



UK
FINANCE

CONTACTLESS TRANSIT

Implementation in the UK

June 2019



ABOUT UK FINANCE

UK Finance is the collective voice for the banking and finance industry. Representing more than 250 firms across the industry, we act to enhance competitiveness, support customers and facilitate innovation.

UK Finance has worked with a wide range of stakeholders during the Contactless Transit project and subsequent discussions. Our member firms from the card payment ecosystem – card issuers, acquirers and schemes - have been integral to the development of the Contactless Transit Framework. At the government level we have worked with the Department for Transport, Department for Regional Development Northern Ireland, Transport Scotland and Transport Wales. At the regional level we have engaged with Transport for London, Transport for the North, and Transport for West Midlands. We have also worked closely with Transport Focus on their research projects.

Above all the Contactless Transit project relied on capturing detailed business requirements from the transit industry, and we are grateful for the time dedicated by both bus and train operators to the Project and to updating us on progress for this report.

PREFACE



Contactless debit and credit cards are continuing to grow in popularity, even as the range of payment options – cash, real-time payments – diversifies to meet the needs of different demographics¹. While contactless payments are widespread in the retail world,

contactless payment cards and related devices such as phones and watches have also been used on London's transport systems for the past five years with great success, and there is a growing desire to see contactless card payments as an option for travelling on public transport outside of London.

Contactless transit embraces the technology consumers already have in their hands and reduces the use of bespoke hardware and tickets. Research shows that some passengers are willing to sacrifice knowing the exact cost of their travel for the convenience of not having to pre-purchase tickets²; and young people are more likely to use public transport if they are confident they will always have the right means to pay without having to find the exact change³. As contactless cards operate on open, global standards, they not only provide the potential for customers to travel between transit operators on the same device, they also enable international tourists to use public transport without having to understand proprietary ticketing systems.

At the same time, cities are being required to be smarter in their deployment of resources, with over 80 per cent of the UK population now living in cities (this reflects a global trend whereby the 55 per cent of the world population living in cities is estimated to grow to 68 per cent by 2050⁴). In this context contactless transit helps by removing some of the cost of ticketing, such as producing smartcards, and promoting account-based ticketing which can help transit operators understand passenger flows. This coincides with a political desire to see regional areas more connected for economic

purposes – for example, in the Northern Powerhouse – and a view that this could be facilitated by easier to understand, faster ticketing options for low value travel.

With all these benefits in mind, in 2015 UK Finance's predecessor began a project with UK card payment providers, transit operators and government bodies to develop a framework, based on the experience from Transport for London, that would allow any transit operator to enable contactless payments on their systems. The Contactless Transit Framework was launched jointly by the Department for Transport and the card payment and transit industries in January 2016. Work continued into 2017 to develop further detailed guidance for transit operators and to support early implementations of the Framework.

I am delighted to say this Framework has been used to great success by the bus industry in the UK, with 100 per cent of the major bus fleet contactless enabled. Customers are providing glowing reports on social media and drivers are the strongest advocates, embracing the quicker boarding times and reduced cash handling. We have been contacted by transit operators globally to learn lessons from our work and have even seen our Framework translated into Spanish for use in Costa Rica and other countries.

There has also been a resurgence in interest in contactless transit for the rail sector, but there are complexities with implementing contactless transit for higher fare journeys. We continue to work with the card payment industry, government, train operators and suppliers to explore whether the tangible benefits being realised by the bus sector through contactless transit can be extended to rail journeys.

A handwritten signature in black ink, appearing to read 'Stephen Jones'.

Stephen Jones
CEO, UK Finance

1. UK Finance 2018 Payments Report: there are 124 million contactless cards in the UK, and 7.4 billion contactless payments were made in 2018.

2. Transport Focus 2014 research found that for local/cheaper travel, passengers were willing to have less control over getting the most cost-effective fare in order to benefit from using the convenience of contactless payments.

3. Transport Focus 2018 research found that the experience of boarding the bus can be a stress point for young people, with concerns largely focussed around the interaction with the driver.

4. <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

TABLE OF CONTENTS

A. Executive summary	5
B. Background	7
C. Bus industry	13
D. Rail industry	19
E. Regional	24
F. Macro-industry activity	31
G. Technology	36
H. Conclusions	39
Annex. Documentation	40
Annex. Glossary of terms	41

A. EXECUTIVE SUMMARY

This report reviews the rollout and adoption of EMV Contactless (cEMV) as an alternative form of ‘ticketing’ outside of London since the creation of the cross-industry Contactless Transit Framework in 2017. It draws on quantitative data provided by transit operators, and on qualitative research with various stakeholders from the payments and transit industries and government bodies.

What has worked well

- **The UK bus sector** has exceeded expectations in rolling out cEMV across 100 per cent of the UK’s ‘Big 5’⁵ bus fleet. The speed of uptake of cEMV on UK buses has also exceeded expectations, with an average of 25 per cent of UK bus journeys made outside London now being carried out using a cEMV debit, credit or prepaid payment card. The customer, driver and business reaction to cEMV acceptance on buses has been very positive.
- **Transport for London** continues to see growth in the adoption of contactless with 54 per cent of Pay-As-You-Go (PAYG) journeys now made using contactless payment cards and devices⁶. Mobile wallet-based payments are growing and represent 16 per cent of those journeys⁷.
- Large scale regional initiatives, such as **Transport for the North**, are underway and have the potential to further reshape and simplify how travel is paid for.
- **Regional plans continue**, with contactless launches on the tram network in Manchester and city-wide cEMV acceptance in Edinburgh recently having been announced.

- **Ubiquitous acceptance**, with significant improvements made to the card scheme processes to enable the acceptance of cards from 140 different countries around the world on UK transit networks.
- **Technology challengers** entering the market that offer alternative, and potentially disruptive, commercial models.

Areas requiring further work

- **Contactless on rail** has seen limited progress, although a strategy for PAYG in the South East is beginning to emerge.
- **Contactless for Transit Model 2 (PAYG)** has been rolled out by the bus sector but some of the functionality, such as aggregation and capping, still needs to be deployed.
- **Interoperability** is complex, with concerns being raised over the different commercial approaches being proposed. This is of particular concern to the deregulated bus operators. There are different regional back office approaches evolving, with no overarching national back office plan or approach to standardisation, all of which are needed to ensure interoperability.

5. Arriva, First, Go Ahead, National Express and Stagecoach.

6. Data provided by TfL.

7. Data provided by TfL.

- **Multi-Mode Travel Products** are limited, which is likely to further impede interoperability.
- **Closed Transit Infrastructure** could limit innovation. An Office of Road and Rail (ORR) strategic consultation highlighted the closed nature of the reader/validator estate, especially in and around London⁸. It is believed that adoption of open and common standards across the UK's transit infrastructure would significantly aid innovation.

Other developments

- The government-appointed Williams Rail Review⁹ is investigating the most appropriate organisational and commercial frameworks to support the delivery of the government's vision for the railway. The results of this could help to support more open ticketing systems like contactless transit; for example, through simplifying fares, or through devolving power over commuter routes to regional/local authorities to allow for more of a joined-up approach – similar to that taken by Transport for London.
- At the same time, the Department for Transport recently consulted on extending the PAYG area around London¹⁰, which could see Transport for London's systems supporting contactless payments on the wider rail network.

8. https://orr.gov.uk/__data/assets/pdf_file/0020/40628/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-2019-final-report.pdf

9. <https://www.gov.uk/government/consultations/williams-rail-review>

10. <https://www.gov.uk/government/consultations/pay-as-you-go-on-rail>

B. BACKGROUND

UK Finance, with the support of the card payments and transit sectors, commissioned this report to review the progress that has been made against the original goals of the Contactless Transit project and to identify any barriers and strategic issues that are facing the transit industry in adopting the Framework further.

Card payments have been used for many years in the transit industry to buy paper tickets, or to top up smart ticket cards or devices. In 2007 the UK card industry introduced contactless payments to provide a fast and frictionless payment experience in retail, where up to a certain value (currently £30)¹¹ the normal cardholder verification method of entering a PIN is not required. Contactless card payments are also ideal for certain transit environments where speed and convenience are key to a good customer experience.

In 2013, Transport for London (TfL) introduced contactless card payments on its bus network as a complementary alternative to its proprietary Oyster card. This was followed by the rollout of contactless payments on the TfL tube, DLR and rail network¹² in 2014. TfL's objective in introducing contactless was to provide more convenience to customers using Pay-As-You-Go (avoiding the need to top up Oyster cards), and to cut their own operating costs in producing and maintaining Oyster cards.

The success of the TfL initiative led to interest from other UK transit operators in implementing contactless payments alongside smart ticketing and cash payments. However, the situation outside of London is more complex as transit businesses are independently run organisations,

with a mixture of the regulated rail sector working alongside the less regulated bus sector. As such, variations were required on the TfL model which underpinned the development of a wider framework that would encourage adoption across the UK as well as internationally. A number of discussions took place between transit operators and individual card companies and by the end of 2014 it became clear that it would be helpful to have a central project to allow the two industries to discuss the most suitable models for contactless transit.

Contactless Transit Framework

From 2015 – 2017, UK Finance's predecessor, the UK Cards Association, ran the Contactless Transit Project (as part of a wider two-year programme to increase the use of contactless cards across the UK). The purpose of this project was to create a national Contactless Transit Framework. This was designed to help transit operators consider whether to implement EMV Contactless and support the delivery of a consistent and good customer experience for journeys made across the UK where a contactless card¹³ has been used during that journey. The project was jointly funded by the cards industry, transit industry and government. The Framework won the Cards and Payments Awards for the Best Industry Innovation in 2017.

11. The cardholder verification limit has been increased over time to accommodate spending patterns on contactless cards, and was raised from £20 to £30 from 1 September 2015.

12. London over-ground and National Rail Services within the TfL Travelcard zones

13. Multiple EMV Contactless form factors exist such as mobile and wearable devices

The Framework includes three Contactless Transit Models:

- **Model 1, Single Pay-As-You-Go:** A model where the contactless card or device is used at the start of the journey with a known fare; primarily for buses and trams.
- **Model 2, Aggregated Pay-As-You-Go:** A model where the contactless card or device is used multiple times for travel, and the fare is aggregated at the end of the day or journey leg; for multi-mode operators. This was the model already being used by TfL, but with some adaptations. A key part of this model is that card issuers share the liability with transit operators. Due to delayed settlement, there is a risk that a customer
- will travel without funds in their account. To address this, the Framework includes an agreement that issuers will pay the first £10 of any such debt¹⁴.
- **Model 3, Pre-purchase:** A model where a contactless card or device is associated with a pre-purchased ticket and then used to access the travel.

