



Your career

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Preface

The present document represents the Yorcard Ltd. view of Best Practice in the delivery of regional, smart, integrated ticketing and payment systems in the UK. It is presented as part of the research outputs of the Yorcard Pilot to fulfil the Yorcard Pilot Project's obligation to:

“Assess the Customer Experience and the Operator and PTE expectations and provide recommendations for rollout. Included within this analysis shall be a study of the business case for deployment of similar regional schemes” (Research Project Objective C).

The obligation is achieved within this document by it being based on:

- The findings of the Yorcard Pilot Research Programme itself,
- Other sources of research as identified in the bibliography;
- The experiences and lessons learned during the procurement, design, build and operation of the pilot;
- The views of the many stakeholders involved in the Yorcard Pilot.

In 2008, Yorkshire Forward, the Regional Development Agency, approved an approach to delivering integrated smart ticketing across the Region of Yorkshire and the Humber. The lessons learned from the Yorcard Pilot and proposed changes to the Bus Service Operators' Grant (BSOG) make the approved approach obsolete. This paper describes a revised approach to delivering integrated, simple to understand and attractive electronic ticketing.

Many of the detailed examples quoted in this document are taken from the new Yorcard Regional Plan and the Yorcard operational pilot area (South Yorkshire). It is the Yorcard view that the examples selected and quoted are relevant and applicable to other areas and regions in the country.

The paper is in two parts:

- A discussion of the qualitative and quantitative economic and business reasons for integrated smart ticketing
- An outline delivery plan, which represents a “how to” guide for the implementation of a low-risk, deliverable solution for regional integrated smart ticketing.

Executive Summary

The DfT's plans for BSOG reform will result in the majority of buses across the country being equipped with smart ticketing equipment; and rail franchise agreements will oblige local rail operators to smart enable their ticketing arrangements. The actions of the DfT have gone a long way to encourage integrated smart ticketing, but gaps remain. Yorcard's recommended, Best Practice strategy is to fill these gaps on a regional basis. A regional scheme benefits from economies of scale and has the potential to deliver a quicker rate of return on investment.

The Yorcard Pilot Project lessons learned and research undertaken by SYPTTE have been analysed to identify the requirements of the passengers, the PTEs/TCAs and the transport operators. Yorcard Ltd's view is that Best Practice is to focus on providing services to PTEs and TCAs who will then, through existing routes to market, encourage the adoption of smart ticketing by passengers and operators alike. It is therefore recommended that the following list of activities should form the core of any future scheme

- Establish and operate a regional processing centre for the clearing and settlement of smart ENCTS, concessionary and multi-operator smart ticket sales and usage
- Create an e-money solution to support a regional, integrated 'pay as you go' smart card aimed at the significant number of passengers who currently pay cash
- Develop a low-cost, easy-to-operate on-bus smart ticketing device, that will be affordable and manageable by even the smallest bus operator
- Establish web-sales and retail sales channels

- Install an infrastructure of smart ticketing kiosks in travel interchanges and other key locations to allow passengers to check e-money balances and collect tickets and e-money bought on the web.

The case for the Best Practice smart ticketing plan is compelling.

- The outline delivery plan described in this report meets the policy of the DfT's ticketing strategy. In particular the Yorcard scheme put forward meets the strategies and objectives of the two Yorkshire PTE's. The outline delivery plan in this report is likely to meet most of the key strategy areas, if not all of those for other areas or regions in the country
- The customer proposition (convenience and security) is attractive. A survey conducted on behalf of SYPTTE showed that 58% of people are likely or very likely to use a smart ticket when it is introduced. Experience with the Yorcard Pilot demonstrated the popularity and ease-of-use of the smartcard as a means of payment.
- Economically, smart ticketing has the potential to deliver significant benefits over the life of a project.
- A Benefit to Cost Ratio in excess of 5.8 is realisable in Yorkshire. For other areas and regions the figure will vary but the underlying case is strong for all areas and regions of the country.

- Financially, the case for PTEs and other TCAs is strong. The Yorcard scheme for SYPTTE will deliver up to £700k per annum in ENCTS benefits from improved information capture. Proportionate financial benefits should be realisable in other areas and regions if the outline delivery plan in this report is adopted.
- Non-PTE TCAs, who currently have little expertise in smart ticketing and no processing capacity, will benefit by avoiding a steep learning curve and significant set-up costs.

The Best Practice plan put forward by Yorcard is low-risk and deliverable:

- BSOG reform will ensure that the transport operators themselves implement the smart ticketing infrastructure. This one item significantly mitigates the risk of cost overruns and scope creep.
- The delivery should be modular and cumulative. Each module can stand alone and deliver benefit; this means that difficulties in one part need not hold up the delivery of the overall programme. Funding restrictions in future years will not jeopardise the viability or value of the parts that have already been delivered.
- Collaborating with providers of significant parts of the smart ticketing solution as partners (the e-money/'pay as you go solution', web and retail sales, for example) will reduce the risk to the project sponsors.

In summary, the Best Practice plan put forward by Yorcard is:

- Affordable;
- Deliverable, with a low risk profile; and
- Closely aligned to the requirements of passengers and other stakeholders.

The Benefits of Integrated Smart Ticketing

2.1 What is 'Integrated Smart Ticketing'?

There are a number of quantitative and qualitative bases on which the reasons for Integrated Smart Ticketing stand, which, taken together amount to a compelling case for implementation on a regional basis. These bases include:

- Public Policy
 - o DfT's Ticketing Strategy
 - o PTE and TCA strategies
- The Economic Case
- The Financial Case
- Customer Preference

This chapter outlines the benefits of integrated smart ticketing.

The concepts of 'Integrated Ticketing' and 'Smart Ticketing' are related, but not synonymous.

For the purposes of this report, Integrated Ticketing means the ability to use one ticket product as entitlement to travel on the services of more than one operator. 'Pay as you Go' is a particular type of Integrated Ticket Product, which depends on a store of value being used as payment for ticket products on different operators' services on an ad hoc basis.

There is currently a range of Integrated Ticketing brands which cover particular geographical areas, offering customers multi-modal and multi-operator products.

Smart Ticketing is the employment of a contactless smart card (or, potentially some other token like an NFC phone) as the carrier for the products or stored value. Using a smart card infrastructure as the basis for Integrated Ticketing facilitates the collection of more detailed passenger and usage information; this will be of value in operational planning and pricing. A smartcard infrastructure enables the use of more sophisticated products such as carnets or PAYGo offerings in addition to the more traditional multi-operator/multi-modal offerings.

2.2 The Customer Proposition

Integrated Smart Ticketing has a number of different 'customers'. The supporting research which complemented the Yorcard Operational Pilot, identified through interviews, the appeal of smart ticketing to each of the main customers.

2.2.1 The Passenger Proposition

A typical range of facilities that are offered on smart cards used in public transport include:

- A single contactless smart card which:
 - o Will hold period tickets and e-money
 - o Act as a 'pay as you go' card
 - o Will be valid on any bus, tram or train
 - o Can be topped-up online or at a retail outlet
 - o Will give the 'best value' ticket
 - o Will be easy to use

These facilities are similar to those now offered by Oyster in London, and this level of functionality is often described as 'Oyster-like'. It is important to note that Oyster started with a much smaller range of offerings, and has grown in capability and scope over the many years it has been in operation.

The essence of the appeal to the end user is one of convenience, security and modernity:

- Products (including e-money) can be loaded onto the card over the Internet or at a retailer, and then simply used on a bus, tram or train. Of surveyed passengers¹, 58% said they were likely to use smart card ticketing. The main reasons for use included:
 - o Ease/convenience (52.9%)
 - o Not having to look for change (18.9%)
 - o It's a good idea (8.6%)
 - o Saves time on bus (6.5%)
- Journey times will improve as a result of quicker boarding²

2.3 Why Integrated Smart Ticketing?

- Customer security is enhanced because the products and money stored on a lost or stolen card can easily be replaced.

2.2.2 The Proposition for the PTEs, TCAs and the RDA

Integrated smart ticketing has a number of benefits to public authorities:

- The potential to obtain more accurate passenger behaviour information to improve planning
- Potential for reduction in concessionary reimbursements³ (Although it is generally felt that the same amount of money will be spent, but more equitably distributed)
- Reduction in the risk of overpayment of concessionary reimbursements
- Reduction in the risk from fraud
- PTEs, the TCAs and the RDA will have an interest in the fulfilment of their published plans

2.2.3 The Proposition for the Transport Operators and MTOs

The benefits to operators include:

- The ability to reduce fraud
- Efficiency savings from reduced boarding times which will translate into either cost savings or more services, leading to increased passenger journeys
- More accurate distribution of MTC revenue

Integrated smart ticketing has been part of the policy aspirations of PTEs and the DfT for many years. The DfT has supported many initiatives over an extended period, and has recently published a smart and integrated ticketing strategy.

Within ROYH, both SYPTE and Metro have strategic intent to introduce integrated smart ticketing. Metro has recently confirmed its commitment to going forward in partnership with SYPTE, through the Yorcard Ltd. joint venture⁴.

This section examines the different drivers for integrated smart ticketing: public policy, customer demand, the economic case and the financial case.

2.3.1 Public Policy

2.3.1.1 The DfT's Ticketing Strategy

The DfT has recently published its strategy for Integrated and Smart ticketing⁵.

The Ticketing Strategy says:

- The Government's vision is for smart and integrated ticketing across public transport in England, with the ITS0 specification allowing for seamless travel, potentially across the country, using the same smartcard. As technology develops, it may be possible to use mobile phones instead of smartcards, while contactless bank cards may remove the need for a ticket for some journeys. Local schemes will be able to tailor their offer to the passenger, encouraging sustainable travel patterns and offering the sort of wide integration available in Lyon, Hong Kong and Chicago.

