wouldn't it be great if you could say, I've got £10 loaded in Scotland, and I can use that when I'm in Cardiff next week?"

The ability to have a nationwide stored value purse is absolutely critical, he said, and two multinational firms are currently working towards that. "You can take away the concept of transport money on your card being linked to a locality and turn it into a common currency for use on public transport."

He hailed progress on interoperable ticket schemes. In Oxford, agreement on interoperable fares has just been reached between Stagecoach and Go-Ahead, driven by the county council. In Newport and Cardiff, two schemes initially planned as separate have been integrated, and public transport use in Newport has risen 13% in the 10 months since launch.

Shashi Verma, Transport for London director of fares and ticketing, gave further details of TfL's plans to introduce payment by contactless bank cards, as outlined in *TT* in April.

Even with the success of the Oyster card, collecting fare revenue costs TfL 14p in every pound. And ticket issuing still runs on a "bureau de change" business model in which you have to

change money into a "currency" you can use on the transport system.

TfL approached the problem from first principles. In Oyster, the billing engine in the reader reads the information on the card. It looks up the appropriate fare data locally and writes changes back to the card. A copy of the written data is sent to TfL's servers. "A fundamental problem is that the intelligence is all in the card," Mr Verma said.

After looking at "every possible technology", TfL came to the conclusion that EMV contactless cards held the best promise of reducing costs.

For EMV transactions, no processing is performed at the reader, which holds no fares information. No transport specific data is written back to the card. All card processing takes place centrally in servers. Accounts held in the back office contain all the key data.

This allows travellers to pay for transport in the same way they pay for

everything else, with no need to get a card specifically for transport or top it up. Revenue collection is cheaper; the system is easier to manage and it provides greater flexibility over fares, for peak pricing for example.

TfL's "transit model" will work as follows. When the card is presented at the reader the front office system checks to see whether the card is valid or on the deny list. If valid the "middle office" checks the card authorisation, though not in real time. If authorised the transaction is passed to the back office. If not the card is added to the deny list. TfL still gets paid for the journey but the card will not be usable again.

The back office sorts the data, "constructs" the journey and applies capping, on a daily and weekly basis.

Cubic has been responsible for design of the front end of the system and

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David Hytch: Manchester plans to introduce contactless payment alongside pay-as-you-go and mobile phone tickets



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the security system. TfL has produced the fares and aggregation engine and customer account.

The culmination of five years' work will come next year, with contactless bank card payment being introduced on buses in the first quarter, and extended to rail, Underground and DLR by the end of the year.

David Hytch, information systems director for Transport for Greater Manchester, described the conurbation's own plans for a smart ticket system. TfGM, he

said, had reached similar conclusions to TfL. With the aim of producing a ticket system that is easy to use, understandable and promotes confidence in public transport, TfGM also intends to introduce payment by contactless bank cards.

Manchester's 86,000 students were "a significant factor" in planning: "Lots of them have contactless bank cards but don't want to use them for

travel because they are maxed out," said Mr Hytch. So there will also be an ITSO pay as you go/top-up option. And because many people don't have bank accounts but do have mobile phones, pay as you go mobile phone tickets will also be available.

The system will be introduced in three phases running partly in parallel, beginning with Metrolink and followed by bus and rail (where there are more operators to deal with).

Advantages will be reduced the barriers to using Metrolink; reduced cost of sales; no need to market, sell and maintain cards; reduced transactions at the validator; and reduced fraud and ticketless travel.

The system will work in a similar way to TfL's, with the touch-in validator checking whether the card is on the deny list or not and a back office calculating the cost of journeys made and producing a daily bill on the passenger's card or bank statement.

Gordon Hanning, Transport Scotland head of integrated travel and concessionary ticketing, said Scotland's concessionary fare scheme, introduced in 2006, now accounted for over a third of bus passenger journeys, while one in four Scottish residents is entitled to free travel.

The need for fraud prevention had enabled a business case for an ITSO-based system to be constructed. Some 7,000 electronic ticket machines and card readers had been installed and 900 wireless LAN units established. Since last December every concessionary fare transaction has been ITSO-based. The capital cost of the smartcard infrastructure was £40m but it saves £20m annually.

Transport Scotland's next aim was to introduce an integrated multi-modal ticket system across Scotland

using ITSO. Working with PWC, it concluded that rather than going for integration immediately, that there were sufficient benefits to make replacing cash and paper tickets a worthwhile goal in itself, paving the way for integration at a later date.