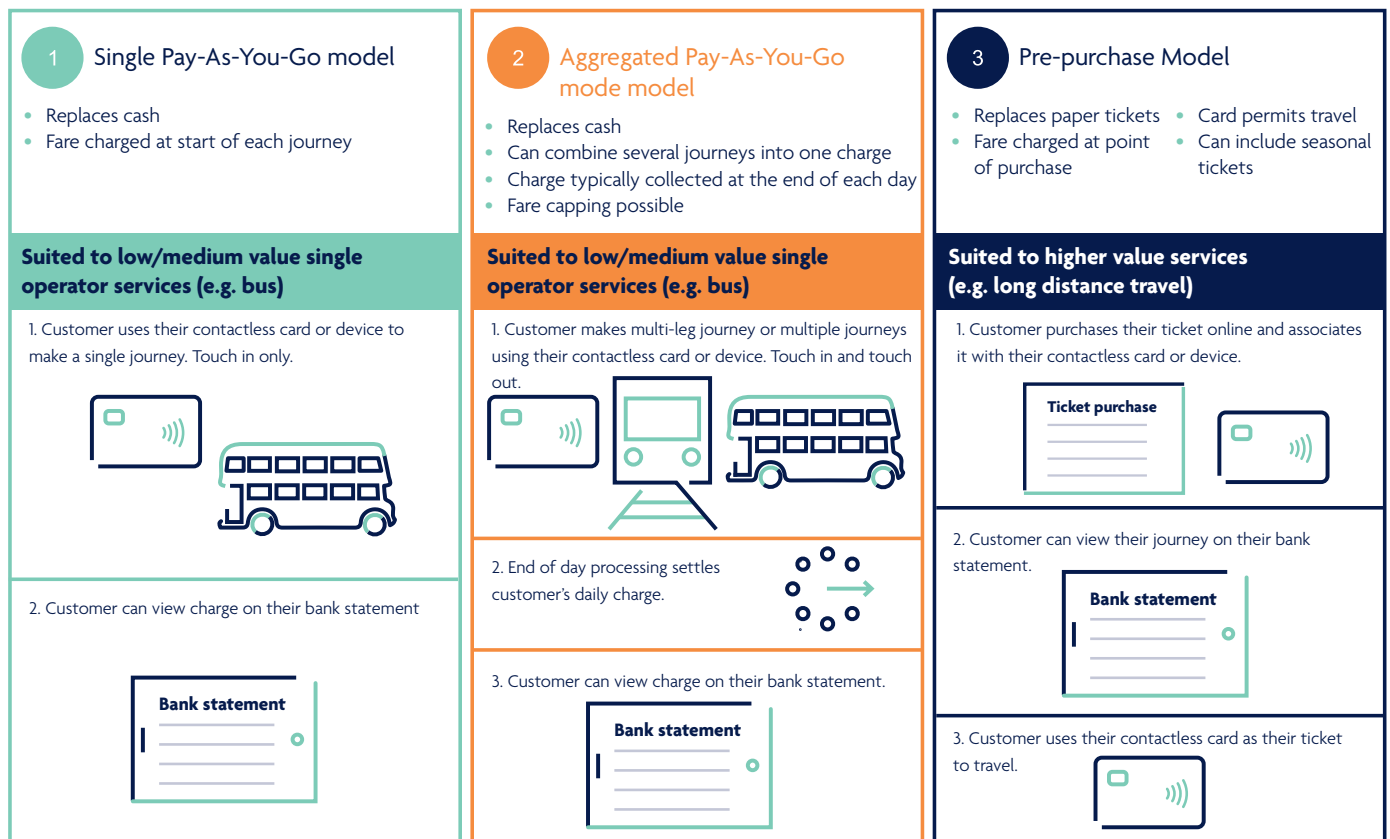


FIGURE 1. CONTACTLESS TRANSIT MODELS

14. This liability sharing agreement was already in place with TfL, but the amount was previously £6.

Original goals

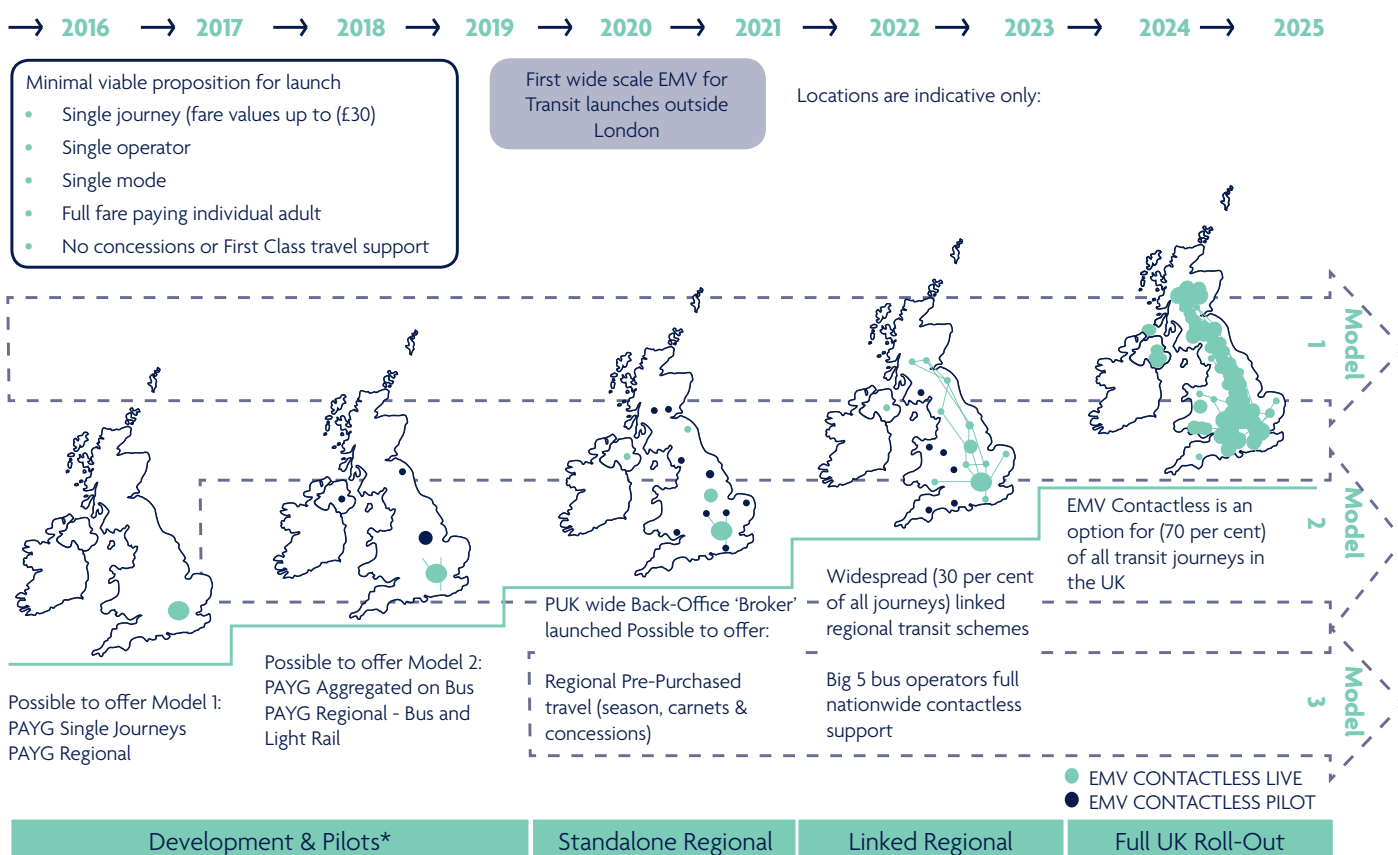
The goals of the original project team for the use of EMV Contactless cards on transit in the UK by 2025 were:

- To see a **nationwide coverage** of contactless across all transit modes
- To create a **compelling customer experience**, similar to TfL's, that would be easy to understand for customers and offer 'best' fare options through fare aggregation
- To see **rapid customer adoption** levels that tracked the adoption rates seen at TfL
- To see a **strong business case** developing for the use of contactless in transit

i. Nationwide coverage

The original goal of the project was to see the expansion, outside of London, of Model 1 and 2 propositions across both bus and rail. It was expected that by 2019/20 the national coverage would be concentrated within a small number of contactless 'islands' within cities and larger towns.

The following geographic roadmap, showing how the rollout was predicted to spread to full UK-wide adoption, was produced early on in the life of the project.



*Outside of TfL

FIGURE 2. FORECASTED NATIONAL CEMV ROLL-OUT (PUBLISHED: 2015)

ii. Compelling customer experience

A survey conducted by Transport Focus in 2016 asked what people thought of being able to use contactless for public transport. The survey found that 61 per cent of customers were very interested, or interested, in a contactless transit proposition¹⁵.

The benefits noted at that time were:

- Fast and easy payment for passengers, eliminating the need to queue for a paper ticket or to 'top-up' smart tickets. These benefits had already been demonstrated through the TfL rollout. The Transport Focus survey found that of customers using contactless payments in general retail, 84 per cent cited 'speed' and 79 per cent cited 'ease' as reasons for use.
- Secure and transparent payments, which can be seen on the customer's bank statement or app.
- Usability on different form factors, including card, mobile and wearables.
- Ability to travel on different operators using the same device, and without needing to register.
- 45 per cent of passengers would feel more positively towards public transport operators if contactless was introduced.

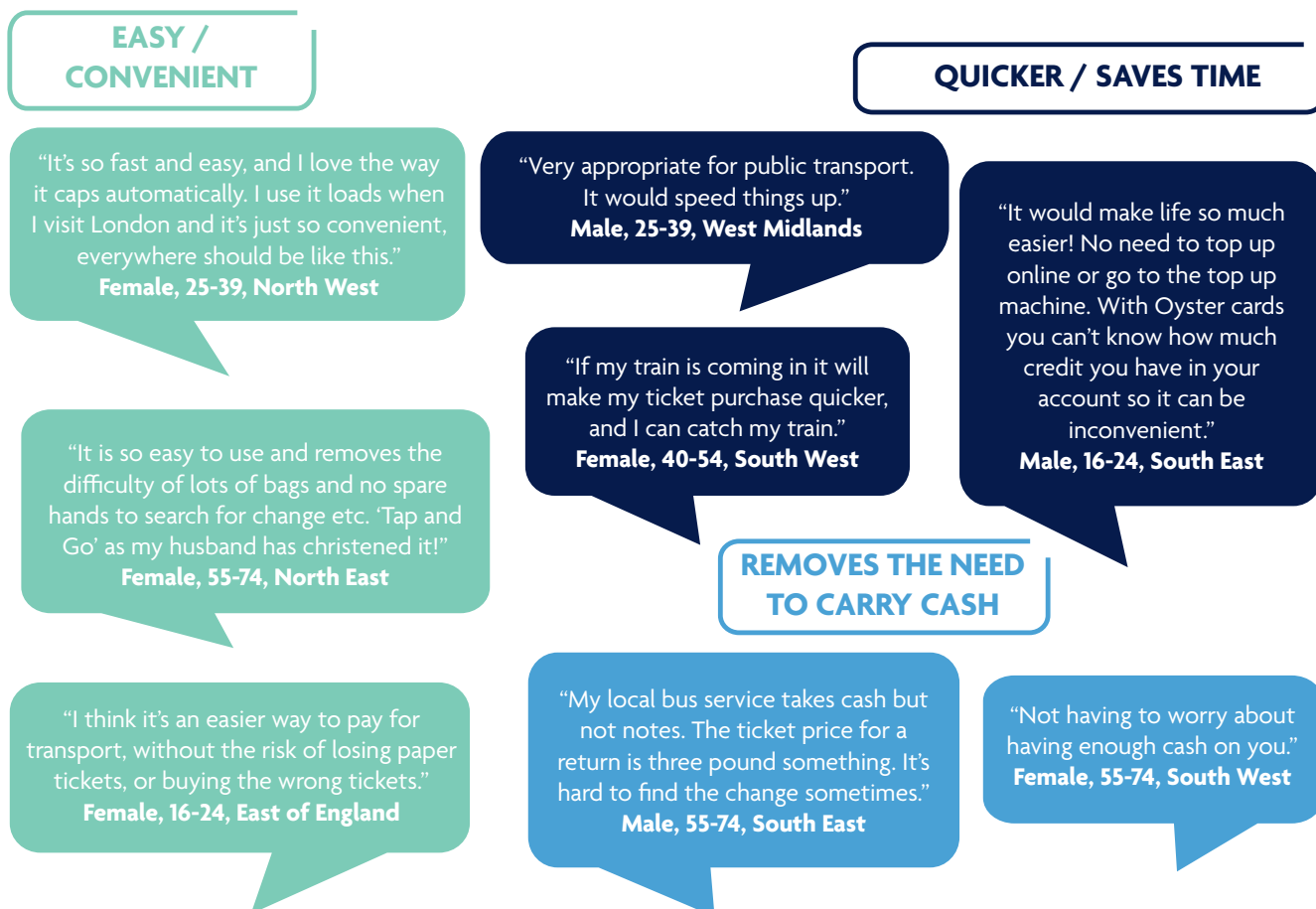


FIGURE 3. TRANSPORT FOCUS CUSTOMER RESEARCH 2016

15. See Transport Focus survey results <https://www.transportfocus.org.uk/research-publications/publications/paying-for-public-transport-with-contactless/>

In addition, the expectations for the development of the models always had a **multi-mode, multi-operator** 2025 end game in mind. It was also felt that developing and agreeing a **common customer experience** would reduce customer confusion and increase trust and adoption.