- To deliver this vision will take time. An immediate goal is to see integrated, multi-modal smart ticketing schemes in the major urban areas in England by 2015. The expectation is that these schemes can form the base for further expansion with the majority, if not all of the country similarly covered by 2020.⁶

2.3.1.2 Meeting a published PTE Bus Strategy (SYPTE)

The following illustration is supplied to provide an example of how the proposed Yorcard plan for ROYH meets local strategic objectives. The example cited is for SYPTE, but it is believed that the essence of the suggested plan would meet most if not all local declared strategies published by PTES/TCAs which are or are likely to be aligned with the recently published DfT strategy.

SYPTE's Bus Strategy for 2006-11⁷ calls for 'simple, understandable ticketing that provides travel at an affordable cost'. The Yorcard smart card ticketing plan will provide an infrastructure on which all the strategic ticketing objectives can be delivered. The summary table that follows shows how SYPTE's objectives will be met by integrated smart ticketing.

Bus Strategy Objective	Smart Card Ticketing delivers this by:
Simplify multi-leg and interchange ticketing	The PAYGo proposition – one card, just tap and go
Supporting park and ride options	For example, ITSO compliant parking and bus equipment allows transactions at the car park and on bus to be matched in the back office and an appropriate discount applied if both parking and bus travel are used
Promote the image of public transport as a first class mode of travel	Smart card ticketing presents the image of a go-ahead, modern service
Facilitate differential pricing	Intelligence in the readers coupled with identification of class of user allows discounts to be applied according to time of day. A variety of loyalty schemes could also be implemented
Reduce driver interaction	Experience from other locations indicates that over a 2 year period, the take up of smart payments will exceed 65% of transport users, who will have converted to some form of smart pre-pay (period pass or PAYGo) compared to today, when almost 70% of non-concessionary travel is single cash fares. The reduction in driver interaction will speed up boarding and improve punctuality
The development and promotion of internet sales of multiple, competitively priced ticket types, including Multi-Operator Travel Cards	The proposed plan (See Outline Delivery Plan) is to engage in a cross-licensing partnership with an e-money issuing firm which will manage the e-money to drive PAYGo. Internet sales of tickets and top-ups will be delivered as part of this arrangement
Increase in the number of 3rd party and self-service sales	The e-money issuing firm will be expected to recruit and equip retail outlets
Introduce mobile phone and e-ticketing	Yorcard's delivery plan is for back office processing capabilities, including transaction repository. Currently, the front office token of choice is the contactless smart card; in the future, other technologies, such as NFC phones, may be used. Yorcard has no proprietary interest in the front office technology and will support any device meeting the ITSO standard for Customer Media.
Develop a telesales service to operate from the Contact Centre	The Yorcard plan is to work to overcome the regulatory and business hurdles to the provision of this functionality

Table 1. Summary of SYPTe's Strategic Objectives for Integrated Ticketing

2.3.2 The Economic Case

The Detica Report ⁸, commissioned by the DfT, presents an economic case for the introduction of smart ticketing throughout the UK. It calculates that the annual benefits to the English economy could amount to £2.6bn, with initial capital costs of £1.1bn and annual operating costs of £263m8. On the face of it, this is a compelling case.

More optimistic parameters were applied to the model in the Detica report than have been experienced in the Yorcard Operational Pilot. Nonetheless, the underlying economic model can easily be adapted for use with figures obtained by actual use in the Yorcard Pilot (and cross-referenced with figures from other schemes, like Oyster).

Detica's model calculates benefits for a range of factors, including decongestion benefit, savings due to journey shortening, potential savings in ENCTS re-imbursment, new ticketing revenue, and the value of benefits from modal shift. The two largest elements are savings due to bus dwell time and re-imbursment savings. From discussions with PTE's and TCA's responsible for administrating concessionary schemes, Yorcard believes that the total of re-imbursment payments will not change significantly, but will be distributed more equitably. The benefits of dwell time reductions are the mainstay of the economic case.

The economic benefit of dwell time reductions accrues due to faster boarding driven by reduced time to pay what would otherwise be cash fares. Every passenger on the bus benefits by this reduced boarding time every time another passenger boards the bus. The Detica Report assumes 10 passengers boarding during an average journey and 15 seconds for boarding time reduction.

To illustrate how the Economic case for a particular area or region can be calculated, data for the SYPTE area is shown in Tables 2 to 5. By selecting the appropriate figures for a particular area or region the process can be repeated to calculate the Economic benefit for those area/regions.

Average Service Journey Loading in South Yorkshire		
Estimate of number of Service Journeys per annum	4,259,052	From Service Mileage Reports ⁹
Estimate of the number of passenger journeys in South Yorkshire	119,000,000	From Transport Statistics Bulletin ¹⁰
Average Boardings	27.94	Passengers per Journey
Average Load	13.97	Average passengers on the bus

Table 2. Average Service Journey Loading in South Yorkshire

Table 3 shows the split between the cash-fares, period product usage and concessionary fares in South Yorkshire in February 2008. The data is derived from SYPTE surveys.

Surveyed Bus Journeys in South Yorkshire - Feb 2008 ¹¹			
	Surveyed Journeys	% of total journeys	% of non-concessions
Cash fares	175,949	39%	64%
Single operator tickets	68,362	15%	25%
MTCs	9,305	2%	3%
Concessions	177,555	39%	
Others	20,414	5%	7%
Total Surveyed Journeys	451,585	100%	
Total Non-Concessions	274,030		100%

Table 3. Surveyed Bus Journeys in South Yorkshire

The data from Table 3 is combined in Table 4 with information derived from surveys carried out as part of the Yorcard Pilot Project. This combination allows the derivation of a new average boarding time, which takes into account the reduction in time taken to pay with cash and the elongation of time required for a 'smart' read of a concessionary or period pass; it assumes a technical improvement to bring the transaction time experienced in the field into line with the ITSO specification. It has been assumed that 80% of cash users will move to PAYGo payments over a period of about 2 years. The estimate of future transaction time is in line with the actual experience in TfL.

Payment Time now and with smart ticketing		
Estimated Current Payment Transaction Time ¹²	5.87	Secs
Estimated Future Payment Transaction Time at 80% take up	4.38	Secs
Saving	1.50	Secs

Table 4. Estimated Future Bus Payment Time with Smart Ticketing

Table 5 completes the calculation in the same way as the Detica Report to show an economic benefit to South Yorkshire of £5.2m per annum. The Economic Benefits to other areas or regions is dependent on the number of passengers in the area or region who are persuaded to shift from paying cash to using smart ticketing and the take up of smart technology on buses.

	South Yorkshire	Notes
Time saved per boarding	1.50	Secs
No. people in journey	13.97	Average passenger numbers per bus
No. journeys	119,000,000	From TS Bulletin ¹⁰
Value of time	£7.49	Standard DfT figure ¹³
Time saved	2,487,909,124	Secs per annum
Time Saved	691,086	Hours per annum
Value of Time saved	£5,176,233	Per annum

Table 5. Economic Value of Smart Ticketing

The rate of take-up by operator is likely to be variable and lag some way behind the delivery of the supporting core smart infrastructure. It is therefore likely that the full economic benefits of any scheme will take some time to be realised. In the case of the Yorcard it is estimated that the total value of the economic benefit to the region of Yorkshire and Humber in reduced dwell time alone will be £97m over a ten year period set against the total capital and revenue cost to the public purse of £16.63m (see Outline Delivery Plan), giving a BCR of 5.8. In the case of the Yorcard plan, it is anticipated that the full Economic benefits should be realised for the ROYH in full from year six onwards. Yorcard believe that other areas and regions should also be able to realise significant Economic benefits. The scale of these benefits for each area and region will vary relative to the number of passengers transferring from cash to smart transactions, the adoption of smart ticket machines on bus, the rate of change and the speed and cost of delivery of the plan. A BCR of order of magnitude to that calculated for ROYH, is believed to be achievable in other areas and regions.

In addition to the economic value of dwell-time savings, the Detica Report makes the case for increased patronage where a smart ticketing system is in place. Yorcard has some evidence to support this contention; a survey¹⁴ conducted as part of the Yorcard Pilot Research Workstream of 120 17-59 year-olds who had used Yorcard for a period of months in touch-on only mode (that is, as a replacement for paper Multi-operator/Multi-modal products), 22% of the respondents reported increased public transport use. Reasons given included:

- Now using bus/train in preference to other modes of transport 6%
- It seems cheaper 17%
- Ease of use / like technology / saves time 35%
- Not Related to smart card 42%

The key smart card related driver to changed behaviour seems to be the convenience of the ticketing medium. This is borne out by a survey commissioned by SYPTE in March 2009, which shows that 58.5% of public transport users are either “very likely” or “quite likely” to use Yorcard when it becomes available – this translates into a user base of over 1 million active users in ROYH¹. Similar increases in patronage growth are potentially realisable for other areas and regions where smart ticketing is introduced. It is interesting that people say that it seems cheaper – this apparent price reduction may be responsible for the increased patronage. It may be that issuing smartcards and allowing more sophisticated means of paying for public transport reduces people’s price sensitivity to public transport costs.

2.3.3 The Business Case

To illustrate a robust business case for smart ticketing, the ROYH is used as an example of what can be achieved if the Outline Delivery plan, which is described later in this report, is adopted. The capital costs of setting up the Outline Delivery Plan are estimated at £7.1m for ROYH. In addition, there are estimated to be a total of £9.5m operational costs over a ten year period from commencement

2.3.3.1 The Business Case for SYPTE

SYPTE will need to pay for the service of collecting and processing smart ENCTS and other concessionary transactions that Yorcard provides, at a rate to be agreed, but likely to be just less than £0.01 per boarding. At this rate, extrapolating the current number of ENCTS and concessionary boardings, the annual cost will be up to £0.5m once the scheme has rolled out to the whole of South Yorkshire. This represents a little over 1% of the revenue distributed.

