Market Study into the supply of automatic ticket gates and ticket vending machines

Final report

13 March 2019

Contents

Summary

1. On 14 March 2018, we launched a market study into the supply of automatic ticket gates ("**ATG**s") and ticket vending machines ("**TVM**s").[1] This final report concludes our market study. It sets out our findings and makes recommendations on how to tackle the market issues we identified.

2. ATGs and TVMs both play important roles in the sale of rail tickets. ATGs ensure the protection of industry's revenue from fare evasion, which some train operating companies estimate may cost the industry over £200 million per year, whilst TVMs sell approximately 150 million tickets per year. Their impact on the passenger experience, and the need for their consistent, reliable operation was demonstrated as recently as February 2019, when a software failure left many travellers unable to collect their pre-paid tickets from TVMs during the morning rush hour.[2]

Purpose

3. The purpose and scope of our market study was set out in the Statement of Scope document, which we published in March 2018[3], alongside our market study notice.[4] Fundamentally, our goal was to ascertain, for both ATGs and TVMs, whether:

    ■ high barriers to entry and expansion were contributing to a lack of competition; and

    ■ whether any such issues were in turn leading to poor market outcomes in terms of price, service quality and innovation.

4. If competition issues were identified, our objective was then to take appropriate steps to address them.

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[1] ORR press release: http://orr.gov.uk/news-and-media/press-releases/2018/orr-launches-market-study-into-ticket-vending-machines-and-automatic-ticket-gates

[2] For example, see: https://www.brightonandhoveindependent.co.uk/news/politics/train-passengers-unable-to-collect-pre-paid-tickets-from-machines-1-8816189

[3] A definition of the products within scope of the market study is set out in paragraphs 2.1 to 2.10 of ORR's Statement of Scope document, dated 14 March 2018: http://orr.gov.uk/__data/assets/pdf_file/0016/27214/market-study-into-the-supply-of-ticket-vending-machines-and-ticket-gates-statement-of-scope-2018-03-14.pdf

[4] Under section 130A of the Enterprise Act 2002, we are required to publish a Market Study Notice. Our Statement of Scope document sets out a definition of the products which are within the scope of the market study and this is set out in paragraphs 2.1 to 2.10 of the document,: http://orr.gov.uk/__data/assets/pdf_file/0016/27214/market-study-into-the-supply-of-ticket-vending-machines-and-ticket-gates-statement-of-scope-2018-03-14.pdf

Approach

5.   We split the market study into two phases. Phase one focused on investigating the market to determine whether there were competition issues. During this investigation stage we also had to decide whether or not to make a market investigation reference ("**MIR**") to the Competition and Markets Authority ("the **CMA**").

6.   At the end of phase one, on 13 September 2018, we published an update paper outlining our progress and detailing our emerging findings about the markets for the supply of ATGs and TVMs. It also set out our decision not to make an MIR to the CMA.[5]

7.   Phase two focused on developing remedies to address the key competition issues that we had identified. On 25 January 2019, we published a 'discussion paper'[6] inviting comments from across industry on our emerging recommendations. The majority of respondents were supportive and in most cases willing to actively assist in the implementation of our recommendations.

8.   We engaged with a large number of market participants throughout the study. We are encouraged by the level of engagement by the industry in actively working with us to identify market issues and, more importantly develop remedies to address those issues. Participants who engaged with us included:

- the Department for Transport ("the **DfT**"),

- the Rail Delivery Group ("**RDG**"),

- representatives from metro operators including Transport for London ("**TfL**"),

- Transport Scotland ("**TS**"),

- Train Operating Companies ("**TOC**s"),

- third party retailers ("**TPR**s"), and

- suppliers of ATGs and TVMs in GB, as well as potential new entrant ATG and TVM suppliers.

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[5] Under section 131(B)(3) of the Enterprise Act 2002, ORR is obliged to publish a notice of its decision not to make an MIR within 6 months of publishing the Market Study Notice. We also published an accompanying statutory notice on the MIR decision.