Finally, it was always envisaged that operators would strive to launch 'best' fare offers with fares being **aggregated and capped** on a daily or weekly basis.

iii. Rapid customer adoption

Together with the rapid uptake of the use of cEMV seen on TfL and an expected greater availability of, and familiarity with, contactless payment cards, it was envisaged that similar adoption rates to TfL could be achieved for new contactless transit deployments. As a result, a benchmark for adoption was set at 15 per cent of journeys being made using contactless cards within one year of the proposition being made available to customers.

iv. Strong business case

It was also seen as essential that the business case for both the payments and transit industries stacked up. This aspect of the original goals of the programme will also be considered within this review. The key business case drivers that were established at the beginning of the project were:



CARD INDUSTRY BENEFITS

- i. Increased transaction volumes
- ii. Halo effect and increasing utility of card
- iii. Prepare customers for contactless payments using mobile devices
- vi. Retain 'cards' as central to emerging payments

TRANSIT INDUSTRY BENEFITS



- i. Increased journey volumes (from simplified ticket purchasing) leading to revenue increases
- ii. Increased range of payment options
- iii. Increase speed of customer throughput
- vi. Increased customer satisfaction
- v. Operational cost savings from speed and reduction in ticket management

FIGURE 4. INDUSTRY BENEFITS

Benchmarking

Taking each aspect of the original goals of the project, we set the following benchmarks to determine how well contactless adoption across the different transit modes and regions has taken place.

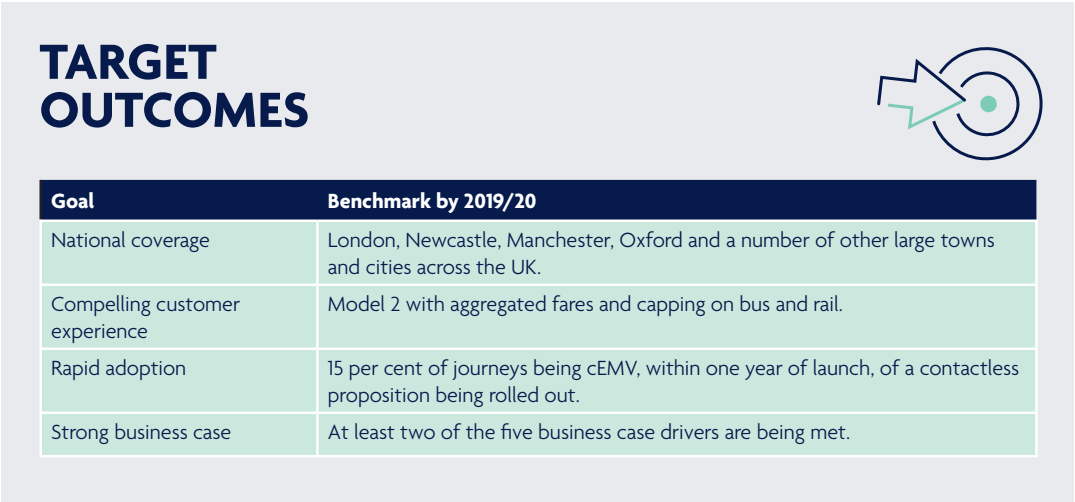


FIGURE 5. TARGET OUTCOMES FOR 2019/20

C. BUS INDUSTRY

Since 2017, substantial progress has been made in the rollout of EMV contactless across the bus industry. 100 per cent of the major bus operator fleet is contactless enabled, with average adoption rates currently at 25 per cent and expected to grow.

Customer reports on social media have been favourable and bus drivers are the strongest advocates, with improved boarding times and reduced cash handling allowing them to run to time more easily. There have been some initial challenges in implementing the Contactless Transit Models, but these are now largely resolved and concerns around bad debt levels¹⁶ have proven unfounded.

Progress

Contactless enablement

Contactless enablement of the majority of the UK's bus fleet has been completed by Q2 2019. This result has been achieved through a focus on cEMV by the 'Big 5' bus operators over the past two to three years. Some smaller operators have also adopted a contactless solution.

There is a mix of Model 1 (single PAYG) systems (the customer taps in once at the beginning of the journey and that fare is settled with the issuer); and Model 2 (aggregated PAYG) systems (the customer typically taps in at the beginning of the journey and taps out at the end, allowing for multiple journey fares to be aggregated and settled with the issuer).

'Big Five' Bus Operators	Fleet size	Contactless enabled fleet size	% Enabled
Stagecoach*	7,500	7,500	100%
Arriva UK	5,065	5,065	100%
First Bus	5,800	5,800	100%
Go-Ahead"	4,900	4,900	100%
National Express	1,600	1,600	100%
Total	24,845	24,765	100%

FIGURE 6. CONTACTLESS ENABLED BUS FLEET

* Excludes London and Megabus

" Includes London

Strong adoption and usage

The average contactless adoption rates across the bus industry outside London are around 25 per cent, but there are significant variations based on geographical and demographic factors. Adoption is considerably higher in the South East, in some areas as high as 50 per cent, but lowest in the North West where adoption rates are closer to 12 per cent.

The strongest advocate for contactless has been the driver community, which appreciates the quicker boarding times and reduction in cash handling. In one case, an enthusiastic bus driver managed to encourage a 100 per cent usage of contactless on one particular day. It was noted that boarding times at the start were not much quicker as people got used to how the process

16. As contactless transit payments have delayed settlement with the card issuer, there was a concern from transit operators that they would see high levels of unpaid or 'bad' debt. In practice, this has been under one per cent.

worked, but that, as time goes on, boarding times are improving. Students are typically seen as the early adopters of the contactless. The growth and adoption rates are seen as positive by the bus industry.

Improved customer experience

Although there has been no recent formal customer research of the bus implementations, there have been high levels of customer engagement on operator social media sites that support the assertion that the contactless 'ticketing' initiative has been well received. Customers claim to be more confident in using public transport when they do not have to worry about having the exact cash for a fare, particularly on non-regular routes.

A recent report by Transport Focus¹⁷ on bus travel for young people found that 'the overriding view was that contactless is the way forward and should be offered via card or phone'. It concluded that the industry would be better to focus on contactless rather than local smart cards. It also concluded that contactless ticketing should be multi-operator and multi-modal.

There was initial concern from bus operators that they were seeing a high level of transactions declined by card issuers, leading to a bad customer experience. However, this has been effectively addressed and is no longer a problem of significant concern. Decline rates are typically under one per cent which is lower than seen in other sectors, such as retail.

Positive business case

The business case for bus operators is reported as being positive:

- Key benefits are driver efficiencies on timing and reduced risks of cash handling for drivers and other staff.

- Other benefits include a reduction in operating ticket vending machines or running other processes required to issue customers with a travel token (such as paper or an ITSO card). There is also a perceived operational downside of having the customer convert 'their money' into 'transit money' and then having to store this money. Contactless payment cards overcome all of these challenges.
- Some operators are beginning to look at how the new metrics generated by cEMV ticket sales can be used to enable better fare modeling, route loading and capacity planning.
- Although there were initial concerns about 'bad debt', these have been addressed through 'deny list' management – where a cardholder's card is prevented from travelling again until they have cleared the debt. Bad debt levels for Model 2 solutions have been reported as typically being half of those seen on Model 1 solutions.
- Some operators have detected intentional fraud, although the incidences of this are low and not deemed to be of material concern.
- There were initial concerns about the potential for higher transactional costs compared to other payment methods. However, with the structure of the Model 2 commercial framework, operators are no longer reporting this area as a major concern.
- The incremental costs for smaller operators can potentially be more material, though alternative commercial models on offer from suppliers, and government support in some areas, are going some way to mitigate.

17. <https://www.transportfocus.org.uk/research-publications/publications/making-bus-a-better-choice-for-young-people/>

Challenges

Model modifications

Three of the five bus operators (Arriva, First and Go-Ahead) have selected a Model 2 (aggregated PAYG) solution, although they have only just begun to deploy some of the key features, such as fare capping. These initial implementations are known as 'Model 2 Minus'. The implementation of the second reader on the bus to support tap-on and tap-off is expected later in 2019 by most of the operators¹⁸. This addition will enable them to offer the full Model 2 proposition, including back office fare processing, and is expected to speed up boarding times.

Multiple operators sharing the same routes and a mixture of models in the market have led to interoperability challenges in some areas. This situation has been partly overcome through the implementation of 'driver intervention' to sell a physical ticket to customers, even in cases where the operator is running a Model 2 back-office solution. The physical ticket that is issued can then be used on other buses operating Model 1 only propositions.

Meanwhile bus operators on a Model 1 (single PAYG) solution have added in some of the Model 2 features such as deny list management and other, card scheme specific, risk mitigation processes. These implementations are known as 'Model 1 Plus'.

This approach has the advantage of providing the operator with improved bad debt levels but does not offer the issuer liability cover for the first journey, as available through Model 2. The business case to move to Model 2 appears to be positive and as such it is predicted that the five largest bus operators will eventually operate with a Model 2 scheme.

A mixture of full and partial models is expected to lead to inconsistencies in the customer journey that will cause customer confusion, and potential unwanted maximum fare charges, leading to increased customer complaints. The diagrams below show how these Model modifications fit between Models 1 and 2, and how they work in practice.

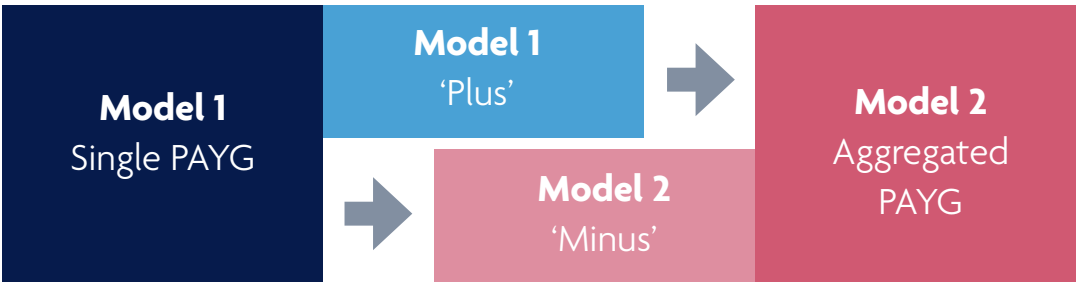
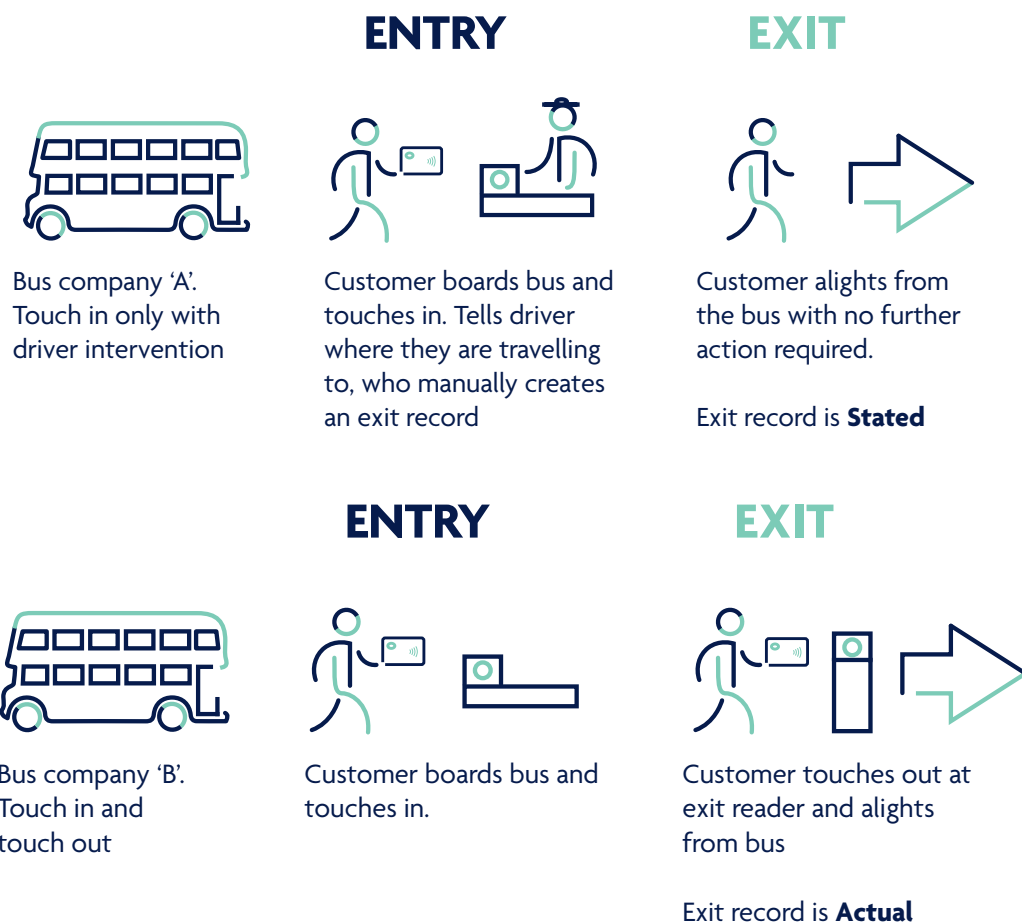


