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# Reducing the Cost of Retailing Tickets

# ABSTRACT

This white paper considers the future impact of developments in smart ticketing on transport operator companies and public bodies that commission transport services.

Given the considerable investment in new technologies associated with smart ticketing, will there be any payback?

If new ways of selling and using tickets are developed merely to support existing products and services, then retail costs will simply increase.

Worse yet, the new smart ticketing channels are likely to cannibalise existing ticketing channels, further driving up the costs of retailing.

While smart ticketing offers the potential to lower the cost of retailing by moving sales to a passenger self-service model, the choices are many and currently fragmented into different technologies, each of which requires significant investment.

The role of collaboration versus “own brand” services can also make a marked difference in influencing the cost of selling the products passengers need to use public transport.

In light of the unprecedented economic, environmental and political pressures the public transport sector is facing today, can transport operator companies and public bodies that commission transport services afford not to consider how to succeed with smart ticketing?



# The winners and losers of the future

The pressures on public transport organizations are increasing as the fallout from the current recession reduces the number of passengers, driving the need to tightly control costs. Any investment needs to be carefully considered against the potential benefits.

It is tempting to do what has always been done to keep costs down during lean times. However, the cost of retailing traditional paper-based tickets is extremely high and increasing. Continuing to do the same thing is no real answer when costs need to be drastically lowered.

With newer ticketing models, you can observe a shift away from traditional ticketing channels. This trend is referred to as “channel cannibalization” where more modern ways of selling tickets eat into the volumes sold via the traditional ways of selling tickets.

The move towards a passenger self-service model also has hidden costs that are associated with the two main technologies supporting this model:

- **Ticket vending machines** – These can be complex to use and may or may not sell the right/best ticket for the passenger’s needs. They are also expensive to maintain, as well as costly due to anti-vandal and theft prevention requirements.
- **Internet ticketing** – The golden age of Internet ticket issuing systems (WebTIS) is long gone. This reflects the reality of the cost of web-based sales. Further, tickets purchased via the web must still be distributed, and ticket distribution costs are high.

Operators are facing a plethora of smart ticketing types, each with its own standards and technologies. Each type has a different potential impact on customer convenience, revenues, existing channels and deployment costs. Some of the popular offerings today include the following:

- **Print@home** – This ticketing type allows ticket purchasers to print their own tickets. Print@home is on the rise across all modes of transport and especially in aviation.

The technique saves money for the operator because there is no cost of fulfilling the ticket other than producing an electronic file for printing. Therefore, at a minimum, an operator saves on postage costs (typically equaling £1.25–£1.50 per ticket sale).

The downside is that this ticketing type is less secure than others. Where the purchaser’s identity is validated by other means (e.g., for air travel), security is not an issue. However, it becomes an issue when the actual ticket purchaser cannot be validated.

The inclusion of bar code printing allows the use of optical readers to validate the ticket, but most operators have not invested in this kind of equipment, preferring instead to validate the tickets manually.



- **Mobile ticketing (m-ticketing)** – The use of mobile phones for ticketing purposes is not new. CGI developed the first European m-ticketing system more than 12 years ago. Since then, mobile ticketing has experienced limited adoption with some operators finding it useful and popular.

For Chiltern Railways, mobile ticketing is the prime in-house smart channel (Oyster is also in use but this is Transport for London technology).

Mobile ticketing has been viewed by many as a niche technology with fears that the next generation of smartphone handsets will supersede this type of ticketing.

This type of ticketing requires a unique infrastructure (and associated costs) adding to the operator's retail costs in return for little extra revenue. In addition, the volumes are "stolen" from other channels, instead of reflecting new business.

- **Smart card schemes** – There are currently several different smart card based schemes in operation in the UK and many more at the global level. These fall into one of two camps. Smart card schemes are either proprietary (such as Oyster for Transport for London or the current Southampton City scheme) or based on an open standard (ITSO in the UK or Calypso worldwide).