Jayne Davidson, product manager for Visa payWave Transit Solutions, considered the question of whether contactless payment was the future for integrated transport. She said that use of contactless cards was growing fast. Public transport had come top in a survey in which people were asked what products or services they would like to be able to pay for using a contactless card.

Barriers to integration – being able to use the same payment system for multiple operators over a multi-leg journey – included operators wanting to lock in customers to their own services.

There was also the need to establish partnerships with other organisations in the areas of scheme management; card or media design, technology and distribution; security management and fraud prevention; hardware provision in stations and on vehicles; system-level integration, testing and proving; customer service provision; and marketing.

With contactless payment, card issuers deal with card design and distribution and customer service; acquirers (the banks that provide the merchants' terminals) shoulder much of the burden of security, hardware provision and system integration; and the card schemes act as the locus for card issuers and acquirers to come together to deal with scheme management and marketing.

"The result is a dramatic lowering of the barriers that stand in the way

Bus information app Edin Bus has clocked up 200,00 downloads



Not hard to follow

London Borough of Harrow sustainable transport office Fuad Omar gave delegates a crash course in using social media to promote sustainable transport, engage with customers and encourage behaviour change.

Anyone who had not so far quite got to grips with Twitter or Facebook would have had their eyes opened by the end of Mr Omar's presentation.

The point about social media, he said, was that it offered two-way communication with the intended audience. It was important to understand the distinctions and use the right channel for any particular situation or group of customers.

Twitter, he said, was analogous to chatting in a coffee shop. Facebook was a mirror of real life, with interactions with friends and family. Blogs were like libraries where you could research other people's experiences to

help you make decisions such as "should I get an Oyster card?"

Old school vs new school

He drew a distinction between advertising, marketing and publicity.

Advertising was "old school" but would work if done well. Marketing will also work but is expensive. Social media can provide a great deal of publicity at next to no cost.

Tweets and Facebook posts allow you to discover what people are planning.

Twitter provides an open dialogue to which you can respond – for example if someone is tweeting about your bus service. Mr Fuad's team at Harrow organised "tweetathons" during the bad weather last winter in which they targeted and responded to people tweeting about transport problems in Harrow. For example if someone tweeted that they were at a certain station but there

were no trains, the team could respond with live transport advice about when a train was expected or what alternatives were available.

Harrow's It's Up to All of Us campaign was based on the idea that if everyone made one small change, like cycling to work once a week, it would add up to a big difference on a global scale.

The campaign targeted 16-25 year olds at the stage of their life when they are forming lifelong travel habits as they left education and started work.

The campaign was publicised on Facebook and via a YouTube channel. *The Green Effect* video received over 12,000 views in less than three weeks. The campaign was highly successful in attracting celebrity endorsements. The overall message was "the way you travel can save the planet: the future is in your hands."

of operators and authorities coming together to implement integrated ticketing," she said. And once contactless cards are widely accepted for travel, multi-operator caps and discounts would become much easier.

Go-Ahead group IT and procurement director Dave Lynch outlined the drawbacks of the current ticket system. It is highly manual, has high operating costs, is inflexible, anonymous, and there is limited ability to detect fraud or to innovate.

Smart media provide a number of opportunities for operators, including improved customer insight, reduced fraud, the ability to drive revenue growth, and the potential to manage demand. For passengers there would be shorter queues and it would be easier to buy tickets.

He cited the success of airline travel organisation IATA, whose 300 members had gone over to 100% electronic ticketing, saving \$3bn annually.

Arriva marketing manager Mike Woodhouse described the company's mobile ticketing project. Rather than wait for mobile phones with near field communication technology the company sought a lower-tech solution that could be introduced immediately, at no additional cost to the traveller.

Concept Data Technologies designed an application which is held on the phone rather than the network, eliminating SMS text message charges. It allows users to register and buy tickets online or directly from the phone. Once purchased the tickets are displayed on the phone's screen. The mobile ticket replicates the appearance of the paper tickets, making it easy for drivers to check them.

Tickets do not have to be activated until they are first used. When a ticket expires it simply disappears off the phone. Payment can be made through the mobile operator, or by bank card, Paypal or cash. It is also possible to download timetables and plan journeys on the phone.

Mr Woodhouse said: "I think we're at the thin end of mobile commerce. At the moment we're seeing early adopters but everyone will be using it in a few years."

Independent software developer Gordon Christie described how he had created the EdinBus app for the iPhone to access information from the Edinburgh Bustracker system, which since 2008 had supplied real time information for all bus stops in Edinburgh via the mybustracker website and via WAP.