The benefits accruing to SYPTE from this service include:

- An accurate count of ENCTS and other concessionary uses. The Detica Report’s¹⁰ model suggests that ENCTS savings of up to 8% may be achievable through more accurate recording of transactions. Although, intuitively this seems high, even a figure of 2% (in SYPTE’s case, this would amount to £700k per annum) would more than pay the cost of having Yorcard collect and process the boarding information.
- Information facilitating re-imburement by mileage, if that is required
- Reduction in the risk of over-paying ENCTS and other concessionary re-imburements
- The introduction of an integrated e-money / PAYGo scheme fulfilling the objective of integrated ticketing at no risk to the PTE

It is understood¹⁵ that by buying in this service from Yorcard, SYPTE will make no direct staff savings. On the other hand, SYPTE will, at some point in the future, need to buy in a service to process its ENCTS and concessionary data. In that event, it is unlikely that a “for profit” offering will provide a lower cost.

The rate to be agreed charged represents good value for money, and, by using the Yorcard Ltd vehicle, SYPTE is able to obtain economies of scale by combining with other authorities in the region; it reduces the costs that SYPTE would otherwise have to spend on its own facilities. As a result the income stream from transaction processing from all the TCA's and PTEs' for Yorkshire can be set at a level of less than £0.01 with a view to match revenue expenditure. In the case of Yorcard the plan proposes that this will be achieved from year five onwards when the installation of smart ticket machines is well advanced on buses.

By adopting the arguments described above, a robust business case can be formulated for other areas and regions.

Outline Delivery Plan

3.1 Key Lessons Learned from the Yorcard Pilot

The DfT's intention to make changes to BSOG will radically alter the smart card ticketing landscape. It is the DfT's intention to make an additional BSOG element attributable to smart ticketing which will be worth approximately £800 per bus per annum¹⁶. This incentive will be sufficient to encourage the larger operators to implement smart card ticketing systems. However, the difficulties of smart ticketing are such that even at the expected level, it is unlikely that the incentive will be sufficient to encourage smaller operators to invest.

To illustrate the Outline Delivery Plan in some detail the case of the Yorcard plan for ROYH is used throughout this section of the report. The illustrations have been selected on the basis they are believed to be valid in other areas and regions of the country either taken as a whole or in part with appropriate adjustments to reflect individual circumstances or preferences.

As part of the Yorcard Pilot Project Close-out, a 'Lessons Learned' report was produced¹⁷ which are presented here with a view to assist those planning future smart ticketing schemes.

Observation	Reason	Rectification envisaged in this Business Plan
The pilot was late being delivered and the functionality didn't match what was originally expected	There is a tendency for suppliers and procurement teams to be over optimistic	Aim for a staged implementation of incremental functionality; implement only what has already been done in the Pilot or what can be seen working elsewhere
It proved impossible to maintain a working system for the participating small bus operator	Current solutions are too complex for smaller operators	Invest in the development of a low-cost, low-maintenance, easy-to-manage, ITSO on bus solution suitable for smaller operators
Eventually the technical system worked, but business support functions in the back office software were inadequate.	There is a tendency to focus on technical issues rather than the business processes and the customer experience	Ensure that business support functions (for example, customer self-service web facilities, customer support, reconciliation and settlement) are properly specified and provided.
Many changes to software worked in the test laboratory's at the suppliers base, but then failed when introduced	The testing regime needed a step between test laboratory's at the supplier's site and the bus depot. A comprehensive on-site testing facility should have been built into the project from the start	A comprehensive, integrated testing suite is a necessity and has been included in the plan for the full rollout.
Even though the three operators in the Pilot agreed to take the same solution, it quickly became clear that they had differing business processes to support and different standards to adhere to.	Different sovereign organisations inevitably have different business processes and adhere to different standards for their own work. Without a massive systems integration workforce skilled in managing the different business situations, a "one size" solution cannot be implemented.	This is one of the two killer blows (the other being BSOG changes) for the delivery strategy previously approved by the RTB. The new plan envisages that BSOG will pay the operators to equip themselves.
The project was understaffed to begin with and eventually grew to a complement of 8 plus part-time contributions from Development, Marketing, Finance and IT	An adequately large, informed, skilled team is required to manage the procurement and delivery	The plan for Yorkshire makes provision for an implementation team of 7 full time staff, plus 3 part-time staff.
Yorcard tried to deal with operators and other customers and stakeholders directly, when there are established channels	The Yorcard Pilot project was inadequately "grafted into" the existing SYPTE and Metro organisations.	Position Yorcard as a service and support organisation to the PTEs and other TCAs, providing smart card processing other services on a regional basis. The PTEs should lead in market operations.

Table 6. Key Lessons from the Yorcard Operational Pilot.

The changes to the business environment caused by BSOG announcements, the lessons learned from the pilot and the initiatives taken by or likely to be taken by commercial organisations will dictate the approach to be adopted if integrated ticketing is to be delivered to a region.

3.2 The Market Demand

Providing the link between DfT Ticketing Strategy and Operator Provision

The economic benefits of smart ticketing are increased by the so-called “network effect” (the more people that have them, the more useful they become). As smart cards become the standard way of ticketing, rather than the exception, then boarding time benefits and information benefits grow. As the network of readers grows then there are more places that tickets can be bought and delivered and more places where people can check their balance and therefore more utility to the passenger, operator and local authority.

The crucial elements for success are:

- Universal access to the technology for transport operators
- Commercial arrangements between operators and local authorities which support Integrated Ticketing
- Engagement with the passenger with a compelling offer.

What is the regional role in delivering the DfT’s business model for Integrated Smart Ticketing in the UK ?

1) Firstly, there is provision in the DfT’s Ticketing Strategy for financing regional infrastructure including regional processing centres, which will be required to process ENCTS transactions on behalf of PTEs and other TCAs. There are also elements of infrastructure (for example, facilities at interchanges for collecting smart tickets or checking the status and balances of cards) which are necessary for the effective operation of a smart card ticketing scheme, and will not be provided by the operators.

2) Secondly, the effect of BSOG is likely to favour larger operators which already have the technical expertise managing IT systems (as observed in the Operational Pilot) and a greater potential to raise the financial resources required to invest in smart ticketing , leaving smaller ones unequipped for the integrated, smart ticketing world.

3) In addition, it was observed through the Yorcard Operational Pilot, that existing smart ticketing systems require too great a level of IT capability for smaller operators to be able to effectively manage them. The Operational Pilot equipment supplied required staff to follow strict procedures and adopt new methods of working which they were unfamiliar with. (For example use of wireless data transmission systems.) When these were not adhered to, the assistance and support of the supplier was required to resolve issues. Many small bus operators operate to very tight staffing levels and may not have the staff resource and skills required to maintain the smart ticketing systems used in the pilot. The use of smart ticketing systems like those used in the Operational Pilot, risk creating a competitive disadvantage going forward.

4) Fourthly, just providing the infrastructure will not guarantee interoperable ticketing. Some organisation will need to take on the responsibility for issuing cards for Multi-Operator Travel Cards (MTCs) and for processing the transactions to establish the correct amount to be distributed to the participants.

5) Integrated ticketing needs to include a PAYGo / E-Money offer. (Whilst some Bus operators in Yorkshire have said they would participate in such scheme, this may or may not be the case in other parts of the country.)

3.2.1 What needs to be delivered to meet the market requirement?

The business model adopted and recommended by Yorcard means it will offer to be a service organisation to TCAs, MTOs and operators. As such, it will act to put in place the pre-conditions for a successful region-wide deployment of integrated smart ticketing. The Yorcard plan for smart ticketing means that it will:

- 1) Operate a regional processing centre to:
 - a) Process the ENCTS transactions of the PTEs and TCAs in the region (for which there will be a fee charged to the TCAs and PTEs)
 - b) Process MTC transactions, re-distributing the funds as determined by the MTOs (for a fee payable by the MTCs)
 - c) Process small operator transactions, providing information required to manage the operators claims for re-imburement for ENCTS travel, distribution from the MTC fund and payments from the stored value fund
 - d) Provide a help desk to help customers and other participants with first line support
- 2) Work with manufacturers to invest in the development and distribution of an on-vehicle solution which is suited to the needs of smaller operators. Support smaller operators with smart product creation, card issuance and management of transactions
- 3) For MTCs, TCAs and operators, issue smart cards and ticketing products for a fee

3.3 Market Positioning

4) Work in partnership with an E-money Issuing Firm (whether a bank or a specialist like Squidcard or EPay) to provide a cost effective, regionally interoperable electronic travel purse as a key plank in the integrated ticketing offering. In the case of Yorcard it proposes it will pay for the set up and software licensing and issue and account maintenance of the first 50,000 cards, the operators will pay the fees for the transactions. It is expected that, after the first 50,000 cards have been issued, that sufficient traction will have been generated in the market place for the offering to be self-sustaining.

- 5) Invest in:
- a) A web-portal for self-service by passengers, where they can buy smart tickets and manage their stored value account
 - b) A network of smart readers at bus stops and interchanges where customers can check their balance and collect tickets bought on-line
- 6) Provide advice and guidance to TCAs and operators

By filling the gaps between the incentives provided by the DfT to operators and the commercial interests of the operators the plan described in this report will result in the delivery of integrated smart ticketing for an area or region.