[6] ORR's discussion paper: http://orr.gov.uk/__data/assets/pdf_file/0014/40325/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-january-2019-discussion-paper.pdf

Products and purchasers

9.   There are two types of buyers for ATGs and TVMs in Great Britain ("**GB**"):

■   **Metro systems**: Metro operators use these machines on integrated rail transport networks, confined to a particular urban locality (e.g. TfL); and

■   **Mainline**: TOCs have been awarded franchises by the DfT and use ATGs and TVMs on the mainline infrastructure on which they operate.

10. There is more to ATGs and TVMs than the gate and vending machine hardware that is visible to passengers at stations. Both ATGs and TVMs are complex systems that include back office software and interconnectivity with other systems. The location of an ATG or TVM is important in terms of the connectivity and functionality they require. For example, an ATG situated in the TfL metro station may only need to read or validate smart tickets for use on that 'closed' metro system. In contrast however, an ATG situated in a London mainline station may have to be interoperable with a wider range of mainline tickets and the TfL metro system.

11. Metro operators and mainline TOCs take significantly different approaches to procuring ATGs and TVMs. We found that metro operators purchased both types of equipment together as part of their wider revenue collection services, whereas TOCs procure ATGs and TVMs separately. As a result of this and other factors, we found that the competitive conditions for the supply of equipment to the respective types of purchaser are different. In our analysis, we therefore distinguished between these different purchasers where appropriate.

Findings

Strength of competition

12. We found that competition for the supply of ATGs is weak. Market concentration is high in relation to both metro and mainline services. The largest player, Cubic Transportation Systems Limited ("**Cubic**"), has an approximate share of 97% of all ATGs currently installed in GB. We understand that this market share has remained at approximately this level for at least the past 20 years. While some of this equipment was purchased quite some time ago, analysis of recent procurement activity suggests that Cubic's advantages have remained persistent to this day.

13. For TVMs, our analysis of the number of installed machines and the market shares of suppliers also pointed to a very concentrated market. The incumbent supplier, Scheidt and Bachmann (UK) Limited ("**S&B**"), retains a high share. However, analysis of recent procurement competitions suggested moderate levels of

competition between S&B and other players, namely, Worldline IT Services UK Limited ("**Worldline**"), and Parkeon Limited ("**Parkeon**") (recently renamed Flowbird Limited). In 2018 a new entrant, Sigma S.p.A. ("**Sigma**") entered the market after being awarded a significant contract to supply TVMs to a TOC. Cubic is also active in this market, albeit it only supplies TVMs to TfL.

Barriers to entry and expansion

14. As noted above, metro operators and TOCs take different approaches to procurement and therefore, the barriers to entry and expansion are different for each.

Metro systems

15. Metro operators[7] procure ATGs and TVMs together as part of a single service contract for their revenue collection systems. TfL is a significant customer in both the ATG and TVM markets, operating more than half of all ATGs in GB. Its purchasing decisions therefore have a significant influence on the wider market. A key TfL contract in this regard is its 'Revenue Collection Contract' ("**RCC**"), which, following a recent extension, is 10 years in duration.

16. We note that the approach adopted by metro operators, in particular regarding the aggregation and duration of supplier contracts, may limit opportunities for new or existing suppliers to supply metro operators, and, in turn, may restrict the number of suppliers in the GB ATG and TVM markets overall. That said, there are counter-balancing benefits to this approach – metro operators have seemingly been able to drive efficiencies of scale through aggregating demand, and, having one supplier means it is easier to monitor overall delivery of revenue collection services.

Mainline

17. Mainline TOCs typically purchase ATGs and TVMs separately and, unlike metro operators, it is not as part of their wider revenue collection services. TOCs often purchase ATGs and TVMs in response to franchise commitments, although it is not uncommon for TOCs to procure on commercial grounds.