All schemes work in a similar manner but require significant investment costs as each scheme requires the following:

- **Back office services** – Although most schemes claim to have a back office, the back end may only collect and route transactions rather than process them. In this case, the scheme is really a "middle office" type because it does not perform the processes required for fare and reimbursement calculations.
- **Customer services** – These include card application management, card-holder management and customer enquiry management.
- **Retailing channels and equipment.**
- **Validation equipment on station or vehicle** – This can be the largest spend item within the budget. A bus can cost up to £10,000 to fit with a suitable ETM. There are approximately 180,000 registered buses and coaches in the UK. The average rail franchise must equip approximately 140 stations, including gates and platform equipment.

All of these factors make the use of smart cards extremely expensive. The bill for Transport for London for Oyster was more than £192 million, and TOCs are spending £15–20 million per franchise to meet the ITSO commitments required by the Department for Transport.

While Transport for London has recouped its original investment as a result of the success of Oyster, which has enabled it to close a significant number of ticket offices and reduce the use of paper tickets, it remains unique in finding a demonstrated economic return. Interestingly, the original business case was predicated on an economic model based on capital gains rather than cost reduction.



The Integrated Transport Smartcard Organisation (ITSO) is a worthy attempt to at least standardise the communications protocols between schemes and form an interoperable base for smart cards, which ultimately will reduce costs. It does, however, create several key issues that, if not managed carefully, have the potential to cause scheme costs to spiral:

- Security management is complex, and it is easy to have too many products that are duplicates. There are 294 versions of the same elderly concessionary pass in England alone, for example.
- There is no concept of shared business processes even for the same mode of transport and the same ticket types. This is leading to confusion among equipment manufacturers, as well as delays and added costs as each scheme and operator does something different.
- There is no guarantee of a scheme successfully working end to end. Currently, each piece of equipment certified by ITSO should be able to communicate, but this doesn't necessarily mean that the overall scheme will work. The levels of testing required to ensure that each part of the scheme works as part of the whole are often underestimated, and this unexpected expense only adds to the operators' cost base.
- Back-office issues are not tackled early and costs are added as the scheme expands. Most smart card schemes start life as pilots. These can easily be managed without any systems overhead. For example, a single product deployed between two points requires little maintenance. But, what happens when the scheme expands to greater levels of complexity? How are fares kept in line? How are the millions of transactions reconciled? Anybody who looks at Oyster will realise that maintaining more than 17 million cards, with 38 million journeys per week and 1 million transactions per day requires a significant suite of back-office systems. These staggering transaction numbers need to be accurate from a fares, charging, account and reconciliation perspective. To do this, the equipment needs to be kept up-to-date and changes coordinated across the whole estate.



# Emerging smart ticketing methods

There are several emerging methods for ticketing, which are raising concerns across the operator community. There is a growing fear that the current smart technologies may be obsolete before they are implemented. These fall into a number of categories. Currently, the debated technologies include new mobile systems, EMV-based contactless bank cards, and “Be In/Be Out” (BIBO) devices.

These new technologies are emerging from other business sectors. The interest that is rising in transport is largely due to the high number of small value transactions, which are predominantly cash based (more than 60 percent of all transactions of less than £20 are paid for in cash).

The costs for cash handling are considerable. For example, a survey of food retailing estimated the average cost of cash handling to be €6,000 - 8,000 per year per till.

The mobile phone market is developing near field communications (NFC) within the handset. This enables the phone to interact wirelessly with a range of services and exchange data with other phones and smart information points, one of which can be ticketing. The advantage of using a phone is that the user has a device that can be used as an interface for passenger decisions. The phone can ask the passenger which one of several products he or she wants to use (unlike a card, which lacks this type of facility). These handsets have been successfully tested to emulate smart cards (as the NFC uses the same radio communications protocols as smart cards) and several suppliers have developed Java-based software to allow an NFC phone to act as an ITSO point-of-service terminal (POST).

This technology has led many operators to question the use of m-ticketing, but as yet these handsets are not widely distributed.

Similarly, smart bank cards that have until now relied on contact technology for Chip and Pin are now being extended to encompass contactless interactions with the computer chip in the card.