The business organisation of public transport outside London means that different and more complex commercial arrangements for multi-operator and multi-modal use of smart ticketing have to be made. In particular, different arrangements have to be made for e-money and PAYGo. The business model adopted by Yorcard means that its role is to deliver support and services to MTOs, TCAs and PTEs, who will drive the commercial agreements which will underpin the Yorcard brands' "use anywhere" promise.

3.3.1 Yorcard's position in the supply chain

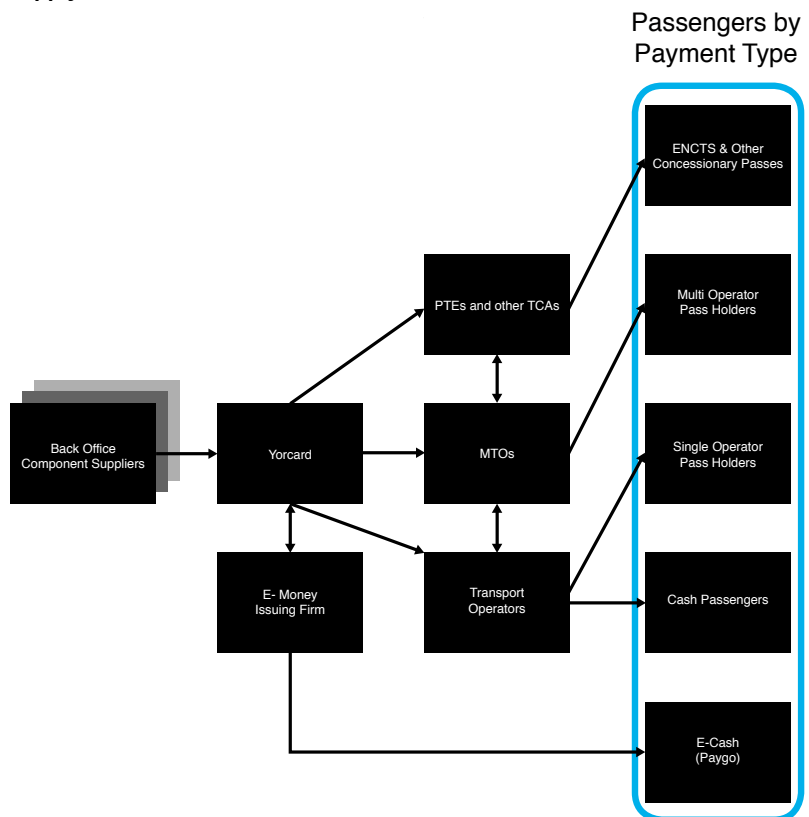


Figure 1. Yorcard's Position in the ticketing supply chain

Figure 1 illustrates the position to be adopted by Yorcard in the supply chain. Yorcard's customers, for the business model it has adopted, will be:

- TCAs and PTEs in the region, to whom it will provide:
 - o Transaction processing,
 - o Hotlisting,
 - o Re-imburement calculation and Management information
- Smaller operators, to whom it will provide:
 - o Transaction processing services,
 - o Card issuing services,
 - o Self-service product definition and distribution,
 - o Self-service route and fare table definition and distribution,
 - o Hotlisting,
 - o Re-imburement calculation and Management information
- Multi-Operator Travel Card Operators, to whom Yorcard will supply:
 - o Card Issuing Services,
 - o Transaction Processing and re-imburement calculation services,
 - o Hotlisting,
 - o Self-service product definition and distribution services

Yorcard considers that the Best Practice route to delivery of an integrated Pay-as-you-Go solution will be to work in partnership with an EMIF to deliver an e-money based PAYGo facility, which will be positioned as a cash replacement offering. The EMIF will take responsibility for marketing the product to passengers and reimbursing the operators. Yorcard's role will be confined to passing information between the parties to enable payments to take place. Yorcard itself will have no direct relationship with the passengers; another party will distribute all the products. Thus, Yorcard will have no financial exposure in the event that the PAYGo proposition does not find favour in the market place.

Given that there are currently a limited number of suppliers in this specialist market, it is Best Practice to buy in the components of a regional back office from a number of sources (it will probably be most cost effective to have these run as managed services) to create a robust and scalable system which can handle growth and expansion of smart ticketing. Procurements should be underpinned by a thorough requirements analysis and design to ensure that the systems reflect local circumstances and the needs of customers and potential customers. This infrastructure can then be converted into a service for onward sale to its customers.

One of the key lessons of the Yorcard Pilot has been the observation that existing technical solutions are too difficult for smaller operators to manage. Yorcard will address this issue by investing in the development of a low-cost, simple to use device for on bus operations, which does not rely on complex depot IT infrastructure and systems. Yorcard will therefore commission the design and development of a low-cost, easy to manage on-bus device which will be sold by the manufacturer at a price point which will make it affordable, by even the smallest operator, within the expected envelope of the BSOG re-imburement attributable to smart ticketing. Yorcard, once this device has been designed and proven, will have no ongoing exposure to financial risk – that will lie with the manufacturer.

3.3.2 Yorcard's Business Model : Role in the Business System

In the case of Yorcard, operationally, its role is to be the lynchpin in the information flow between transport operators and Yorcard's customers and partners – the TCAs, smaller operators, MTOs and the EMIF, as illustrated in Figure 5. Process Map for Roll-Out and Operations Phase.

Stepping through the business flow illustrated in Figure 2:

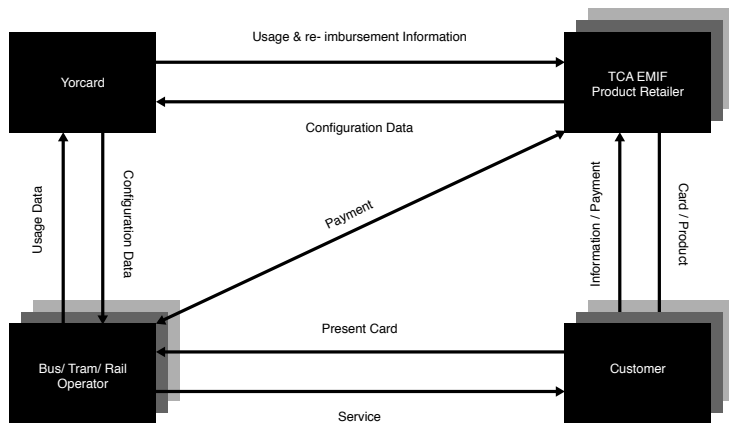


Figure 2. Information and money flow in the Yorcard Integrated Smart Ticketing Scheme

- The customer will acquire a card or product from the operator, a retailer, an MTO or a TCA (in the case of concessionary products and cards). He will either exchange money or information to get the product.
- On presentation of the card and valid product at the Validator on boarding or on the platform, the Customer will be allowed to travel on the vehicle. Possibly, he may need to 'check-out' as well (at the operator's discretion).
- At a later point, the information about the product use (where it is not an 'operator's own' product) will be passed to Yorcard, which will aggregate the transactions and send a settlement report to TCAs, MTOs and the EMIF
- The EMIF, product retailer, MTO or TCA will then reimburse the Transport Operator
- If there is any Configuration Data (new products, hotlists, etc) to be downloaded from one of Yorcard's customers, it will be transferred to Yorcard for distribution to the ticketing equipment owned and maintained by the transport operators.

3.4 Programme Delivery Strategy

From its experience of the Operational Pilot, Yorcard's recommendation for a Best Practice delivery strategy, is to have as much as possible provided by third parties who have the detailed expertise and capability to deliver specific pieces of work. In the delivery, Yorcard's own role will then be primarily through leadership, requirement definition and solution design, procurement, supplier management, project & quality assurance and client support.

The programme of work is best delivered by a number of interconnected Phases.

3.4.1 Design Phase

- Develop a clear operational business process design which meets the needs of all stakeholders
- Develop requirements specifications for:
 - o The back office facility
 - o Integrated Test Facility
 - o Low-cost on-vehicle reader and supporting central software
 - o Help Desk
 - o E-money facilities
 - o Devices for the on-street reader network

3.4.2 Procurement Phase

- Procure the supply of a back office facility for the region which will support the entire business process:
 - o The IHOPS required to enable the receipt of transactions, the distribution of hotlists and action-lists and the central storage of smartcard usage data
 - o Interface to the relevant Cardholder Management Systems in use in the region
 - o Interface to the relevant Card Issuing systems in use in the region

- o A data analysis suite for aggregation, clearing and settling of concessionary reimbursement payments
- o Acceptance of e-money transactions and routing to EMIF for clearing and settling; and the fulfilment of transit purse transactions by action-list distribution
- o Interface to the Help Desk systems in use in the region
- Procure the supply, through partnership with an EMIF, of an e-money service and retail network which will be used by all participants for PAYGo and the on-line/retail purchase of smart products; the EMIF will also be responsible for web-sales / top-ups and the retail network
- Engage with at least two ETM manufacturers, and make the minimum necessary investment to ensure that a low-cost, simple to operate and maintain, ITSO compliant on-bus solution is available to all operators; establish a route to finance for smaller operators to procure such a device
- Design and procure the network of readers to be established in the area or region

3.4.3 Build Phase

- Initiate a number of projects in a programme of work to manage the quality and timeliness of the delivery of:
 - o The back office processing facility
 - o Integrated Test Facility
 - o Card Issuing and Help Desk
 - o Low-cost on-vehicle reader
 - o The regional on-street reader network

3.4.4 Roll-out and Operations Phases

During the operations phase, Yorcard will:

- Manage and maintain the back office system, ensuring adherence to agreed service standards
- Provide information to customers throughout the region and partners to facilitate operator reimbursement
- Issue cards and products on behalf of customers
- Manage Configuration Data on behalf of customers
- Provide demonstration and integrated test facilities
- Provide advice and guidance to new customers and ensure a smooth entry into the smartcard world for them