FIGURE 7. MODEL DELINEATION 2019

Driver Intervention on Model 2

18. For example, Transdev, support by TfN funding, have started to pilot this.

**FIGURE 8. TAP-ON / TAP-OFF**

It should be noted that each of the card schemes (e.g. Visa, Mastercard and Amex) has their own flexible rules, operational guidelines and commercial frameworks to support the customer proposition models outlined above. It is apparent that not all operators are making the most of what these frameworks have to offer, though this may be simply the result of the significant progress in the substantive areas having been achieved in a relatively short timeframe. Transit operators should contact the card schemes directly to understand the relationship between the three Contactless Transit customer proposition level models outlined above and the individual card scheme rules and procedures.

Implementation

Some of the earlier reports on the challenges of getting new contactless devices approved have since improved and the installation and implementation of hardware and systems has been relatively trouble-free. The good relationships that have been developed among the supplier community have helped to ensure better system design and deployment than would have otherwise occurred in a traditional multi-vendor procurement.

International cards

Significant improvements have been made in the way that international cards are accepted and processed since 2016. This has led to TfL, for example, reporting that customers from 140 different countries have used their contactless cards to travel on London transport.

There are 'swap out'¹⁹ programmes in place for the remaining small minority of international cards that currently are not accepted, to bring them up to the global standard.

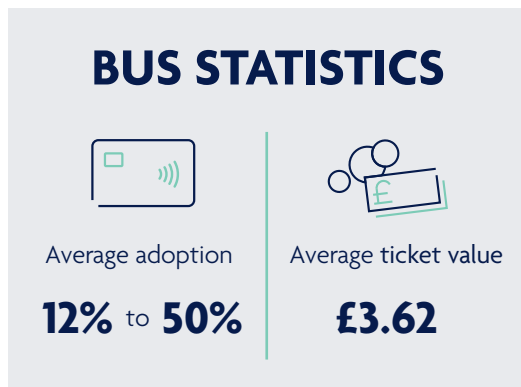
The adoption of the global EMV standards, underpinned by global card scheme processing arrangements, also means that customers with UK issued contactless payment cards can use the ever-increasing number of international contactless transit schemes while travelling abroad.

Future development

Regional adoption and uptake

Adoption of contactless in rural areas is around one half of the levels seen in and around towns and cities. The view expressed by some operators is that this is to be expected and that over time, with improved confidence and greater penetration of contactless cards, the adoption levels will increase. One region going against this trend is Cornwall, which is experiencing high levels of contactless usage on buses, according to one industry official.

It is too early to establish the extent to which contactless has stemmed some of the passenger journey losses. For most operators though, passenger journey numbers were not the primary driver for the implementation of a contactless solution.



Interoperability

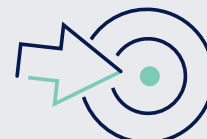
Some bus operators are starting to consider to what extent interoperability can incrementally drive up passenger journeys and, with it, an increase in revenue. Early stage interoperability could be enabled between some of the operators, especially those that share the same or compatible technology providers. It is envisaged that interoperability, with fare aggregation and other benefits such as capping, may lead to some short to medium-term competitive advantage.

19. It is estimated that around 50 per cent of US based contactless cards currently do not support the Offline Data Authentication capability that is required for UK transit contactless implementations. However, US card acceptance still remains one of the highest for international card usage on TfL.

Benchmarking

As can be seen by comparing the original goals set out by the project there has been exceptional progress in the bus sector, especially with regard to national rollout.

BUS PERFORMANCE



Goal	Benchmark by 2019/20	Rating	Comments
National coverage	London, Newcastle, Manchester, Oxford and a number of other large towns and cities across the UK.	Excellent *****	Exceeded the targets announced by the bus industry in 2017 and established at the outset of the Contactless Transit project. 100 per cent of the major bus operator buses and an estimated 72 per cent of all UK wide buses are now able to accept contactless 'tickets'.
Compelling customer experience	Model 2 with aggregated fares and capping on bus and rail.	Good ***	Model 2 adopted by 3/5 operators. Aggregated fares and capping in planning but not yet delivered.
Rapid adoption	15 per cent of journeys being cEMV, within one year of launch, of a contactless proposition being rolled out.	Excellent *****	Achieving a ranges of adoption rates of between 12 per cent and 50 per cent with the average being 25 per cent across the UK.
Strong business case	At least two of the five business case drivers are being met.	Good ***	Buses have delivered an increase in the range of payment options and are reported as seeing some operational cost savings from speed and reduction in ticket and cash management.

FIGURE 9. BUS PERFORMANCE AGAINST GOALS

D. RAIL INDUSTRY

Progress

To date, contactless transit has not seen much traction in the rail industry. While Transport for London (TfL)'s geographical reach continues to grow, allowing customers to use contactless for rail journeys within a wider perimeter around London, there has not been an implementation outside of London so far. However, contactless is frequently used as a payment channel to purchase rail tickets²⁰ so converting these customers to the Contactless Transit models would seem a natural evolution.

There are some unique challenges in rail; for example, the complex fare structures are not straightforward to encompass within the contactless transit models, and concessionary fares would require some form of verification. Moreover, the typically higher fares mean rail operators are not as comfortable with a PAYG system, preferring a pre-purchase model. UK Finance is continuing work with the payments and transit industries to develop Model 3, which could allow both for pre-purchasing and concessionary fares.

The Department for Transport (DfT) has invested significantly in smart ticketing over the last few years, and some of this infrastructure is expected to be able to be used to facilitate contactless transit as well.

Contactless around London

Some commuter lines in and out of London are already seeing extensive use of Oyster and contactless with, in some cases, up to 76 per

cent of journeys being made in this way.²¹ Out of the two, contactless is the customer's preferred option.²²

In early 2019, the DfT consulted on extending the PAYG network beyond the current TfL boundaries.²³ The consultation does not, at this stage, seek to determine which technology should be used. It is assumed that there will be an extension to the TfL boundaries around London. This is significant as over 60 per cent of all journeys start, end or go through London.

Smart ticketing initiatives

There continues to be government attention on rail ticketing, driven in no small part by the public statements by the Transport Secretary that every rail passenger should have the option of travelling without a paper (magstripe) ticket.²⁴

The Department for Transport (DfT) has coordinated a major drive towards smart ticketing in recent years, by combining and coordinating initiatives led by the Rail Delivery Group (RDG) and Transport for the North (TfN), together with an additional £80 million investment in smart card infrastructure.

DfT met the target of achieving 90 per cent of all journeys supported by at least one smart ticket option by December 2018 (70 per cent of all relevant product flow combinations are enabled for barcode), and the programme is seen as enabling the take up of ITSO for regular commuters. The focus is now on driving customer uptake.

20. UK Finance Payments Report 2018: 383 million contactless payments were made for travel on public transport, including payments for tickets on train, bus and tube.

21. Statistics provided by TfL.

22. According to TfL.

23. <https://www.gov.uk/government/news/passenger-views-sought-on-bid-to-extend-pay-as-you-go-on-rail-network>

24. <https://www.bbc.co.uk/news/uk-politics-41475478>

However, smart ticketing and barcode solutions are not accepted by all rail operators, making interoperability a challenge. Barcodes, for example, cannot be used across London. Due to a belief that contactless would not meet the required end of 2018 delivery timescales, the smart ticketing initiative did not support the major use case of PAYG or EMV Contactless.

Challenges

Complexity of fares and concessionary fares

TfL's system includes zonal fares, and its back office has to manage some complex fares. However, it is still only being used for full adult fares. It has been noted by TfL and many others in the industry that having a stable fares base and overall regulatory powers were critical to the success of TfL. It is worth noting that Oyster PAYG on National Rail took considerably longer to achieve, as it sits outside of TfL's powers. DfT is also consulting on simplifying rail fares across the UK.²⁵

Simple matching of a card's identity can enable the use of contactless for travel that includes concessionary and discounted fares. However, transit operators will need to agree an approach to revenue inspection and cardholder verification (e.g. a 16-25 rail card) and then build supporting processes if this capability is to be deployed. The lack of appetite to make progress on alternative fare options is believed to be compounded by the weak business case for these lower-value travel use cases. A solution for advance purchases, reserved seats and first class options, has been sought but still seems some way off.

Model 3 (for pre-paid journeys) offers a potential approach to deliver this proposition. Conceptually, digital wallets for pre-paid journeys using a cEMV based token remains a viable proposition.

The DfT's PAYG consultation considers that fare structures will need reforming to enable any meaningful PAYG offering across rail in the South East.

Franchise structure

The structure of the UK's rail franchise system is also believed to make the adoption of new technologies more challenging. The current franchise approach is typically based on a seven-year contract, and requires significant investments by Train Operating Companies (TOCs) at the start of their franchise, followed by the uncertainty of having a future income towards the end of the franchise period. An additional challenge for TOCs is that they need to decide what might be relevant innovation, many years (over ten years in the case of C2C) in advance of them requiring, or being able, to deploy them.

In recognition of these challenges a review into franchising is being led by independent chair Keith Williams, the former chairman and chief executive of British Airways. Aspects of the review that may have an impact on EMV Contactless are in the areas of:

- Commercial models for the provision of rail services prioritising the interests of passengers and taxpayers.
- A system that is financially sustainable and able to address long-term cost pressures.
- A rail sector with the agility to respond to future challenges and opportunities.

25. <http://www.bbc.co.uk/news/business-47258909>

Future look

Increasing contactless limits for transit

TfL is currently planning the extension of contactless ticketing to support the Elizabeth Line (Crossrail) extension. The Elizabeth Line will stretch more than 60 miles from Reading and Heathrow in the west through central tunnels across to Shenfield and Abbey Wood in the east and is expected to serve around 200 million people each year. The new line is currently due to open in late 2020 or early 2021. Fares for these longer journeys could be higher than current Zones 1-6 travel and some of the latest estimates indicate that fares could reach up to £40 each way.

The use of a contactless card for transit, in reality, is not a standard contactless payment from a technical or scheme rules perspective. However, there may be an expectation when customers use their card for transit by tapping it on a reader that the existing £30 limit applies.

Payments and transit industry consideration on how to extend the £30 limit will become key to the delivery of the Crossrail extension and to avoiding potential customer confusion. Incoming European regulation²⁶ places a cap on contactless transactions but provides an exemption from authentication for contactless transit journeys. This means that unlike retail contactless transactions there is no regulatory constraint to a higher limit, although of course any increase in limits would have potential implications for existing liability models.