Unlike NFC phones, these are rapidly becoming mainstream, as retail banks have made the decision to issue all new cards with contactless capabilities. Such a decision opens up possibilities for using bank cards to pay for travel, opening the door to a true pay-as-you-go model. The issue in the UK is how this fits within the context of an ITSO-based smart card world.

We already have solutions to enable a single infrastructure investment to cope with dedicated ITSO cards and bank contactless cards.

For short journeys and urban schemes, bank cards with a £10 guarantee by the bank could easily replace the complex stored-value, e-purse type of technology, which underpins most PAYG products in the world today. Use of this type of media also saves the scheme operator money, as there is no dedicated card to issue, control and maintain.





Other radio devices are also possible. Cycle hire schemes, for instance, use a key fob device for customer convenience, which unlocks the bike with a radio key. Such devices often have more range than a smart card and can be used for a BIBO model where the customer does not need to do anything but carry the device. The customer is tracked around the transport network and will be billed accordingly.

Radio devices have also been built into items such as watches (for the Geneva BIBO pilot), wristbands or even mobile phones.

However, there is a danger that these new alternatives will become new ticket sales channels in their own right with their own technology, standards and processes. All of this would add further to costs to retail tickets.

Incurring higher costs to deliver the same volume of business is hardly a sound financial decision. Any operator needs to consider how its technology can achieve the following:

- Add significant revenue to the business
- Develop new ways of doing business with the passenger to lower ongoing costs
- Provide a single platform to underpin the current and future likely channels to lower future costs
- Make expensive, manually intensive channels truly redundant
- Provide evidence for funding in whole or part

The following sections consider each of these alternatives against common knowledge and CGI's experience. We are one of the few organisations to have deployed smart technology en masse beyond limited pilots and have helped many operators and public bodies with retail strategy and the subsequent business impact of smart ticketing.



# Adding revenue to lower cost of retailing (as a percentage)

Put simply, if retailing costs can be contained in the face of increasing turnover, this new revenue will add disproportionately to the bottom line.

Two years ago, the number of passengers who travel by public transport was expected to increase year-over-year based on external economic factors. Had those conditions continued, then the most sensible business strategy would have been to spend as little as possible and increase margins from the increased efficiency of retailing.

As a result of the recession, however, passenger numbers have fallen. Further, operators have been working hard to gain fare-paying passengers and to also justify the cost of contracted services to the public bodies that commission them.

The adoption of smart channels for ticket sales offers several mechanisms for increasing revenue, including the following.

- **Improved targeting of consumers with offers that stimulate patronage.** Knowing who you need to target with what offers will not only increase your hit rate and result in extra revenue but will also avoid wasting marketing budgets (which add to retailing costs). Smart ticketing offers not only information on what has been bought but also how it has been used. Why does this matter? Let's take a simple example. It is no good sending weekday off-peak offers to an established commuter. But how do you know who these individuals are? Are they season ticket holders? Although you may identify people who bought a season ticket, they may not be using it every weekday at peak times. The economics of rail seasons, for example, mean that if you travel more than three days per week, a season ticket is the cheapest way to travel. As smart ticket usage is tracked, new consumer groups become apparent.
- **Increased customer convenience increases patronage.** Most smart cards exceed the forecast (in some instances by 400 percent). In a recent Department for Transport strategy consultation, it was reported that one Nottingham operator had experienced an increase of 15 percent in revenue (due in part to fraud prevention).
- **Smart ticketing also helps remove the opportunities for fraud.** Fraud is estimated to account for five percent of turnover and, in some instances, as much as 20 percent. Additionally, data on usage can help identify revenue protection activities.
- **The opportunity to collaborate can increase revenue for all scheme players.** This has been the case for the players involved with the Transport for London's Oyster ticketing scheme.

If the operator community can achieve these revenue benefits, then the investment in smart ticketing technology starts to make sense.





# New models for doing business with customers (and genuinely reducing retailing costs)

If doing the same non-smart thing with smart ticket technology will keep your retailing costs high, what are the alternatives? It is not intelligent to invest in every smart technology piecemeal. This adds to overall costs with no real benefit, and there is a real danger of adopting technology to produce a series of fragmented channels that will ultimately make things worse—definitely not a smart way to operate.