3.4.5 Resource Plan

3.4.5.1 Staff Plan for Design, Procurement and Build Phases

The processes that Yorcard believe need to be executed in the Design, Procurement and Build Stages are shown in Figure 3:

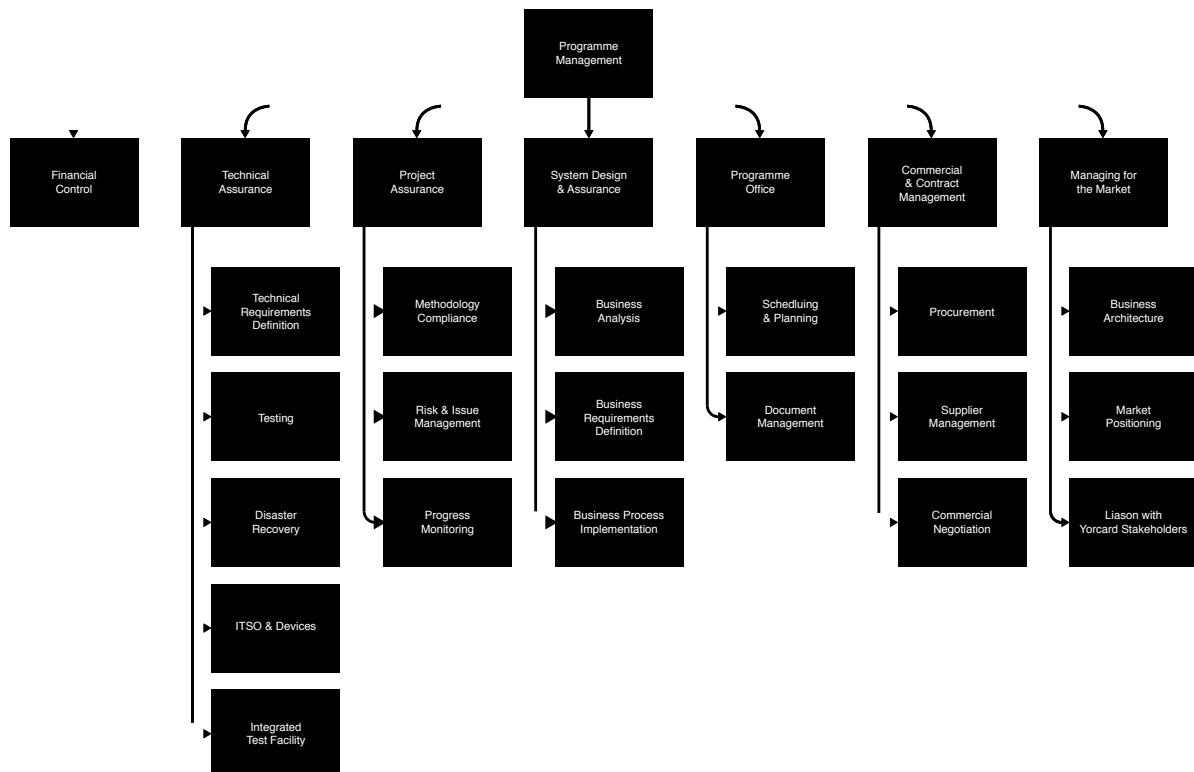


Figure 3. Process Map for Design, Procurement & Build Phases

Best Practice would have these roles mapped on to the staff requirements. A suggested team size for a regional scheme such as Yorcard is shown in Figure 4:

Description	Quantity	Duration
Programme Manager (covering 'Commercial & Contract Management', 'Managing for the Market' and stakeholder and supplier liaison)	1	Full Time
Quality & Testing Manager (Covering 'Technical Assurance')	1	Full Time
ITSO / Device Specialist (within the 'Technical Assurance' team)	1	Part Time
Technical Architect (within the 'Technical Assurance' team)	1	Part-Time
System Designer (covering 'System Design & Assurance')	1	Full-Time
Business Analyst/Test Analyst (within the 'System Design & Assurance' team)	1	Full-Time
Programme Office Manager	1	Full-Time
Project Manager (covering 'Project Assurance' and the management of the implementation of the Integrated Test Facility)	1	Full-Time
Administration Assistant	1	Full-Time
Financial Controller	1	Part-Time
Total (approx)	7	Full-Time
	3	Temp/ Part-Time

3.4.5.2 Staff Plan for Roll-Out & Operations Phase

Following the completion of the Build Phase, there will need to be a managed change in operations. In the case of Yorcard it will stop being an organisation organised around delivering specific built products, and will become an organisation rolling out and then operating a regional smart card scheme on behalf of its customers and partners.

The processes that the business model adopted by Yorcard that will require to be undertaken are shown in Figure 5:

Figure 4. Staff Requirement for Design, Procurement and Build Phases

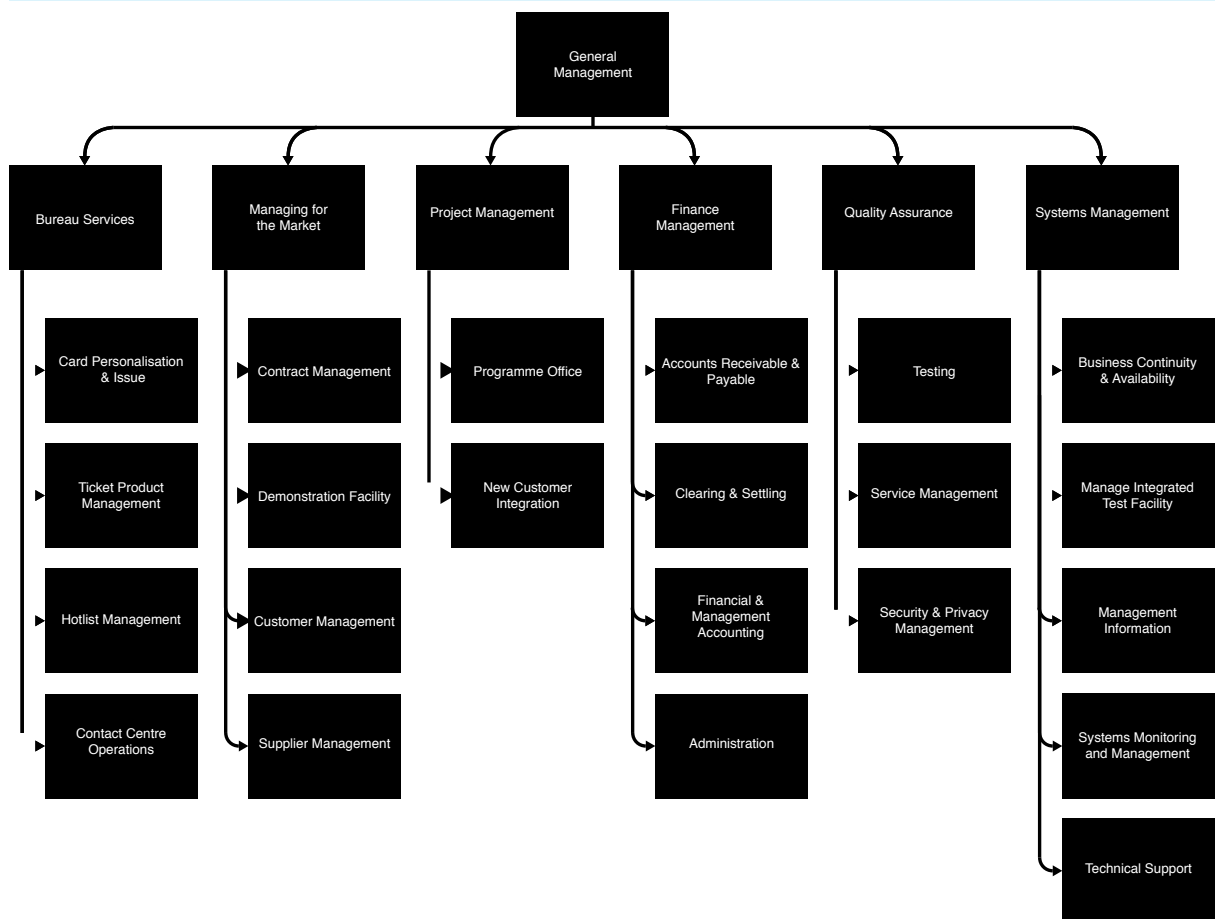


Figure 5. Process Map for Roll-Out and Operations Phases

Description	Quantity	Duration
General Manager (covering “ Managing for the Market”)	1	Full Time
Bureau Services Manager	1	Full Time
Finance Manager	1	Part Time
Systems Manager (covering “Quality Assurance” and “Systems’ Management”)	1	Full-Time
Business Analyst / Developer	1	Full-Time
Programme Office Manager (within the “Project Management” team)	1	Full-Time
Project Manager (covering “New Customer Integration” and the management of the Integrated Test Facility)	1	Full-Time
Administration Assistant	1	Full-Time
Total (approx)	7	Full-Time
	1	Part-Time

Figure 6. Staff Plan for Operations Phase

Best Practice would deliver the process model with the staff shown. A suggested team size for a regional scheme such as Yorcard is shown in Figure 6.

In the business model to be adopted by Yorcard the Roll-Out Phase comes to an end when:

- Three-quarters of the buses in the Region have been equipped and are processing smart tickets and
- Both Yorkshire PTE’s are managing their ENCTS transactions using information from Yorcard and are signed up to continue to use the service for at least seven full years and
- PAYGo/e-money service is in operation.