18. The mainline ATG market is characterised by a number of barriers to entry, of which the most important are:

   ■ **Issues relating to the overall level of demand, including the way demand is brought to market**. Tender opportunities are fragmented and unpredictable in frequency. This exacerbates the underlying problem that the overall potential market

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[7] TfL, Glasgow Subway, and Tyne & Wear Metro

is small relative to the investment necessary to develop a product. However, there is some residual demand for new and replacement ATGs, and in addition, potential for the introduction of new innovative approaches to revenue protection; and,

- **Issues with access/interoperability with the TfL network**. There is currently no option for a third party ATG supplier to connect to the TfL network. We note that no third party ATG supplier has actually ever pressed TfL for access to its system. This is important because of the importance of London termini to the operations of many TOCs. The lack of any mechanism for third parties to supply products which connect to the TfL network has resulted in only one supplier being able to supply ATGs to TOCs who require compatibility with TfL systems.

19. The mainline TVM market exhibits similar barriers to entry as those identified in the ATG market, albeit to a somewhat lesser degree. One mitigating factor in the TVM market is the availability of the Pearl reader, which allows access to the TfL network for alternative TVM suppliers. However, a key barrier to entry that was consistently raised by stakeholders is RDG accreditation for rail retail products. Our main concern is that the scope and process of accreditation may not adequately balance its legitimate objectives of ensuring accurate revenue allocation and accuracy, with stimulating new entry and innovation.[8]

Outcomes

20. For ATGs, we found that prices in GB may be higher than would otherwise prevail under more competitive market conditions. A second area of concern for us is that innovation appears to be driven through the passenger train franchise process, or through schemes organised and coordinated by industry bodies such as the DfT, RDG and the Railway Safety and Standards Board, rather than by competition in the supply chain.

21. Despite the above concerns, we observed very high levels of satisfaction with service quality as measured by reliability, availability and safety. This was particularly apparent for products supplied by Cubic.

22. For TVMs, we did not find strong evidence of high prices. The availability of alternative suppliers and, increasingly, alternative methods of ticket delivery, appear to provide a degree of competitive restraint. Evidence we obtained on service quality, however, indicated fairly wide-ranging stakeholder concerns.

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[8] Further details on accreditation are set out in Annex B of the update paper:
https://orr.gov.uk/__data/assets/pdf_file/0005/38993/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-annex-b-accreditation.pdf

23. In relation to both ATGs and TVMs, we consider that outcomes for the mainline rail network may be partly contrasted with, and differentiated from, those obtained by the largest metro operator, TfL. We found that TfL obtained better outcomes than mainline TOCs, in relation to:

- pricing;

- securing open book accounting arrangements to monitor profit levels;

- securing ownership of back office intellectual property to its revenue collection system; and,

- driving innovations such as Oyster, and latterly, contactless ticketing.

The case for intervention

24. We consider there to be a particularly strong case for intervention in relation to the market for the supply of ATGs. We are particularly concerned that the market conditions do not facilitate fair and robust rivalry between suppliers. Further, they do not promote natural innovation from the supply chain to allow for the introduction of dynamic new entry.

25. As regards the market for the supply of TVMs, we consider the case for intervention is less clear. Competition appears to be driving better outcomes (albeit slowly), though improvements could be made in relation to specific identifiable issues, notably, accreditation processes.

Remedies

26. In the light of our decision not to make an MIR to the CMA, any market solutions we chose to adopt required support and cooperation from industry. We therefore worked closely with stakeholders to develop viable and proportionate remedies.

27. Our objective was to seek remedies to improve the functioning of the ATG and TVM markets through increasing rivalry, improving value for money, and, importantly, in the long term, increasing the potential for innovation and the introduction of new approaches to retail and revenue protection.

28. Given the long-standing and entrenched nature of the issues in these markets, together with the very high levels of concentration we observed, we are conscious that our intervention is unlikely to be a 'silver bullet' bringing about full reform. Rather, we have focussed on developing solutions to 'kick-start' these markets by improving incentives for new businesses to compete for demand in GB and introduce new technology.