It may be time for operators and government bodies that commission public transport to take a step back and look at ticket retailing from a business perspective.

The first question to ask is, “Why have a ticket at all?” The ticket evolved to meet several needs, including the following:

- **Travel authorization:** Allows the holder to take a specified journey or series of journeys
- **Travel validation:** Ticket details form the basis of deciding the entitlement of the passenger
- **Proof of unredeemed travel:** If you want a refund, you have to surrender the unused ticket along with the proof of purchase.

Ultimately, the ticket represents a person, his or her entitlement to travel, and what he or she has or has not used. When examined at this level of granularity (as it must be in implementing the technologies that support smart ticketing), some interesting possibilities occur:

- What if the digital ticket represents a personal account? This is the basis of the EMV payment scheme in the New York subway system. The person's bank card is their ticket.
- What if we merely identify an individual and associate the payment for travel in the back office against credit or another payment method? Amtrak uses this principle in the U.S.
- How can we deliver the traditional ticket in novel ways?
- Are there new products that can use the smart aspects of the ticket medium rather than just the old-style products?

For each of these questions a range of innovative answers is available.



## I have an account not a ticket...

We have been exploring ways in which the current EMV (Europay, MasterCard and Visa) activities can be integrated with the ITSO world in the UK.

Building on the experience of mass transit schemes around the world, a smart back office is required to handle a new way of working.

The basic principle underpinning EMV is to identify a person's bank account and collect the money as required. The banks are currently setting a floor limit of £10, which is less than most urban transport tickets for an entire day's worth travel across all modes. This means that, as long as the person's account is correctly accessed, the banks will underwrite the revenue risk.

This technology, however, does not currently fit within today's ITSO schemes, and there is a danger of "two technologies" being fitted into a scheme.



# A new approach to traditional ticket products

Many schemes are using the range of traditional ticket types as if ITSO is merely electronic paper. The reasons for using traditional types of ticketing might give us some insight into how to be innovative and save money.

- Season tickets are the most popular targets for ITSO cards. This is because they are usually held by known customers, and therefore it is easy to convert these ticket holders. Season tickets were developed for repetitive commuting journeys with discounts as an incentive to lower the number of tickets to be issued. The issues raised by these tickets are the periods they cover and how to renew the product. We are working with several clients to produce a “perpetual season” ticket. This product does not require renewals and, in an ITSO environment, does not need sales and fulfillment, which is a major source of cost to the average operator.
- Singles and returns are the traditional way to handle ad hoc needs. If EMV cannot be used (for example, long distance rail travel is not suitable), then other channels may be appropriate. Many long distance journeys need an itinerary for the passenger and a smart card will not provide the visible information. Many organisations, therefore, turn to more complex devices (such as NFC phones and PDAs) to solve this. However, print@home tickets are simpler, already in use today and do the job. What would happen if you could use your debit/credit card for shorter (cheaper) journeys around a city and have a simple “buy on the web and print it” product for the longer ones?
- Carnets have often been used to encourage a person to buy a bunch of single use tickets at once. This, of course, lowers the retailing costs as one transaction sells many tickets (usually 10, 20 and so on). These savings, however, are traded by the operator in discounts to the public. If one ticket in a carnet of 10 is given away, then the 10 percent discount may be wiping out retailing cost savings. Carnets have an appeal in smart schemes as one transaction can add many tickets to the card avoiding fulfillment issues.
- Pay-as-you-go (PAYG) is a misnomer. The current products labelled as PAYG are, in fact, consumption of pre-paid credit, usually in a “stored value” product or an e-purse or wallet. This product really is payment against credit in an account and therefore rivals the EMV bank card proposition. Currently ITSO has a “stored-value” product, and many people are flocking in to use it. Unfortunately the Prestige system has a back-office function to manage stored-value and the calculations in support of Oyster, which does not exist in the ITSO world. Current ITSO stored-value scheme pilots (none are in full rollout) have compounded the complexity of such a product by adding a proprietary e-purse system and attempting to synchronise the two. We have developed several novel back-office alternatives that can handle PAYG either using a stored-value product to supplement EMV. Using several types of platforms (SAP, Oracle or Microsoft), the CGI Smart Transport e-Payments System, STEPS, can support a true PAYG offering.