26. Under the Payment Services Directive 2, the European Banking Authority was required to develop Regulatory Technical Standards on Strong Customer Authentication (SCA). For the majority of electronic payments, customers will be required to provide two factors of authentication at point of payment. Contactless payments under €50 are exempt, as are all contactless transit payments.

Strategic development

There still remains a strong belief that cEMV has a role to play in PAYG journeys, with other technologies being better suited to longer timespan (e.g. annual) season tickets. RDG is working on a National Rail ticketing strategy and has agreed to some high-level principles for PAYG journeys. They are also undertaking feasibility work on a centralised back office that will support multiple tokens, including EMV.

Furthermore, there is an increased interest in how open APIs (similar to that delivered in the finance sector through Open Banking and in the airline sector through the New Distribution Capability), can aid competition and innovation in the transit sector. Consideration is also being given to the implications of moving rail ticketing into the cloud and how to achieve interoperability as this is done.

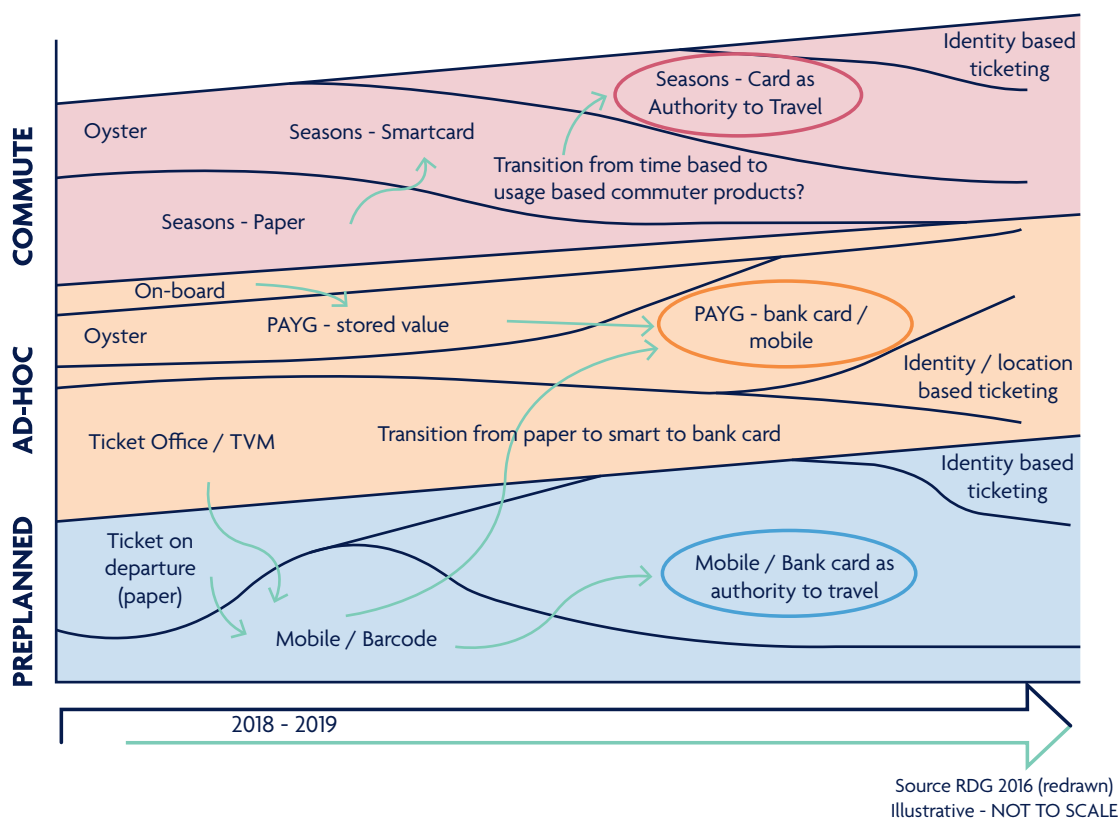


FIGURE 10. TRANSIT TICKETING ROADMAP

Benchmarking

As can be seen by comparing the original goals set out by the project, there has been limited progress on the rollout of cEMV for rail. The 'direction of travel' is however looking more promising than it has in recent years, with a new focus from the government becoming more evident.

RAIL PERFORMANCE



Goal	Benchmark by 2019/20	Rating	Comments
National coverage	London, Newcastle, Manchester, Oxford and a number of other large towns and cities across the UK.	Slow *	TfL still dominates and is doing well. There are some signs of interest being shown however, such as through the issuance of the DfT's PAYG extension consultation.
Compelling customer experience	Model 2 with aggregated fares and capping on bus and rail.	n/a -	No other rail operators outside of TfL are yet to deploy a contactless solution. See TfGM's regional light rail update that follows.
Rapid adoption	15 per cent of journeys being cEMV, within one year of launch, of a contactless proposition being rolled out.	n/a -	Adoption on TfL continues to increase however no other rail operators have yet deployed a contactless solution.
Strong business case	At least two of the five business case drivers are being met.	n/a -	As above.

FIGURE 11. RAIL PERFORMANCE AGAINST GOALS

E. REGIONAL

Progress

With the trend in devolution to regional authorities and the government's granting of greater local powers, regional activity in transit ticketing has been increasing. Transport for the North has a planned phased approach to implementing smart ticketing, including contactless transit across the North. Midlands Connect is also developing plans for its region.

At the same time, individual cities are starting to launch their own implementations. A barrierless Model 2 (PAYG) solution for Metrolink trams in Manchester is expected to be launched in summer 2019. This is the first light rail roll-out outside of London. Birmingham transit operators are keen to leverage contactless transit for international tourists coming to the 2022 Commonwealth Games.

This organic development of regional and city contactless transit schemes in the UK could lead to travel interoperability issues in the future if not carefully managed. Moreover, the Department for Transport (DfT) only has authority in England, meaning that Welsh and Scottish transit schemes sit outside of its strategic influence.

To address this concern, and with support from TfN, Transport Scotland and Transport for Wales, the DfT has commissioned research looking at how public transport ticketing schemes can be better joined up.²⁷ This research will look at existing and medium-term landscape of public transport smart ticketing schemes within England; and explore how the growing number of regional and local smart ticketing schemes can offer the potential for a consistent customer experience through contactless payments (cEMV), in particular including interoperability.²⁸

i. Transport for London

Transport for London, as highlighted throughout this report, continues to experience growth in contactless transit. Customer experience improvements have been made, especially around how TfL's deny lists are handled.

27. <https://www.digitalmarketplace.service.gov.uk/digital-outcomes-and-specialists/opportunities/9692>

28. For example, looking at potential system architecture options, recommendations on how multi-modal, multi-operator, multi-scheme public transport account-based ticketing (based on contactless EMV payments (open and closed loop), transport-specific smart cards or other validation approaches) could be rolled-out nationally across England (or excluding, but interoperable with TfL's scheme in London) in a coordinated and coherent fashion. This could include the general commercial arrangements that would need to be in place for each option to be viable (including what bodies / organisations would need to be involved).

Transport for London Data

Total cEMV journeys
89.4m
+20.8m (year on year)



cEMV journeys
as % of PAYG
54.2%
+7.0% (year on year)

Rail cEMV journeys
56.8m
+13.8m (year on year)



cEMV journeys as
% of PAYG - Rail
56.0%
+6.8% (year on year)

Bus/tram cEMV journeys
32.6m
+6.9m (year on year)



cEMV journeys as %
of PAYG - Bus/tram
51.3%
+7.0% (year on year)

These figures are for the period 3.3.19 to 31.3.19

Contactless Uptake on TfL

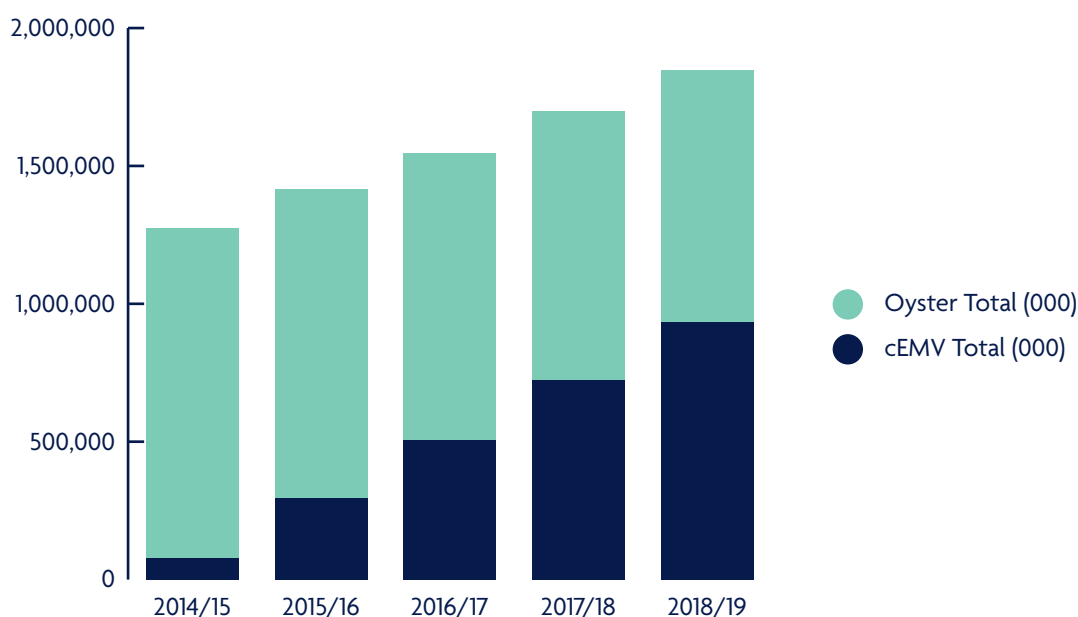


FIGURE 12. TFL CONTACTLESS UPTAKE

Traditional season tickets have been in decline as working patterns change and contactless, presumably with daily and weekly capping, has become better understood. As a result, people within the rail sector believe that we need to be thinking differently about how we define 'season' products in the future.

Transport for London Data

Contactless market is coming from all other products

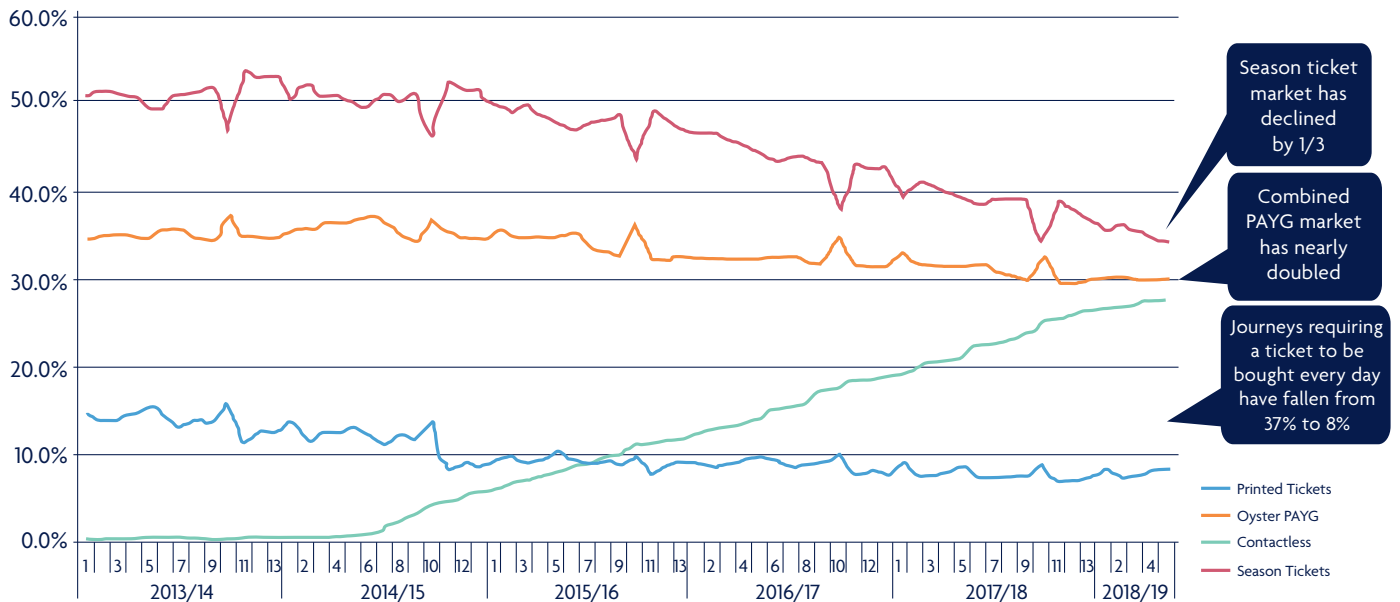


FIGURE 13. TFL CONTACTLESS JOURNEYS

ii. Transport for the North (TfN)

TfN has aspirations for joined-up public transport journeys across the North, and contactless is a key part of this discussion.