In the case of Yorcard this is likely to be during year six from the commencement of the project. Thereafter staff costs will diminish. However, since it is uncertain when that point will actually be reached, and given the tendency of roll-outs to “move to the right” then Best Practice dictates that the Financial Plan has been built on the prudent assumption that the operational staff requirement is constant across the two phases, both Roll-Out and Operations.

3.4.5.3 Summary Costs

For illustration purposes only, the total costs that the Yorcard project model is estimated to cost for Design, Procurement and Build is shown in Table 7. The assumptions underlying the summary are described in ‘Basis of Estimate’ which follow later in this report.

Capital Expenditure	Total £m
Regional Processing Centre Equipment & Software	-
Investment in Low-Cost Solution	-
Conversion of gates at Leeds & Access Bus	-
Local Card Bureau Facilities	-
Retail, E-Money, Web-Site, On-Street Equipment	-
Contingency during build phase	-
Total Set-Up Costs	7.1

Table 7. Summary of Yorcard Estimated Set-up Costs

Again for illustrative purposes only, the total estimated Yorcard costs for Roll-Out and Operations for years one through to ten are shown in Table 8.

Revenue Expenditure for first 10 years	Total £m
Staff-Set-up	-
Staff-Operations	-
Regional Processing Centre Equipment & Software	-
Local Card Bureau Facilities	-
Retail, E-Money, Web-Site, On-Street Equipment	-
Fees, Charges, Facilities & Sundry for set-up	-
Fees, Charges, Facilities & Sundry for Operate	-
Contingency during Operate	-
Total Revenue Expenditure	9.5

Table 8. Roll-Out and Operational Costs

3.4.5.4 Summary Revenue

Funding to support a new smart ticketing scheme could come from a number of potential sources and it is not proposed that this report recommends how this is best achieved or pursued. The information described earlier in this report does, however, give sufficient detailed information to give an understanding of how a business and economic case can be made and identify funding gaps or shortfalls.

In the case of Yorcard, external funding is being sought from Central Government to meet the capital costs described earlier in this report. The level of funding approved will dictate how much of the plan Yorcard can deliver. The Yorcard model seeks capital funding over a minimum period of three years. Critical to the Yorcard business model is the income stream to be generated from smart transaction processing costs identified earlier in this report.

In the case of the Yorcard business model the predicted income stream is calculated to be sufficient to cover revenue costs from year five. Clearly the level set for transaction processing is a key element in determining the level of revenue. Again for illustrative purposes only, Yorcard have calculated that an annual income stream in excess of £1m is achievable on full roll-out in ROYH with a charge of less than £0.01 per smart transaction processed. However, it is open to scheme sponsors in other areas or regions to adopt a different or more complex model suited to their particular needs.

3.4.6 Timescales for delivery of a Scheme

The timescale for delivering the Outline Delivery Plan will vary for each area or region. For illustrative purposes, the plan that Yorcard are to deliver will see the first transaction processing at the end of year two along with the delivery of the on-vehicle smart reader for smaller bus operators. By year six, the timescales set out in the Yorcard plan for ROYH drawing upon the experience gained from the Operational Pilot and knowledge shared from other schemes across the country, Yorcard intend to deliver the full plan and have achieved full roll-out across the ROYH. The full benefits of smart ticketing will only be realised when bus operators have installed the required smart technology on their bus fleets.

Best Practice for delivery will take tactical advantage of opportunities as they arise, within the context of an overarching strategy. In Yorcard's case this includes:

- Enabling Leeds and Bradford Railway Station gates and issuing (initially annual) Metrocards
- Enabling West Yorkshire's Yellow Bus and Access Bus Fleet with the "Low Cost" on-vehicle Validator
- Working with operators of Tendered Services as and when the contracts are renewed to get them equipped with smart card equipment
- Working with any Quality Contracts which are introduced to make sure that smart card ticketing is included in the plans

It should be noted that Yorcard's view of Best Practice does not include driving sales of its services (there is no business development function) but rather to respond to and support the requirements of the PTEs and TCAs in the delivery of integrated smart ticketing. The exception to this rule will be that it should be expected that the EMIF will want to sell its e-money (and therefore the PAYGo product) quite aggressively and will expect, as part of its partnership arrangements, that Yorcard and the PTEs support its sales efforts.

3.5 Risks

As dictated by Best Practice, Yorcard has carried out a thorough risk assessment on its own plans (the detail of which can be found in “4 Risk Assessment” later in this report). Many of the risks identified in the Yorcard project are likely to be encountered by other schemes and may be in part or whole generic to all smart ticketing schemes. The principal identified risks in the case of Yorcard are discussed below:

3.5.1.1 There is a risk that the operators may not accept “Pay as you Go” as a means of payment.

The key to delivering integrated ticketing is establishing suitable commercial and contractual arrangements so that transport operators will accept e-money for payment, and will accept the multi-operator card as a container for its own products.

Discussions have been held with operators in the region to obtain their views on the general proposal.

It is possible to mandate a Transport Act 2000 Ticketing Scheme in the Region, which would meet the requirement of delivering integrated ticketing. Yorcard feels that compulsion is unlikely to result in the best value for the passenger, but should be reserved for use in the event that the desired outcome cannot be achieved by attraction and negotiation. Operators canvassed in ROYH said they are content to accept e-money as a means of payment on the vehicle, providing the commercial terms are acceptable. Further, Yorcard has budgeted for seeding the market with up to 50,000 cards; thereafter, it is expected that the offering will be self-sustaining.

3.5.1.2 TCAs may not accept fee basis

There is a risk that the TCAs will not accept the fee basis for transaction processing.

The two major contributors to the revenue stream in the Financial Plan are SYPTE and Metro, with only a small part coming from MTOs and regional TCAs. It is expected that the Yorcard business will reach a steady state in year six from the ENCTS processing fees from the two PTEs

It is expected that in the case of ROYH fees at less than a £0.01 per transaction processed, coupled with the improved quality of information and the reduction in the risk of overpayment of ENCTS re-imbursments will make a viable business case for the PTEs and TCAs and will be affordable. By adopting the arguments set out in the Business Case described earlier in this report, PTE's and TCA's in other regions should be able to calculate a transaction fee that they will be required to charge to ensure that their estimated running costs can be met.

3.5.1.3 There is a risk that costs are greater than anticipated, or the revenue doesn't materialise

Yorcard is a company limited by guarantee, which would mean that the responsibility for any revenue shortfalls or cost overruns would rest with the guarantors (SYPTE and Metro). By working in partnership as a regional scheme, the potential benefits of a greater revenue stream and the sharing of costs should be realised. Taken together this reduces the overall level of risk to the Financial Plan.

The Financial Plan is well underpinned with quotations from third parties who would be very likely to want to participate as suppliers and partners in the Yorcard Programme going forward. Further underpinning is provided by the actual costs that we know have been incurred in the Yorcard Pilot.

Best Practice programme management suggests that the project should be divided into business phases to allow the guarantors to review the viability of the programme at the end of every phase and decide whether or not to press on, thus minimising exposure to unforeseen circumstances.

Contingency provision should be made (and has been made in Yorcard's case) to cover, wholly or partially, all the quantified risks which may affect the budget for money, time or staff.

3.5.1.4 There is a risk that the assumptions about BSOG payments will not be met

It is assumed that the level of BSOG put at risk by the DfT's changes to BSOG will be sufficient to enhance any business case that operators may have for smart card ticketing to point where they will all be keen to implement systems as quickly as reasonably possible – in any case within a year or two.

The position for smaller operators is less clear, but it is assumed that the BSOG incentive will largely pay for the on-bus and depot equipment, but will be insufficient to pay the technical expertise to design and manage the solution. Yorcard will provide these facilities and recharge the operator by charging a transaction fee for each smart transaction made.

3.6 Financial Plan

Yorcard's own financial plan has been presented here in outline with a view to demonstrate that that a robust financial plan is achievable. The Yorcard plan requires funding to cover the capital costs.

3.6.1 Basis of Estimate

For the benefit and clarification of other schemes the following information is provided on the financial plan for Yorcard. The Yorcard financial plan was built based upon a number of assumptions.

- All pilot costs are written off, as they are mostly grant funded. Any assets remaining from the pilot are utilised by Yorcard Ltd for the full scheme at nil cost to the scheme.
- Grant income is made available to cover the capital costs identified in the plan.
- The business case includes revenue lines from medium sized commercial operator ticketing schemes, the TravelMaster and Metrocard multi-operator ticketing schemes and the concessionary fare schemes of all TCAs in the region.
- There is no account taken of revenue or costs for a roll out of the system on tram or train.
- It is assumed that bus and depot equipment will be funded by BSOG and, if Yorcard provides the equipment, then the costs will be passed straight through to the operator.
- The BSOG uplift for smartcard enablement will start in April 2011
- Other assumptions on patronage, growth, roll out timescales and transaction fees are as set out in earlier in this report.

In the case of Yorcard, the projected summary accounts have been prepared on the basis that all operational costs will be covered by income from the PTEs, TCAs and operators over the life of the project.