Mr Christie said: "I created EdinBus because it didn't exist and I wanted to use it. The website was a bit difficult to use and the iPhone doesn't support WAP."

The app allows you to search for a bus stop, street, or service. You can

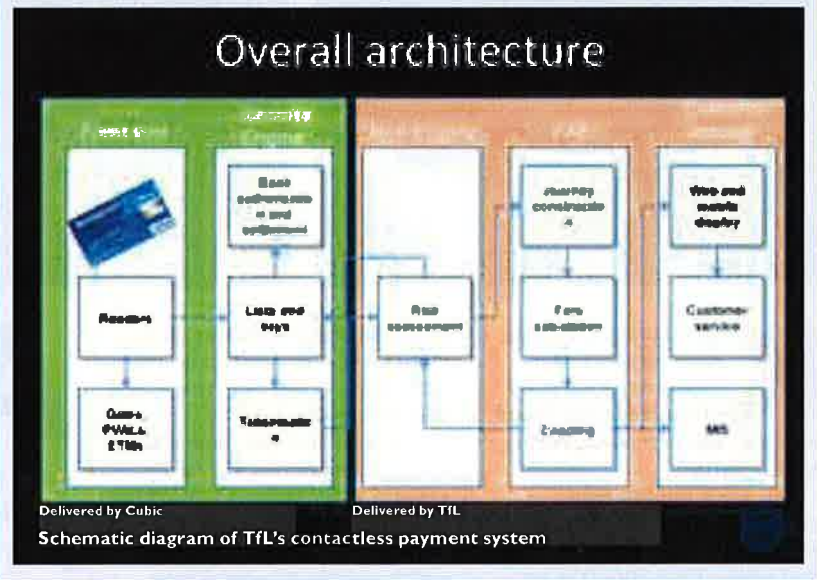
Lots of students have contactless bank cards but don't want to use them for travel because they are maxed out

Smart ways to pay

- Jayne Davidson, of Visa payWave Transit Solutions, outlined five ways of using smartcards to pay for transport.
- Visa payWave Retail: analogous to buying a coffee using "wave and pay" – suitable for use when buying tickets where time is not critical, but not for gated entry and exit points. Above a certain limit chip and PIN authorisation is needed.
- Contactless – flat fare: as used on Merseyside. When the card is presented the bus driver pushes a button and a set amount is deducted

from the card. No back office is needed.

- Contactless – distance based fare: in this case it is necessary to touch out as well as in.
- Contactless – variable fare: as planned by TfL and TfGM. The back office records journeys and works out the charge on a daily basis.
- Hosted application card: like Barclays OnePulse, a bank card with Oyster capability built-in: two cards combined in one, without integration of the travel and payment functions.



save stops you use frequently, allowing you to get information quickly. It also provides walking directions to stops.

Popularity has exceeded expectations, with 200,000 downloads, 30,000 upgrades within a week of the software being updated, and 500 five-star reviews.

A similar app for Android phones, My Bus Edinburgh, has since been developed by an undergraduate, Niall Scott, as a final year project. This has so far had 14,000 downloads.

Since the launch of EdinBus, hits on the mybustracker website, which had levelled out, have risen exponentially.

From smart technology to smarter choices. Darren Richards, executive head of planning and transportation at the London Borough of Sutton, explained Sutton's approach.

The pioneering three-year, £5m Smarter Travel Sutton initiative had been undertaken with Transport for London. Its centerpiece was a personal travel planning initiative in which all 76,000 households in the borough were visited by volunteers with walking maps and information about cycling and public transport. In hindsight, said Mr Richards, this was expensive and not good value for

money – it would have been better to target groups more precisely.

Other activities included awareness-raising events, school travel planning (Sutton was the first borough in which all schools had a travel plan) and Walk-Cycle-Reward in which local shops offered discounts for people walking or cycling to them.

The results were an 83% in cycling (from a low base), an increase of 18% in bus patronage, and a 10% mode shift from the car.

At Sutton the transport planning and network development service has been renamed Smarter Travel Sutton. It includes both the behaviour change team and traffic and transport engineering, integrating services with the aim of combining physical and smarter choices measures and locking in the benefits of STS.

The borough is also pioneering a "big society" approach to transport planning, with three key strands: giving people greater responsibility for how their roads, cycling routes, buses and trains are organised; working with TfL and the DfT to create more open mechanisms for consulting on public transport issues; and reducing bureaucracy so that schemes can be put into practice more quickly and cheaply.