TfN is a conglomeration of 19 transport authorities and is now a Sub-national Transit Body (STB) which has the potential to use its devolved power for rail services from 2024. TfN has access to a budget of £150 million based on meeting certain government set criteria. TfN has established Heads of Agreement with Transit Operators to arrive at an agreed commercial model and proposition, and is also working together with Network Rail, Highways England and HS2.

There are three concurrent phases of delivery for TfN planned over the next four years:

Phase 1: The delivery of early benefits focused on rail, including the introduction of smart and integrated travel to customers offering multi-operator support with complex capping. This involves working with train companies and the DfT to issue smartcard products, complementing the availability of barcode ticketing for other journeys. This first phase has been part of the DfT's STNR national programme to roll out smart, ITSO based, ticketing on all rail travel.

Phase 2: The continued delivery of smart and integrated travel benefits, including enhanced real-time customer information such as disruption messaging, and open data sources.

Phase 3: This phase is expected to deliver EMV tokens and weekly capping. TfN will facilitate the sharing of knowledge between operators and transport authorities and identify new opportunities for collaboration.

This phase also includes the implementation of the “ABBOT” – a back office to enable customers to use contactless bank cards to obtain a ‘Fair Price Promise’ when they travel on multiple modes of transport across the north. ABBOT will collate and read customer data to facilitate the capping of multi-modal, multi-operator journeys. This will ensure that customers pay the best possible price for their travel on public transport.

iii. Transport for Greater Manchester (TfGM)

TfGM is considered to be a part of the Transport for the North initiative, although the relationship is not clearly defined. TfGM is launching contactless payments on its barrierless, light rail system – Metrolink – in summer 2019. This will be the first Model 2 (aggregated PAYG system) on light rail outside of London.

iv. Midlands Connect

Midlands Connect (MC) is the Sub-national Transport Body for the Midlands. MC is solely funded by government and constitutes a partnership of national and local bodies, including 23 local authorities, local enterprise partnerships, chambers of commerce and two international airports.

Midlands Connect is planning on implementing a contactless payments solution for transit available by the start of the Commonwealth Games that are being hosted in Birmingham in 2022.

During 2018 Midlands Connect worked closely with Transport for West Midlands (TfWM), Nottingham City Council (NCC) and the Robin Hood Area Operators group to develop an Account Based Ticketing (ABT) solution proposal

to meet the needs of the Midlands. It is through this work that Midlands Connect considered the option of a “broker model”.

In autumn 2018 Midlands Connect sought £20 million from the government for the development and delivery of an ABT solution that encompasses both ITSO and cEMV technology. Funding was not awarded, as significant central funding was already being provided for Transport for the North’s solution which provides similar passenger outcomes. The DfT’s decision to fully support TfN’s approach will mean that other adjacent regions will be required to integrate with TfN to avoid the creation of ‘islands’ of ticketing solutions across the different regions.

Since the decision by the DfT, Midlands Connect has been actively engaging with TfN to see how the Midlands requirements for a cEMV solution can be integrated within their programme.

v. Transport Scotland

Transport Scotland (TS) operates a rail franchise and deregulated bus sector model. Ferries, for historic reasons, are a mix of regulated and unregulated approaches. The TS focus to date has been on implementing ITSO and are helping to fund the roll-out of contactless readers for the smaller bus companies. TS is making a commitment to an Account Based Ticketing trial and is maintaining a watching brief on contactless.

vi. Transport for Wales

Transport for Wales has recently issued a 15-year franchise to Transport for Wales Rail Services. Retail enhancements are part of the franchise arrangements and, as such, smart ticketing is being rolled out across Wales and the Borders. Validators on the South Wales Metro will enable PAYG flexible ticketing. Elsewhere, customers will be able to use mobile tickets to ensure they always pay the lowest fare.

PAYG using cEMV is also in the scope of the franchise and it is expected that routes across the Welsh Valleys will be the first to be cEMV enabled, possibly as early as 2020. TfW Rail Services is also keen to ensure that bus journeys are integrated into the PAYG proposition. TfW Rail is also reported to be considering the development of a back-office broker, similar to Midlands Connect but as yet they have not announced their plans for EMV Contactless.

vii. Translink - Northern Ireland

Translink's multi-modal, Future Ticketing System (FTS) is reported as being on plan for autumn 2019. Contactless is expected to be delivered during spring 2020 and has been prioritised over barcode ticketing. Historically, Northern Ireland has led the UK in ITSO based smartcard usage in passenger transport, alongside London, with around 28 million smartcard journeys annually and nearly half a million active smartcards.

viii. Transport in Cornwall

The local government in Cornwall has published its ambition to deliver a Transport for London style, integrated, multi-modal transport network. They plan to introduce this new single ticketing system which can be used across all bus, rail and ferry services regardless of the company providing the transport.

As part of the project they are reviewing ticketing with the aim of making a standardised system that is simple to use. They have stated their aim to expand the way passengers can buy tickets on buses to include using a mobile phone app, credit or debit card.

Challenges

Interoperability

One of the main benefits of cEMV, with its global standards, is enabling interoperability of the contactless transit experience. Full interoperability would allow a customer to be able to use their card in the same manner, anywhere and with any operator and receive one charge for doing so. The wider customer engagement with contactless to date has prompted interest, in some regions, in the desire to achieve this type of interoperability across the suite of transport services including car parking, taxi services, cycle hire.²⁹

However, there appears to be a degree of doubt across the industry that full interoperability, in the sense of a customer being able to travel across multiple modes, multiple operators and multiple regions and only pay once (as they can today with a paper ticket), can ever be achievable.

There are clearly a number of challenges to overcome to achieve interoperability:

- The commercial agendas of the various organisations and concerns around erosion of customer loyalty, which might be a feature of increased interoperable travel, are making the finding of any agreeable commercial solution to interoperability challenging.
- Issues relating to the establishment of regional borders which, by their very nature, are artificial and not easy for customers to understand. The bus industry is working with transit agencies, such as Transport for the North, to address these issues.
- Establishing the identity of a customer across transport modes and regions. The card schemes are considering the implementation of the EMVCo Payment Account Reference that will provide one common account reference number that will link up a

29. TfN put forward this vision in its Strategic Outline Business Case in Spring 2016.

customer's different payment devices (card, mobile, wearable) that use the same card account. The PAR may help interoperability when using cEMV for prepaid journeys.

- The rail industry has net-settlement arrangements in place for interoperation already through the RDG – this allows fare allocation for paper-based tickets. However, the bus industry does not have such a system in place and is unaccustomed to fare-sharing.

Technologically, the challenges to interoperability are not insurmountable. There appear to be two different approaches to sharing information that would enable the interoperability currently being supported or proposed across regions:

- Broker-based model: one of the operators involved in the interoperable set of journeys charges the customer and then shares the revenue on a pre-agreed basis with other operators.

- Aggregator model: a central back office processes the customer charges and then shares the revenue on a pre-agreed basis with all operators.

With no multi-modal national transit strategy in place, the 'organic' direction of travel could lead to at least a seven-region 'island' model, potentially interconnected by pre-paid 'bridges'. Consideration as to how boundaries are handled will determine how easy these national transit 'zones' will be for customers to understand.

One option for multi-operator charging under the broker model is that the operator that was involved in the last journey which the customer took charges the customer. That operator will then share its revenue, using a pre-agreed split, directly with the other operators. Consideration will need to be given to how the broker model can be made to comply with prevailing regulations and global card scheme operating procedures, such as those that involve the sharing of customer information.



FIGURE 14. PREDICTED UK-WIDE TRANSIT REGIONS

Benchmarking

There has been significant progress made in the design of systems that would support integrated, multi-model, multi-operator travel, however the political environment and competing agendas make progress slower than was hoped for.

REGIONAL PERFORMANCE



Goal	Benchmark by 2019/20	Rating	Comments
National coverage	London, Newcastle, Manchester, Oxford and a number of other large towns and cities across the UK.	Slow but progressing **	Progress being made by the several regions (TfN and Midland Connect) in designing a contactless proposition and solution.
Compelling customer experience	Model 2 with aggregated fares and capping on bus and rail.	n/a -	No other regions outside of TfL are yet to deploy a contactless solution.
Rapid adoption	15 per cent of journeys being cEMV, within one year of launch, of a contactless proposition being rolled out.	n/a -	No other regions outside of TfL are yet to deploy a contactless solution.
Strong business case	At least two of the five business case drivers are being met.	n/a -	As above.

FIGURE 15. REGIONAL PERFORMANCE AGAINST GOALS

F. MACRO-INDUSTRY ACTIVITY

Bus Industry

The number of local bus passenger journeys in Great Britain was 4.78 billion in the year ending September 2018, a 2.3 per cent decrease when compared with a year earlier.

Bus use in England outside London declined by 63 million or 2.9 per cent to 2.1 billion passenger journeys over the same period, a continuing decline since 2009. It is now 13 per cent lower than the peak in the year ending December 2008.

In London, bus use decreased by 29 million passenger journeys or 1.3 per cent to 2.21 billion in the latest year but remains six per cent higher than in the year ending September 2007. Passenger journeys in London accounted over half of the total 4.31 billion passenger journeys made by local buses in England in 2017/18.

In metropolitan areas (Greater Manchester, Merseyside, South Yorkshire, Tyne and Wear, West Midlands and West Yorkshire) in the year to September 2018 there were 0.88 billion passenger journeys, a decrease of 3.7 per cent compared with a year earlier. In non-metropolitan areas there were 1.22 billion passenger journeys, a decrease of 2.3 per cent.

In both metropolitan and non-metropolitan areas, the introduction of free concessionary travel in local authority areas from 1 April 2006 and nationally from 1 April 2008 led to annual increases in local bus passenger journeys. Since 2008/09, bus use in England outside London has decreased at a faster rate in metropolitan areas than in non-metropolitan areas.

Some of the factors that have impacted bus usage include congestion and roadworks, changes in car ownership models, reductions in local authority supported services and an increased preference for online shopping.

In 2017/18, the total estimated operating revenue for local bus services in England was £5.52 billion. Passenger fare receipts made up the largest proportion of operating revenue: £3.22 billion or 58 per cent of operating revenue.

Operating revenue from concessionary fare reimbursement has increased by nearly 60 per cent in real terms over the same period, from £0.63 billion to £1 billion. This increase reflects the wider coverage of the concessionary travel scheme, moving from a local authority to a national scheme in local authority areas from 1 April 2006 and nationally from 1 April 2008, increased eligibility and a larger proportion of elderly people in the wider population. Total concessionary journeys made up 33 per cent (1.46 billion) of all local bus passenger journeys in England. In England outside London 29 per cent of journeys were elderly or disabled concessionary journeys. In London the corresponding figure is 16 per cent.

Recent quarterly figures³⁰ from the Department for Transport show a slight increase in bus passenger journeys, though at this stage it is not possible to ascertain if this will develop into a potential trend.