- **New ticket types** - Several journey types do not have a main ticket solution today due to the difficulty in administering these on paper media.
- **Match day:** People buying a football season ticket (often issued as smart cards today) will need to get to the home matches. For one client, we demonstrated a “match day” ticket, valid to and from the match when home games are played.
- **Student school and discount:** The popular way for school transport to be administered is through flash passes. These, however, need to be renewed regularly (or at least annually). Over the life of a student, these 50 pence passes exceed that of a smart card that can be electronically renewed and altered as children change schools. These can be made service specific to allow only travel on the right bus at the right time and can automatically contain discount flags for non-school use.
- **Off-peak, first-class upgrade:** This is used to encourage customers who typically will not travel off-peak to do so.
- **Reverse season ticket:** This is for customers who, let's say, hold a London-bound season ticket. There is not much incentive when travelling in the opposite direction (to Birmingham, for example). To encourage customers to use public transport rather than the car, offers can be made to recognise that the season ticket is being (partly used) in the opposite direction every now and then.
- **Park & Ride, not Park & Shop:** Some large metropolitan authorities offer free parking at stations. This may be misused by the non-travelling public. Many parking spaces are filled with local shoppers looking for free parking rather than the intended commuters who need to park their vehicles and use the public transport into city centres. Smart entry can ensure that if a person has a ticket to travel then free parking is given, if not then parking must be paid for.

These are just a few of the novel products that are helping our clients to justify the investment required in smart solutions, minimising the costs associated with the technology.

The final question to ask is, “Who’s helping you navigate the maze of opportunities and issues that retailing smart tickets brings?”

We currently support a number of smart ticketing schemes with nearly three million cardholders under our management.

There is no substitute for experience, and in smart ticket retailing, CGI is unrivalled.

We have a deep understanding of both the benefits and risks involved in smart retailing. We support the largest ITSO scheme in Britain, successfully deploying equipment to 4,500 buses and handling more than 6.6 million transactions per month.

Our transport team has been engaged by public transport operators and authorities throughout the UK to support concessionary and commercial travel schemes, rail franchise operations and new franchise bid teams.

## We have delivered:

- Largest concessionary scheme in the UK
- Back-office solutions to manage large urban environments
- More than 100 smart card schemes worldwide
- Business opportunities and budget models (to help assess the benefits smart retailing can bring)
- Technical architecture for solutions that will deliver your retailing vision and integrate with current retailing and settlement systems
- Forecasting models for channel switch and consumer uptake of new retailing and distribution of tickets
- Innovative ideas for exploiting the smart retailing investment

## We offer you:

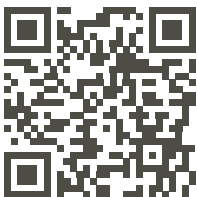
- Fully-managed smart retailing service covering ITSO ticketing, fulfillment, card management and point of sale solutions
- Full range of consultancy services delivered by staff with hands-on ITSO experience
- Implementations and live systems
- Turnkey ITSO and payment solutions
- Fully integrated back-office solutions
- Card management solutions
- Point-of-sale solutions
- Hand-held ITSO posts and validators
- New fulfillment systems
- End-to-end testing services
- Project and programme management
- Roadmap deployment plans to make your vision a reality

CGI is an ITSO member and is proud to be part of teams delivering the public transport network of the future to the UK government. We draw in mobile and smart card concepts developed across our five European transport centres of excellence (the UK, Sweden, the Netherlands, France and Finland) to enhance our UK experience.





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With over 68,000 professionals in 40 countries, CGI fosters local accountability for client success while bringing global delivery capabilities to clients' front doors. Founded in 1976, CGI applies a disciplined delivery approach that has achieved an industry-leading track record of on-time, on-budget projects. Our high-quality business consulting, systems integration and outsourcing services help clients leverage current investments while adopting new technology and business strategies that achieve top and bottom line results.

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