29. Our remedies are summarised in the table below.

Recommendation	Competition issue addressed
1. RDG should facilitate an industry working group dedicated to improving supply chain issues with regards to ATGs and revenue protection. This group should have clear deliverables regarding exploring options for demand consolidation, introducing new technology and increasing interoperability. *ORR will participate and monitor the achievements of this group.* *DfT and TS support this proposal and will attend the working group.*	The purpose of the working group is to look at options for consolidating demand and introducing new technological solutions for revenue protection on the mainline. We consider this will provide a means for industry to address the issues preventing alternative suppliers entering the market, by improving the way **demand is brought to market**, and developing solutions to overcome issues with **access/interoperability** across the wider network. The group will be a forum for industry parties to come together to set a vision for the network, providing clarity to the supply chain and incentivising alternative suppliers to develop innovative products to enter the market.
2. TfL and industry should work together to develop a solution to provide access to TfL's network for third party suppliers. *ORR will monitor progress of developing a solution(s) and ensure third parties are able to access interoperable products.* *ORR will also engage with other metro operators and*	This solution is aimed at addressing the barrier to entering the market caused by the inability of alternative suppliers to obtain **access to/ interoperability with the TfL network**. In the first instance, we consider this could take the form of an interoperable 'yellow reader' to be provided to third parties together with necessary interoperability specifications. Providing a mechanism for access would mean that alternative gate suppliers would, for the first time, be able to supply a product that is capable of reading and accepting TfL products, and therefore, compete for demand in GB.

integrated transport provides to ensure interoperability issues are considered in the development of systems in the future.	In the longer term, we recommend TfL ensures that future readers are designed with maximum possible interoperability as a specific design criterion. This will benefit TOCs, as it will generate viable alternative technological options to meet their needs. In the longer term we also expect TfL (and other metro operators) to benefit as it could increase the pool of suppliers bidding for future revenue collection contracts.
3. RDG should continue to deliver on its commitments to improve its accreditation processes *ORR will continue to hold RDG to account for delivery of its commitments.*	When we published our update paper in September 2018, RDG provided nine commitments to significantly improve and simplify their procedures for accrediting new and innovative retail products. The commitments are aimed at making **RDG accreditation processes less complex** and more effective and efficient for prospective and existing rail retailers. They are also aimed at making **it easier for new entrants** to both engage with RDG and enter into the rail retailing market with new technological propositions. Two potential new entrants have since begun engagement with RDG.

30. We consider, as a package, that these remedies will improve interoperability and generate stimulus and incentives for third parties currently operating in wider international markets to engage with and ultimately compete for demand in the GB market.

Implementation

31. Key industry stakeholders including RDG, TfL and a number of TOC owning groups have agreed to take a number of important initial steps towards the implementation of these remedies. Overall, we were pleased with the strong level of engagement in our development of remedies from industry. We will continue to engage with industry to ensure our recommendations make a real difference in these markets.

Next steps

32. The publication of this final report and the adoption of its recommendations concludes our formal market study into the supply of ATGs and TVMs. However, we will continue to take an active interest in these markets.

33. Our involvement will include delivering on our specific commitments to:

     ■ Participate in the ATG working group (recommendation 1);

     ■ Monitor the progress of developing a solution to access the TfL network (recommendation 2); and,

     ■ Continue to monitor RDG's delivery of its commitments on accreditation (recommendation 3).

34. More generally, we will continue to monitor the progress of competition in accordance with our legal duty to monitor the competitive situation in rail markets.

1. Introduction

1.1. Both ATGs and TVMs are a familiar presence in GB railway stations. They are a key interface for passengers using the rail network. The functionality and capability of TVMs has a significant impact on ticket distribution and passenger experience. The need for their consistent, reliable operation was demonstrated as recently as 19 February 2019, when a software failure left many travellers unable to collect their pre-paid tickets from TVMs during the morning rush hour.

1.2. The primary purpose of ATGs is to protect industry revenue from fare evasion, which some TOCs estimate may cost over £200 million per year.[9] We estimate that annually there are approximately 4.4 billion passenger entries and exits through ATGs on mainline and metro networks.