Index: 2004/05 = 100, seasonally adjusted

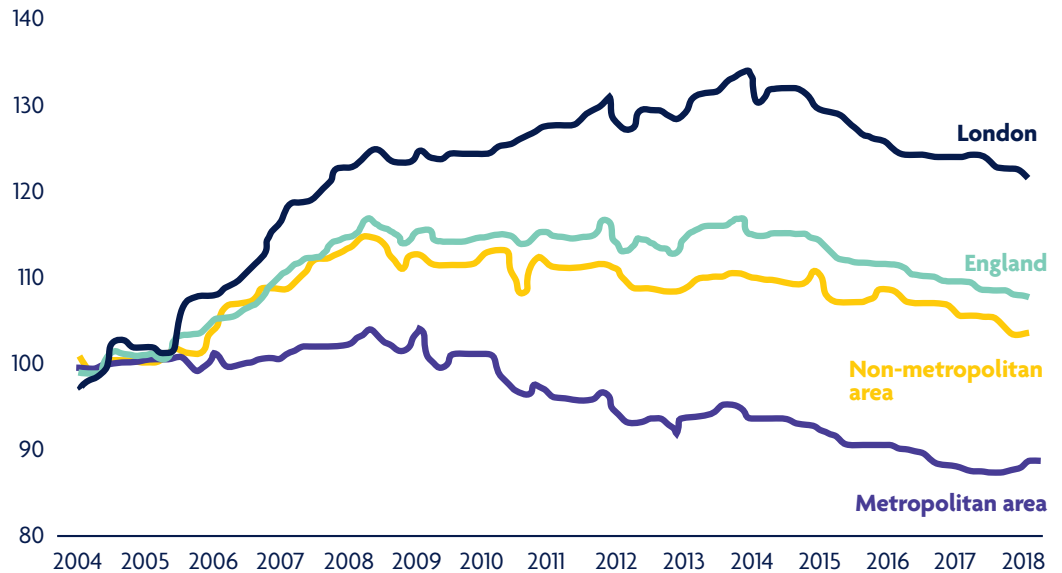


FIGURE 16. BUS PASSENGER JOURNEYS³¹

The 2017 Bus Services Act presented local authorities with new powers to bring about enhanced partnerships. Enhanced partnerships and advanced quality partnerships powers provide the framework for authorities to work side by side with operators to set a shared vision for bus services in their area.

Two of the mayoral combined authorities, Transport for Greater Manchester and Merseytravel, are considering the use of their new bus franchising powers and, should they decide to proceed, it will, for practical and planning reasons, take some time before the powers can take effect.

Rail industry

There is a considerable national rail network in Great Britain. It has almost 16,000km of route and serves over 2,500 individual stations. Each year around 1.7 billion passenger journeys are made on the network. Use of rail services has more than doubled over the last 20 years, a faster rate of growth than for any other mode of transport. It is particularly important for certain journeys and geographies e.g. 45 per cent of journeys into central London during the weekday morning peak are by rail. In the midst of the increases in journeys made, and maybe as a result of the increase, the rail sector continues to be beset by a fall in customer satisfaction levels.^{32,33}

30. <https://www.gov.uk/government/statistics/quarterly-bus-statistics-october-to-december-2018>

31. <https://www.cubic.com/news-events/news/cubic-bring-contactless-transit-cards-apple-wallet-starting-chicago-later-year>

32. <http://www.bbc.co.uk/news/uk-england-46606525>

33. <http://www.bbc.co.uk/news/business-47040644>

Fewer trips are now taken by car, van and local buses than 15 years ago. However, car or van travel, either as a passenger or driver, remains the most common mode of travel in England, followed by walking and bus trips.

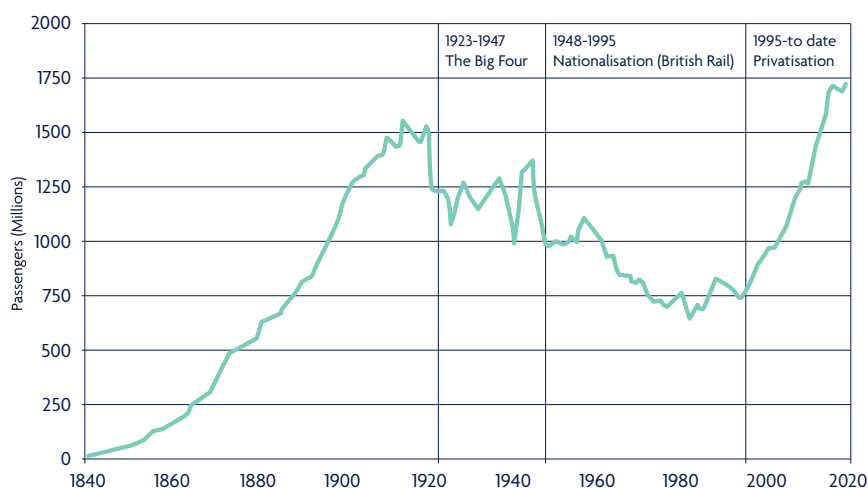


FIGURE 17. INCREASE IN RAIL PASSENGER NUMBERS

Rail accounts for two per cent of all trips made and eight per cent of distance travelled in England, in contrast to car travel which is at 61 per cent of trips and 78 per cent of distance. In comparison to other European countries, rail use across all of Great Britain in 2017 was the second highest after Germany.

Rail travel tends to be used for longer journeys and so makes up a larger proportion of travel when measured by distance and time. The only surface transport mode with a longer average trip length is non-local bus travel (including coaches). These average distances and times per trip have remained largely unchanged across all modes for the last 15 years.

Approximately 70 per cent of all rail journeys are provided by operators in London and the South East, with over one million passengers arriving into London by rail on a typical weekday, with train operators in London and the South East generating around half of total passenger revenues.

People with higher incomes make substantially more rail trips than the rest of the population. In 2017, the top quintile of earners made on average over three times as many rail trips per year as those in the lowest quintile.

Passenger train services are provided through 17 franchises, three concessions and four 'open access' operators (including Eurostar). However, some franchises involve multiple brands, making the number of visible franchise brands a total of 23.

Most of these are franchised by the UK government, although some are franchised by different devolved governments or authorities. The boundaries between most of these operators are broadly geographic, with relatively little overlap. In addition, the four 'open access' operators are not contracted by the government but also operate a small number of services on the national network, sometimes competing directly with franchised operators on the same journeys.

Payments

Cards overtaking cash

The growth of card payments continues to be a key feature of the UK's payments market. 2017 marked a significant point in the UK at which cash was displaced as the most frequently used payment mechanism by consumers, having been overtaken by debit card transactions. During 2018 the volume of cash payments reduced by 1.9 billion to 11 billion, with forecasts suggesting that a continuing reduction in the demand for cash by consumers will result in cash payments falling by over 60 per cent to 3.8 billion in 2028. Last year, cash withdrawals over the LINK network fell by 7 per cent and it is predicted that they will reduce by 8 per cent this year.

These established trends are predicted to continue and even accelerate in response to the pace of digital innovation in payments, which are increasingly being embraced by large numbers of consumers. Growth is also being accelerated by the growing acceptance of contactless on public transport environments.

Bus operators report that despite some geographical and socio-economically driven differences in customer usage, take-up has been generally good and the proposition well received by customers. This adoption of contactless could prove to have a significant effect on reducing cash usage, as it is estimated that around 614 million cash transactions are made in the transport sector each year. The UK's payments landscape has changed considerably. Consumers are adopting new payment methods available to them that better meet their needs in a digitally connected world. Retailers and service providers are offering increased choice in payment mechanisms to meet customer requirements, sometimes in response to customer preferences, but often to harness innovation as a competitive differentiator.

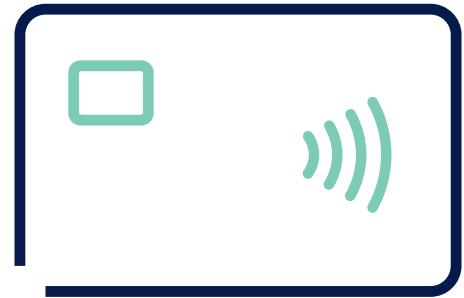
Contactless transactions increase

There were 18.3 billion debit and credit card transactions in the UK in 2018, 12 per cent more than the previous year. The total value of these transactions was £733 billion, 6 per cent higher than 2017.

There were just under 7.4 billion contactless card transactions in the UK in 2018, a 31 per cent increase on the previous year.

The growth of card payments was primarily driven by the increased usage of contactless payments, which is also a significant trend that we see globally, but also due to increased acceptance opportunities as sectors such as transit, convenience stores and small businesses and traders, have responded to customer needs by offering card payment options.

2 in 5



card payments are contactless

**FIGURE 18. CONTACTLESS CARD PAYMENTS
COMPARED TO ALL CARDS**

Contactless cards

By the end of 2018 there were nearly 124 million contactless cards issued, with 84 per cent of debit cards and 64 per cent of credit cards having contactless functionality. The card industry has committed to ensuring that from January 2020, every card payment terminal in the UK will be capable of accepting contactless payments. This will further increase the number of locations where consumers can pay using contactless payments.

Regional variation

The various demographic differences in the usage of contactless are not confined to transport. While 69 per cent of all adults in the UK made a contactless payment in 2018, there are some distinct terms of differences between age groups. Those between 25 and 34 were the most likely group to use contactless cards, with 83 per cent of people in this age group making contactless payments. Whilst people aged 65 or older are the least likely group to make contactless payments, over 60 per cent do make contactless payments.

Card payments are now widely accepted in sectors that were traditionally cash centric e.g. bus travel, pubs and fast food etc. The British Retail Consortium reports that the increasing use of cards has been driven by a number of factors, including the growing number of retailers that have invested in payment technology to accept cards, contactless payments, and new payment applications both online and in store.

Proportion of people making contactless payments, by region, 2018

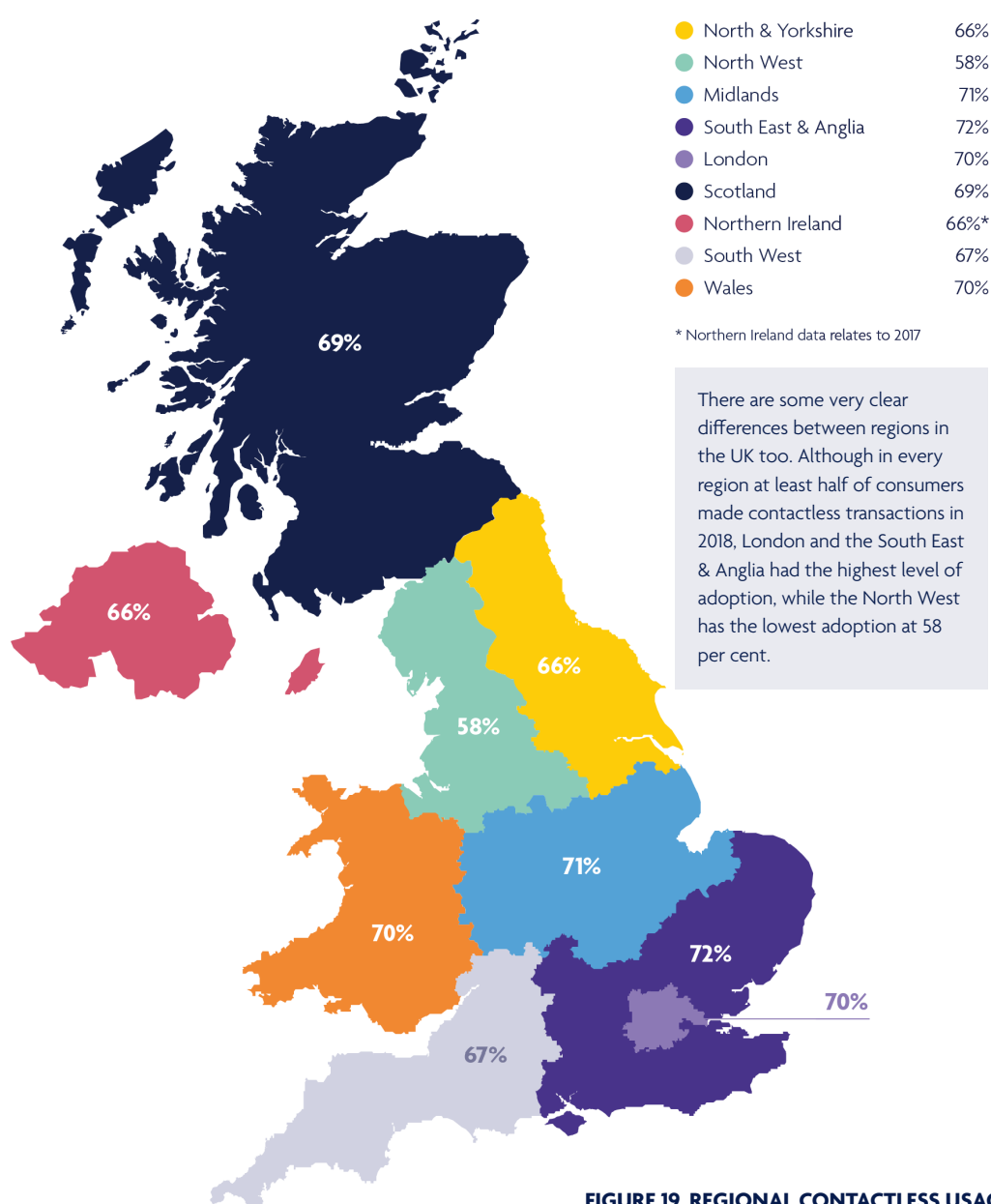


FIGURE 19. REGIONAL CONTACTLESS USAGE

G. TECHNOLOGY

UK infrastructure

We already live in a multi-standard/ token world (e.g. ITSO, barcode, EMV etc), which could potentially make interoperability more complex, but not impossible, to achieve. Furthermore, multi-standard readers and associated processing introduces additional infrastructure and operational costs over a more limited range of standards and tokens.