For illustrative purposes the following table shows those risks in the Yorcard plan for which Contingency provision has been made in the financial plan along with the Counter Measure to the risk:

Risk Entry Number	Risk Description There is a risk that...	Counter Measures
1	The procurement phase will take longer than expected	Make a provision to cover a 3 month overrun
2	The software integration will take longer than expected	Allow contingency in the time and money budgets to cover a 30% time overrun
3	Projected Timelines will be exceeded	Allow contingency in the time and money budgets to cover a 30% time overrun
4	Estimated Costs will be exceeded	Allow contingency in the time and money budgets to cover a 5% cost overrun;
5	There are errors and omissions in the requirements specification	Make provision to review specification with knowledgeable people, Allow extra time and money in budget to cover this eventuality.
6	Unforeseen events will disrupt the delivery of the solution	Monitor the political, economic and industry environments to spot potentially disruptive events as early as possible. Allow contingency in the time and money budgets to cover a 5% time & 5% cost overrun
9	Transport operators will not use the e-money, because they want to use EMV contactless bank cards	Include EMV in the reader specification; make sure that the back office includes provision for aggregation processing and a bank gateway
13	BSOG reform will not come forward in the expected timescale	The business plan assumes that BSOG reform will come into effect in April, 2011 (one year later than the current "official" DfT date)
15	PTEs and TCAs will not use the service for processing smart ENCTS transactions	Work through Metro to make sure other regional TCAs are kept on board
19	Finalisation of contract negotiations are protracted, delaying introduction date.	Make sure that non-compliances to the draft contract are minimised by diligent work with the lawyers to make sure that the draft contract is fair. Make sure that degree of compliance to draft contract is a key part of evaluation criteria. Allow contingency in budget to cover this eventuality.
21	The initial pricing model is flawed and operating costs are higher than projected	Avoid by getting good pre-business case information. Mitigate by allowing contingency.
26	Suppliers cannot honour their contractual agreements	Make sure contractual provisions are in place to get access to source code and designs in this event, that the supplier has some sort of insurance in place and that there is a performance bond around the delivery part of this. Also liquidated damages. Allow additional time & money in the budget to cover project delivery overruns which might be caused by scaling one supplier and employing another.
32	The PTE/TCA and concessions settlement system is complex and expensive to implement.	Allow sufficient contingency, but also avoid by doing proper business analysis at initial design
35	The project isn't governed effectively	Make sure that adequately skilled people are running the project, and don't repeat the failures of the Pilot. Allow sufficient money in the budget to attract the right quality of staff.
16.1	Suppliers may not be able to deliver the payments solution	More likely that we will get down to an offer that is too expensive. TfL already have a solution, and would be happy to share - presumably at a price. Make sure that there is sufficient contingency to cover this.
16.2	Operators may not accept the payments solution for fare payment	There is a risk that integrated ticketing will be undermined by the acceptability of the payments solution to the operators. Mitigation might mean including operators in the choice, or paying them to use the payments scheme. Nevertheless, the usage will not affect Yorcard's finances, as the case rests firmly on ENCTS and MTO ticketing. Might be prudent to add some money to cover this, though

Table 9. Risks for which contingency provision has been made in the Yorcard budget

Risk Assessment

4.1 Methodology

Each new or potential scheme will have to undertake its own risk assessment. The following information is provided about the Outline Delivery plan with a view to illustrate the process and outcomes followed by Yorcard.

In the case of the Yorcard plan the first objective of the risk assessment at the business case stage is to identify any risks which can be foreseen based on:

- Lessons learned from the Yorcard Pilot,
- Lessons learned from previously undertaken projects of a similar nature and
- A review with the possible stakeholders.

The second objective is to assess the risks on a number of dimensions. Some of these dimensions and assessments are dependent on the current view of the outline project plan, which may change quite dramatically as the more detailed planning activities are completed. The dimensions assessed are:

- Which Project Phase is affected by the risk?
- Which deliverable is affected?
- Is the impact on:
 - o Scope
 - o Quality
 - o Budget (Time, Costs, Staff, Revenue)
- What is the scale of the impact
- What is the probability of the impact occurring?
- When will the impact be felt if the risk event does actually occur?

- What should the project do about the risk:

- o Accept it (do nothing, its there and there's nothing that can usefully be done)
- o Avoid it (plan around it, or change scope to avoid it)
- o Mitigate it (make plans or budget provisions which will reduce the impact of the risk event on the final deliverable of the project as a whole)
- o Transfer it (for example, through insurance or liquidated damages)
- o What (if any) counter measures should be taken against the risk (and likely budget for the counter measure)

- The risk assessments combined, giving a "Risk Score" which is used to rank the risks in order of importance. The objective of this is to help ensure that time and effort is expended where it will do most good.

For illustrative purposes, once complete, the budget for the Yorcard business case is adjusted in the light of the risk assessment. The lists of risks shown in the tables below show those risks which have been accepted and those for which some action has been taken and which ones still have action to be taken. At this stage of business case development, the main action taken has been the inclusion of budget provision in the financial mode. This results in a budget which has a clearly defined "minimum cost" for the project and a "worst case" cost which would occur if all the major risks happened. The financial plan in the main body of this document clearly identifies which risks have been accounted for.

4.2 Active Risks for the Yorcard scheme

The table below shows the risks that have been identified, with risk scores greater than zero, in descending Risk Score order (that is, the top of the list is the risk with the highest risk score, taking into account the dimensions of the risk).

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Status	Counter Measure Implemented?	Risk Score	Counter Measures
26	Suppliers cannot honour their contractual agreements	Build	All	All	Add Time & Money	Catastrophic	Low	> 1 Year	Mitigate	No	360.00	Make sure contractual provisions are in place to get access to source code and designs in this event, that the supplier has some sort of insurance in place and that there is a performance bond around the delivery part of this. Also liquidated damages
35	The project isn't governed effectively	All	All	All	Add Time, Money & Staff	High	Low	< 6 Months	Avoid	No	360.00	Make sure that adequately skilled people are running the project, and don't repeat the failures of the Pilot
19	Finalisation of contract negotiations are protracted, delaying introduction date.	Procurement	All	Budget	Add Time & Money	Medium	High	< 1 Year	Avoid	No	259.20	Make sure that non-compliances to the draft contract are minimised by diligent work with the lawyers to make sure that the draft contract is fair. Make sure that degree of compliance to draft contract is a key part of evaluation criteria.
17	Performance issues arise post-go live	Operate	All	Quality	Loss of Revenue	High	Almost Certain	After Go-Live	Avoid	No	72.90	Careful testing; stringently applied SLAs; real contractual teeth to keep the suppliers keen
28	Yorcard becomes insolvent during commercial operation	Operate	All	All	None	Catastrophic	Almost Never	After Go-Live	Transfer	No	18.00	Make sure Yorcard has adequate guarantees from its parents, and adequate insurance. In the case of non-receipt of expected revenue, it will have to be agreed by the PTEs that they will pick up the liability for continued operations for actual customers. Good reporting techniques to be implemented to allow for early intervention to avoid the risk
23	Product interoperability issues arise at GO LIVE	Roll-Out	All	Quality	None	High	Low	After Go-Live	Avoid	No	13.50	Ensure compliance to standards and do rigorous testing
16.3	Suppliers may not be able to deliver the retail solution	Build	Retail Solution	Scope & Quality	None	High	Low	After Go-Live	Mitigate	No	9.00	Make sure there is robust plan with identified, qualified retailers before we commit, thus keeping our options open
33	Smart on-bus solution for small operators is not delivered to time or cost-viable	Roll-Out	Low-Cost On-Bus Validator	Scope	None	Low	High	> 1 Year	Avoid	No	7.92	Careful planning & testing; real contractual teeth to keep the suppliers keen
16.1	Suppliers may not be able to deliver the payments solution	Build	Payments Solution	Scope	None	High	Almost Never	> 1 Year	Mitigate	No	3.60	More likely that we will get down to an offer that is too expensive. TFL already have a solution, and would be happy to share - presumably at a price. Make sure that there is sufficient contingency to cover this.

Table 10. Active Risks

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Status	Counter Measure Implemented?	Risk Score	Counter Measures
3	Projected Timelines will be exceeded	Build	All	Budget	Add Time & Money	High	High	> 1 Year	Mitigate	Yes	2.59	Allow contingency in the time and money budgets to cover a 30% time overrun
13	BSOG reform will not come forward in the expected timescale	Roll-Out	Operators' installation of smart equipment	Budget	Add Time & Money	Medium	High	< 6 Months	Mitigate	Yes	2.30	The business plan assumes that BSOG reform will come into effect in April, 2011 (one year later than the current "official" DfT date)
16	Suppliers may not be able to deliver the on street validators	Build	On-Street Validators	Scope & Quality	None	Low	Low	After Go-Live	Mitigate	No	2.20	Late or more expensive is more likely than never.
38	There have been errors & omissions in the budget calculations	All	All	Budget	Add Money	Low	Almost Certain	Immediate	Mitigate	Yes	2.14	Allow 5% of budget for costs of equipment and services to allow for errors and omissions
5	There are errors and omissions in the requirements specification	Build	All	All	Add Time, Money & Staff	High	Low	> 1 Year	Mitigate	Yes	1.80	Make provision to review specification with knowledgeable people; specification and costs have been reviewed by S&B, who commented that they thought that our estimate of costs was about £700k too low.
6	Unforeseen events will disrupt the delivery of the solution	All	All	All	Add Time, Money & Staff	High	Low	> 1 Year	Mitigate	Yes	1.80	Monitor the political, economic and industry environments to spot potentially disruptive events as early as possible. Allow contingency in the time and money budgets to cover a 5% time & 5% cost overrun
2	The software integration will take longer than expected	Build	Back Office	Budget	Add Time & Money	Medium	High	> 1 Year	Mitigate	Yes	1.73	Allow contingency in the time and money budgets to cover a 30% time overrun
32	The PTE/TCA MTC and concessions settlement system is complex and expensive to implement.	Operate	Back Office	All	Add Time, Money & Staff	Medium	Low	> 1 Year	Mitigate	Yes	1.20	Allow sufficient contingency, but also avoid by doing proper business analysis at initial design
4	Estimated Costs will be exceeded	Procurement	All	Budget	Add Money	High	Low	< 1 Year	Mitigate	Yes	0.81	Allow contingency in the time and money budgets to cover a 5% cost overrun; S&B has reviewed the costs in the plan and believes that we have underestimated the costs by about £700k; build in the amount of contingency
9	Transport operators will not use the e-money, because they want to use EMV contactless bank cards	Roll-Out	Payments & Integrated Ticketing	Scope & Budget	Add Money	High	Low	> 1 Year	Avoid	Yes	0.48	Include EMV in the reader specification; make sure that the back office includes provision for aggregation processing and a bank gateway