1.3. TVMs sell approximately £2.1 billion of tickets per year, almost 20% of the total value of tickets sold on the UK railway.

1.4. Both ATGs and TVMs have an important role to play in facilitating the roll-out of smart ticketing solutions and/or any other future developments in how railway ticketing is organised. It is important that delivering innovative new forms of ticketing is not hindered by limitations in the supply chain, or in the functionality of these products.

Purpose of study

1.5. Markets in all sectors work well when businesses compete vigorously to win business. When markets work well, efficient businesses are rewarded, productivity growth is higher, and customers have confidence that the supply chain delivers good outcomes for them in terms of price, quality, variety, innovation and service. The demand and supply sides of markets are equally important. Well-informed, active, strongly incentivised purchasers can also play a key role in driving competition between firms.

1.6. Market studies are one of a number of tools at our disposal to examine possible competition issues and address them if appropriate.[10] They examine whether markets are working well, and possible causes of market failure. Market studies take

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[9] For example, https://www.northernrailway.co.uk/2016-03-18-16-08-49/corporate-season-tickets/122-fines-and-penalties/825-myth-busting

[10] ORR's approach to monitoring and reviewing markets: https://orr.gov.uk/__data/assets/pdf_file/0007/23974/orr-approach-to-monitoring-and-reviewing-markets.pdf

into account regulatory and other economic drivers in a market, in addition to patterns of consumer and business behaviour.

1.7. This market study built on work we undertook in the wider retail sector, notably our market review into the supply chain for ticketing equipment and systems.[11] In that review we identified our preliminary concerns that:

■ The supply chains for the supply of ATGs and TVMs have few suppliers and limited new entry;

■ There may be a number of barriers which make it difficult for new businesses or products to enter the market for the supply of ATGs and TVMs; and

■ A lack of effective competition may be resulting in consumer detriment in the form of higher prices, lower quality, and stifled innovation.

1.8. Possible causes of high concentration and a lack of effective competition appeared to be:

■ The way in which demand is put out to tender which may be dis-incentivising new entry; and

■ The complexity of the accreditation process for bringing new retailing products/services to market.

1.9. This market study sought to test the above concerns and to understand more comprehensively the nature and strength of competition for the supply of ATGs and TVMs.

Our approach

1.10. On 14 March 2018, we launched a market study by publishing a statutory notice[12] and Statement of Scope.[13] The overall proposal we sought to test was:

"Whether high barriers to entry and expansion are contributing to high concentration and lack of competition, which, in turn is leading to poor market outcomes in terms of price, service quality and innovation."

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[11] ORR's market review: https://orr.gov.uk/rail/promoting-competition/market-monitoring/supply-of-ticketing-equipment-and-systems

[12] ORR's statutory notice: http://orr.gov.uk/__data/assets/pdf_file/0018/27216/market-study-into-the-supply-of-ticket-vending-machines-and-ticket-gates-notice-2018-03-14.pdf

[13] ORR's Statement of Scope: http://orr.gov.uk/__data/assets/pdf_file/0016/27214/market-study-into-the-supply-of-ticket-vending-machines-and-ticket-gates-statement-of-scope-2018-03-14.pdf