On a positive note, the deployment of 5,000 ITSO readers for the STNR project has meant that most locations now have readers with some of the necessary hardware and communications already in place - this would make the move to EMV Contactless less onerous than previously envisaged. Some of the regional schemes are also specifying multi-standard ready readers that will be able to accept cEMV. Taking this approach will further reduce the upgrade challenges for operators.

New technology suppliers

There have been some very encouraging developments in the availability of new technology providers. Formerly, the market had been dominated by a small number of traditional vendors that sold end-to-end equipment and services, quite often using proprietary terminals and interfaces.

There appears to be the beginnings of stratification or layering of the supplier market with reader/ terminals, fare processing, payment processing and customer devices (mobile) being the main 'layers' within the transit infrastructure eco-system. For large-scale implementations it seems that large-scale systems integrator-led solutions are being pursued, rather than

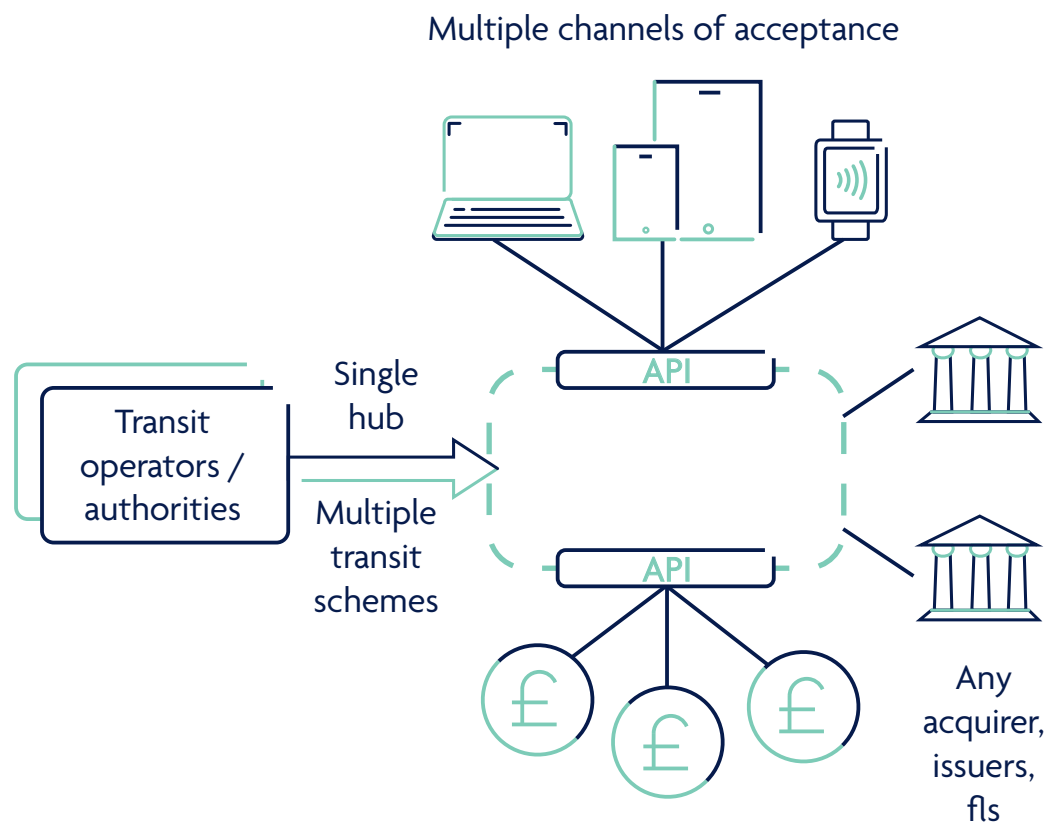
considering procuring from a range of specialist suppliers. New suppliers are now also emerging that can offer cloud-based, highly scalable and opex-based services.

Littlepay case study

Littlepay only launched in 2017, but despite its short time in the industry, it has taken market share through its innovative fully PCI-DSS compliant and scalable cloud-based platform supported by a flexible opex-based commercial model. Ultimately high-volume and low-value micro-payments is their business, and transit is the first sector they are working on.

Littlepay sees its role as being only one part of the overall solution. They believe that the days of large-scale proprietary systems are numbered as industries, in general terms, move towards open APIs and cloud-based services.

Littlepay has built a card reader (validator) agnostic, payments service provider (PSP) to support Model 2, for aggregated fares, though it admits that most of their bus operator customers have yet to launch full aggregation and capping to their customers. Their system processes all customer 'taps' in the back office and they also provide access to a merchant portal where the operator can view transactions, offer refunds and analyse customer data.

**FIGURE 20. LITTLEPAY OPEN SYSTEM DESIGN**

There is a view that it costs a lot to get going with EMV Contactless payments in transit. This type of outdated thinking is something that Littlepay says needs to be updated, given the availability of flexible cloud-based platforms and low-cost validators.

With Go Ahead, First Group, Arriva and over 40 smaller operators under their belt, Littlepay is set to be one of the new wave solution providers that are reducing the barriers and challenges to delivering EMV Contactless across transit networks. Their solution currently processes cEMV transactions for 13,000 vehicles across the UK and Ireland.

Littlepay sees trends in the availability of low-cost validation devices and the launch of tap-on and tap-off propositions as part of the move to delivering the full Model 2 proposition.

Mobile platforms

Mobile is becoming a mainstream for rail ticketing. Customer adoption of mobile barcodes has been fast and strong, with over 80 per cent of customers choosing a mobile barcode ticket over the alternatives such as a ticket on departure delivered as a paper ticket from a ticket vending machine at the station.

The RDG-funded evaluation study on the feasibility of digital wallets for Model 3 journeys in 2017 did much to explore the challenges associated with embedding tickets, in the form of closed-loop EMV-based 'accounts' in customers' smartphone-based digital wallets.

In addition to the number of learnings from this work, mobile technology has advanced to a point where it can provide even better support for future mobile-based ticketing implementations.

Work is underway with some of the mobile providers to explore the feasibility of deploying an ITSO based token within a customer's smartphone digital wallet.

Cubic and Apple have recently (May 2019)³⁴ announced enabling transit cards in Apple Wallet so passengers can use their iPhone and Apple Watch to travel on trains, metros and buses in the United States. Passengers will be able to add transit cards to Apple Wallet on an iPhone, load transit funds, buy fare products and manage their account.

34. <https://www.cubic.com/news-events/news/cubic-bring-contactless-transit-cards-apple-wallet-starting-chicago-later-year>

H. CONCLUSIONS

UK Finance's Contactless Transit Framework has provided a focus and impetus for the adoption of cEMV as a ticketing solution on buses and has been met with great support from customers and drivers. Discussions are continuing with the rail industry on whether a pre-purchase contactless transit model would work for train journeys.

Moreover, with the right central focus, resources and organisation, there is still a possibility of achieving a national, interoperable rollout of contactless transit by 2025. A key decision will be whether regions' technical solutions should be brought together to provide an interoperable customer experience for contactless transit. This could be delivered through a fully aggregated national travel solution; however, commercial, technical and competitive issues may create too much of a barrier to allow for much further progress on this model outside of London. It is hoped that the Williams Review of the structure of the rail industry will go some way to addressing these issues.

Against the targets for 2019/2020: -

- i. **National coverage:** Expectations have been exceeded for bus. Regional progress has been slower than expected although there are some encouraging signs that contactless transit is being adopted.
- ii. **Compelling customer experience:** Customers continue to demonstrate strong support for contactless transit on social media and anecdotally; and most early teething issues have been resolved.
- iii. **Rapid adoption:** Where cEMV has been rolled out, adoption is exceeding expectations, with average adoption at 25 per cent outside of London and 54 per cent inside London.
- iv. **Strong business case:** A number of the original business case objectives have been met, although it is too early to assess the cost impact for the transit sector. For transit, benefits include provision of a wider range of payment options and increased passenger throughput and customer satisfaction.

ANNEX. DOCUMENTATION

The Contactless Transit Framework includes:

- **Contactless Transit EMV Framework:** this describes the Framework at a high level, including the case for transit operators, the card payment industry and government bodies to support EMV contactless as a ticketing option; an overview of how the Models work; and the ongoing governance of the Framework after closure of the Project.
- **Contactless Transit EMV Implementation Guidelines:** this describes Models 1 and 2 in detail including minimum viable propositions, transaction processes and the underlying risk and liability agreements between the two industries to support them.
- **Card Payment Accreditation Guide:** this describes of the stages of accreditation that the suppliers for the transit operators will need to go through to meet card scheme requirements.
- **Contactless Transit EMV Communications Toolkit:** this includes guidelines for customer and staff communication, and a current set of FAQs about the Models.
- **Pre-Purchase EMV BRD:** an amalgamation of the Customer Proposition and the Statement of User Requirements. It provides an outline of the proposed Pre-Purchased solution and requirements for participation, implementation and running of the service.
- **Contactless Transit EMV Project Analysis:** this includes supporting analysis providing rationale behind detail included within the framework documents.

The Contactless Transit Project closed in May 2017. The Framework is jointly owned by the card payments industry, transit industry and government bodies and will be updated if required by mutual agreement of all the parties. The documents are available on request from UK Finance.

The Framework does not include technical specifications or infrastructure. The Framework is intended to help transit operators consider whether to implement one or more of the Models, and it is the commercial decision of the transit operators as to how they deploy their own contactless solutions.

ANNEX. GLOSSARY OF TERMS

Card Payment Schemes	Owners of payment scheme, into which an issuer or payment service provider can become a member. They define the set of rules to be applied within their network.
DfT	Department for Transport
EMV Contactless Card (cEMV)	EMV Contactless works by holding a contactless chip-enabled payment device (typically a card or smartphone) within the proximity of an EMV contactless-capable reader. The EMV standard, managed on behalf of the industry by EMVCo, allows cards and readers to be interoperable and used internationally.
Form Factors	EMV contactless devices including mobile and wearable variants.
Issuer	A payment service provider that offers card associated branded payment cards directly to consumers.
ITSO	ITSO is the national specification, or standard, for smart ticketing.
Oyster	Oyster is the London smartcard which can hold pay as you go credit, Travelcard and Bus and Tram Pass season tickets. Used by customers to travel on the bus, tube, tram, DLR, London Overground and most National Rail services in London.
PAYG	Pay-As-You-Go
RDG	Rail Delivery Group
TFL	Transport for London