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Mitigation Status	Counter Measure Implemented?	Risk Score	Counter Measures
21	The initial pricing model is flawed and operating costs are higher than projected	Operate	All	All	Add Money	High	Low	After Go-Live	Mitigate	Yes	0.45	Avoid by getting good pre-business case information. Mitigate by allowing contingency.
1	The procurement phase will take longer than expected	Procurement	All	Budget	Add Time & Money	Low	Low	> 1 Year	Mitigate	Yes	0.40	Make a provision to cover a 3 month overrun
15	PTEs and TCAs will not use the service for processing smart ENCTS transactions	Roll-Out	Back Office	Budget	Loss of Revenue	High	Low	After Go-Live	Mitigate	Yes	0.20	Work through Metro to make sure other regional TCAs are kept on board
16.2	Operators may not accept the payments solution for fare payment	Build	Payments & Integrated Ticketing	Scope & Quality	None	High	Low	After Go-Live	Mitigate	Yes	0.12	There is a risk that integrated ticketing will be undermined by the acceptability of the payments solution to the operators. Mitigation might mean including operators in the choice, or paying them to use the payments scheme. Nevertheless, the usage will not affect Yorcard's finances, as the case rests firmly on ENCTS and MTO ticketing. There should be an amount allowed (£200) to provide some transitional operational support, and £150 per bus to cover software/hardware changes.
34	Smart on-bus solution for small operators is too complex to manage	Roll-Out	Low-Cost On-Bus Validator	Scope	None	Medium	Low	> 1 Year	Avoid	Yes	0.06	Include operators in requirements gathering, through proper business analysis

4.3 Resolved Risks for Yorcard Scheme

The risks in the table below have been resolved or accepted and therefore are no longer being actively managed. They are included here for reference.

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Status	Counter Measure Implemented?	Risk Score	Counter Measures
7	Suppliers will not be willing to supply one or more elements of the solution at the estimated price	Procurement	All	Scope & Budget	Add Money	High	Low	< 1 Year	Expired / Resolved	No	0.00	Firm quotations have been obtained in advance of submitting business case
8	Suppliers for some elements of the solution will not come forward at all	Procurement	All	Scope	None	Catastrophic	Low	< 6 Months	Expired / Resolved	No	0.00	All elements of the solution have been reviewed with suppliers who are willing to supply.
10	Transport operators will not install smart equipment within the expected timescale	Roll-Out	Operators' installation of smart equipment	Scope & Budget	Loss of Revenue	Low	High	> 1 Year	Accept	Yes	0.00	Consider increasing the contingency (or perhaps the plan) to allow for a contribution to the operators to pay for on time delivery of smart capability. Decided to accept this risk as GOYH and the RDA have suggested that the DfT will not allow this expenditure as there will be a financial incentive through the new revised BSOG payment system. If in the end, the BSOG doesn't deliver the desired results then review again.
11	MTOs will not issue smart tickets	Roll-Out	Ticket Products	Scope & Budget	Loss of Revenue	Low	Low	After Go-Live	Accept	No	0.00	
12	MTOs will find the cost of processing smart ticketing transactions too high	Roll-Out	Ticket Products	Scope & Budget	Loss of Revenue	Low	Low	After Go-Live	Accept	No	0.00	This is really a risk for the MTO itself; it won't have much of an impact on Yorcard.

Table 11. Resolved Risks

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Status	Counter Measure Implemented?	Risk Score	Counter Measures
14	BSOG reform will not lead to the installation of smart ticketing equipment on buses and operators will not put smart readers on the buses	Roll-Out	Operators' installation of smart equipment	Scope & Budget	Loss of Revenue	High	Low	After Go-Live	Accept	Yes	0.00	In this event, then there is no value in the delivered system, unless it then became possible to install the low-cost solution on operators' buses solely for the purpose of concessionary travel and TOTO PAYGO solution. Provision should not be made in the business case for additional funds to be requested from DfT, as any suggestion that there is more money available may prejudice Yorcard's ability to deliver the solution at the best possible value; this should be "accepted" as a risk And, of course, the DfT will not look favourably on a plan to spend more money when they already have a plan to make this happen through BSOG - if the worst happens we'll just have to review position again.
18	The ITSO specification does not adequately support an interoperable integrated solution for the region	Build	All	Scope & Quality	None	High	Low	After Go-Live	Accept	No	0.00	If it transpires that there is something that a regional customer wants to do and it can't be done with ITSO then the proposition would need to be reviewed.
20	There is no customer demand for smart integrated ticketing	Roll-Out	All	All	None	Catastrophic	Low	After Go-Live	Expired / Resolved	No	0.00	Surveys suggest and experience elsewhere shows that this won't be a problem, but make sure promotion is good.
22	The revenue model is wrong and TCAs, PTEs and MTOs will not use the services of Yorcard	Operate	All	All	Loss of Revenue	Catastrophic	Low	After Go-Live	Accept	No	0.00	The business case for Yorcard has been aligned with the DfT and PTEs' strategies for smart ticketing. Officers from the PTE's make up the Board of Yorcard and therefore control its direction, financial and business model.
24	The service is not reliable following GO LIVE	Roll-Out	All	Quality	None	Medium	High	After Go-Live	Accept	No	0.00	Accept this risk as it won't be possible to volume test the solution with a "live" volume; just do the best on the procurement and make sure that the supplier demonstrates capability and understanding of how to operate at the volume we need.

Risk Entry Number	Risk Description There is a risk that...	Phase Affected by risk	Deliverable affected by risk	Potential Impact on...	Impact on budget for...	Scale of Potential Impact	Probability of Risk Event occurring	Temporal Proximity of Impact	Status	Counter Measure Implemented?	Risk Score	Counter Measures
25	Performance issues arise at GO LIVE	Roll-Out	All	Quality	None	Medium	High	After Go-Live	Accept	No	0.00	Accept this risk as it won't be possible to volume test the solution with a "live" volume; just do the best on the procurement and make sure that the supplier demonstrates capability and understanding of how to operate at the volume we need.
29	Testing is not correctly executed	Roll-Out							Avoid	No	0.00	Already covered
30	The project accepts a flawed design	Roll-Out							Avoid	No	0.00	Already covered
31	Cards prove to be unacceptable to certain transport users	All							Accept	No	0.00	Already covered
36	Reverse journey matching cannot be used to calculate journey length, which undermines the business case for Metro	All	All	Budget	Add Money	High	Almost Certain	Immediate	Accept	No	0.00	This is potentially a catastrophic situation. If Metro decline to participate if Reverse Journey Matching cannot be used then the case may collapse. Will require a review in any event.
37	ITSO compliant devices will not reach the ITSO speed requirement when in the field, which may result in economic benefits not being realised	Operate	Operators' installation of smart equipment	Quality	Add Money	Medium	High	After Go-Live	Accept	No	0.00	This is a general risk of using systems based on the ITSO specification. Yorcard will have no direct control over the specification and will not purchase any equipment, and therefore can have little control over the delivery of the performance standard
6.1	Unforeseen events will cause the project to be abandoned	All	All	All	None	Catastrophic	Almost Never	Immediate	Accept	No	0.00	Monitor the political, economic and industry environments to spot potentially disruptive events as early as possible. Allow contingency in the time and money budgets to cover a 5% time & 5% cost overrun

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Glossary

BSOG - Bus Service Operators' Grant

DfT - The Department for Transport

E-Money - Money stored electronically on a smart card or similar medium falling within the regulation of the Financial Services Authority. Distinct from Stored Travel Rights. E-money, by definition, can be used to contract with any party who will accept it, not just the E-Money Issuer

E-Money Issuing Firm - An organisation licensed and regulated by the Financial Services Authority to issue E-money.

EMIF - See E-Money Issuing Firm

Metro - The trading name of West Yorkshire Passenger Transport Executive

MTC - See Multi-Operator Travel Card

MTO - See "Multi-operator Ticketing Organisation"

Multi-operator Ticketing Organisations - Organisations representing the transport operators and local authorities in a locality belonging to a multi-operator ticketing scheme. The MTO - sets prices and agrees revenue distribution rules.

Multi-Operator Travel Card - A ticketing product issued on behalf of operators in a locality by the MTO, for example TravelMaster or Metrocard

NFC - Near Field Communications; an enhanced and unified set of standards that will enable, amongst other things, the use of a suitably equipped mobile phone to be used as a contactless payment token.

PAYGo - Pay as you Go; Validators deduct payment automatically at points of entry to or exit from the transport system, from e-money stored on an electronic medium.

RDA - The Regional Development Authority for , trades as "Yorkshire Forward" and is a participant in "The Northern Way", an organisation co-ordinating the work of the three Northern RDAs)

ROYH - The Region of Yorkshire and The Humber

RTAB - Regional Transport Advisory Board

RTB - Regional Transport Board of the RDA.

RTEG - Regional Transport Executive Board

Stored Travel Rights - A store of pre-paid travel rights, which can only be redeemed of the transport operated by the issuer of the Stored Travel Rights

STR - See "Stored Travel Rights"

SYPT - South Yorkshire Passenger Transport Executive

TCA - Transport Concession Authority; used in this document to designate those local authorities with responsibility for the re-imburement of ENCTS travel, and are not covered by a PTE area

The Northern Way - See "RDA"

Yorkshire Forward - See "RDA"

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