1.11. The CMA has assisted us in undertaking this study, and we have liaised with them throughout.

1.12. Our methodology is summarised in the diagram below.

Figure 1.1: Methodology
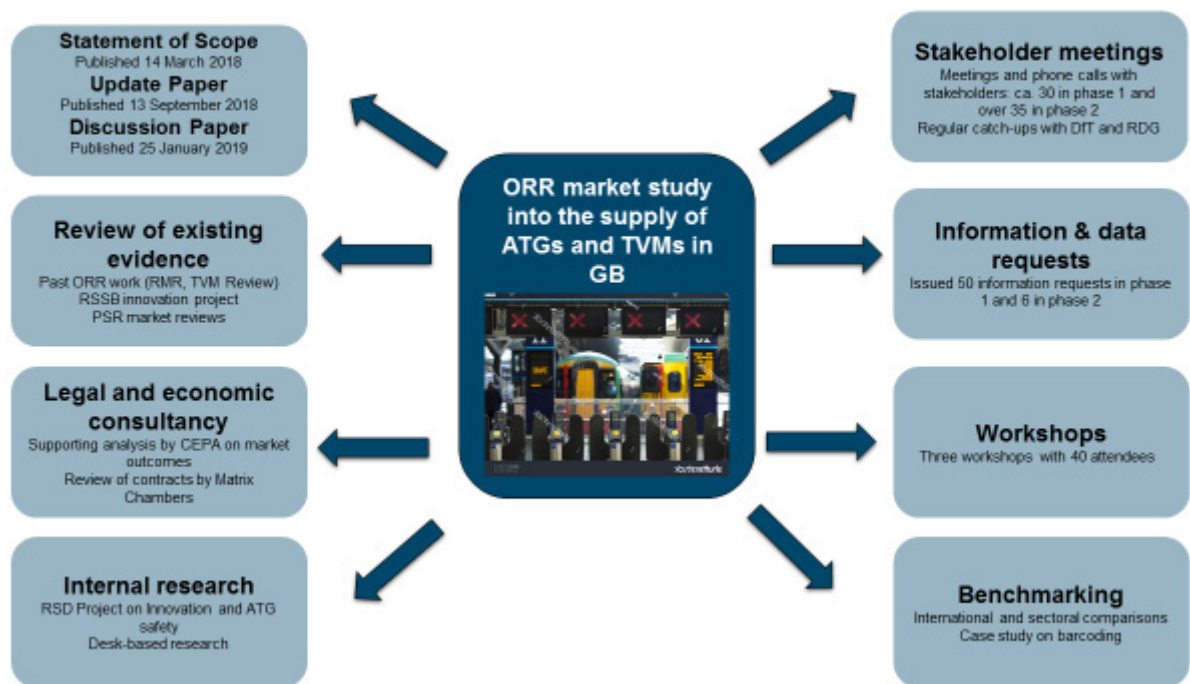
Phase one - investigation

1.13. The first phase of the study, which ran for six months, consisted of an investigation into the markets for the supply of ATGs and TVMs to determine whether competition issues existed, and, if so, to define what the key problems were. During this investigation stage, we also had to decide whether or not to make an MIR to the CMA.

1.14. We consulted a large number of market participants and other interested stakeholders including the DfT, RDG, TPRs, TOCs, metro operators, and current and prospective suppliers of ATGs and TVMs. We also gathered evidence, including

significant volumes of confidential material from a range of sources, in many cases utilising our formal information gathering powers.[14]

1.15. On 13 September 2018, we published an '**update paper**'[15] that set out our preliminary findings on the key issues affecting competition and innovation for the supply of ATGs and TVMs.

1.16. Whilst we identified competition issues in both ATG and TVM markets (see chapters 3 and 4), and that there was a case for us to intervene, we considered that the most proportionate, effective and timely course of action was to work with industry participants to identify solutions to these issues, rather than make an MIR to the CMA.[16] We consulted on this decision in our update paper. We received written submissions from over 20 stakeholders regarding our analysis and recommendations. Overall stakeholders were supportive of our decision and initial thoughts on remedies – we received no responses suggesting that an MIR should have been made.

Phase two - remedies

1.17. In the second phase of the market study, we worked with stakeholders to develop a range of possible remedies to address the competition issues we had identified. We held two workshops, had a number of meetings with key stakeholders including the DfT, RDG, and TfL, and, sent information requests to a select group of stakeholders which focused on costs, impact and timings to allow us to reach a view on the most proportionate and effective remedies.

1.18. On 25 January 2019, we published a 'discussion paper'[17] in which we invited comments from across industry on our emerging recommendations. We received 11 responses. Overall respondents were supportive and in many cases willing to engage with our recommendations.

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[14] Section 67(2C) of the Railways Act 1993 confers formal investigatory powers on ORR contained in section 174 EA02 in connection with deciding whether to make an MIR under section 131 of EA02

[15] ORR's update paper: http://orr.gov.uk/__data/assets/pdf_file/0006/38985/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-update.pdf. We also published an accompanying statutory notice that stated our decision not to make an MIR to the CMA: https://orr.gov.uk/__data/assets/pdf_file/0005/38984/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-notice.pdf

[16] Market studies have a number of possible outcomes, including declaring a clean bill of health for the market, specifying consumer focused action, making recommendations to business or Government or taking competition enforcement action. A possible outcome of a market study is for ORR to make an MIR to the CMA, where we find reasonable grounds to suspect that any feature, or combination of features, of the market under scrutiny prevents, restricts or distorts competition.

[17] ORR's discussion paper: http://orr.gov.uk/__data/assets/pdf_file/0014/40325/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-january-2019-discussion-paper.pdf

1.19. This is our final report on the market study.[18] It sets out our final findings and our recommendations on how to tackle the market issues we identified.

Structure of document

1.20. The remainder of this paper is structured as follows:

- **Chapter 2:** Overview of products and purchasers.
- **Chapter 3:** Findings on strength of competition and barriers to entry
- **Chapter 4:** Findings on outcomes
- **Chapter 5:** Case for intervention
- **Chapter 6:** Remedies
- **Chapter 7:** Next steps and other work in the sector

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[18] Under section 131B of the Enterprise Act 2002, within 12 months of publishing our market study notice, we are required to publish a report which sets out: (i) our findings in relation to the matters specified in the market study notice, and (ii) the action (if any) that we propose to take in relation to the matter.

2. Overview of the products and purchasers

2.1. In this chapter, we give an overview of the products that are the focus of this study. We explain the importance of where the equipment is located in terms of its functionality. We then outline the purchasers of this equipment, and the different approaches taken by different types of purchaser.

ATGs

2.2. ATGs facilitate an automated ticket validation process. Data stored on tickets allows for the process of electronic verification and facilitates the collection of data on entry and exit, which can be used to monitor trends in station usage. ATGs in stations are only the end of a complex underlying system that facilitates the revenue protection process. The entire system purchased typically consists of:

- the physical gates;
- reader equipment, capable of reading data on a ticket to determine whether it is valid;[19]
- local gate control units – usually a local based PC which can process very straightforward functionality;
- a ticket logic back-office (software); and
- a maintenance package.

2.3. ATGs consist of a set of bi-directional paddles or panels powered by a motor that are programmed to open when sent a signal by the reader that a valid ticket has been presented. As a passenger moves through an ATG, a series of laser sensors track their movement through the gate to ensure it does not close on the passenger, but does close to prevent a second person 'tailgating'.

2.4. ATGs are normally installed in a row referred to as a 'gateline'. Within any gateline there is a combination of gate types including those of 'standard' and 'wide aisle' width. The exact combination of gates depends on the needs of the station and passenger flows. Gatelines have a local control panel for station staff to undertake basic gate functionality.[20]

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[19] Some readers (such as those on TfL's network), are capable of retailing through contactless technology

[20] Local systems typically incorporate an emergency plunger to put all gates into the open position. In some stations, there may also be additional controls in ticket offices or centralised control rooms that have oversight of gatelines. In some instances, for instance in lightly used stations with secondary entrance points, gates have CCTV assistance points linking gates to a main station gateline to allow a member of staff to remotely open a gate.

2.5. All gatelines are linked to back office computer systems that feed data to gate readers to ensure that they correctly process tickets. These systems also collect data on entries and exits. There are separate back office systems for TOC mainline tickets (referred to as the central system), ITSO[21] smart tickets (referred to as HOPs[22]) and the TfL back office. See figure 2.1 below.

2.6. As set out in paragraphs 2.31 to 2.34, below, the type of back office system and its required interconnectivity with other systems depends on the location of the gates.

Figure 2.1: Example of an ATG system including back office
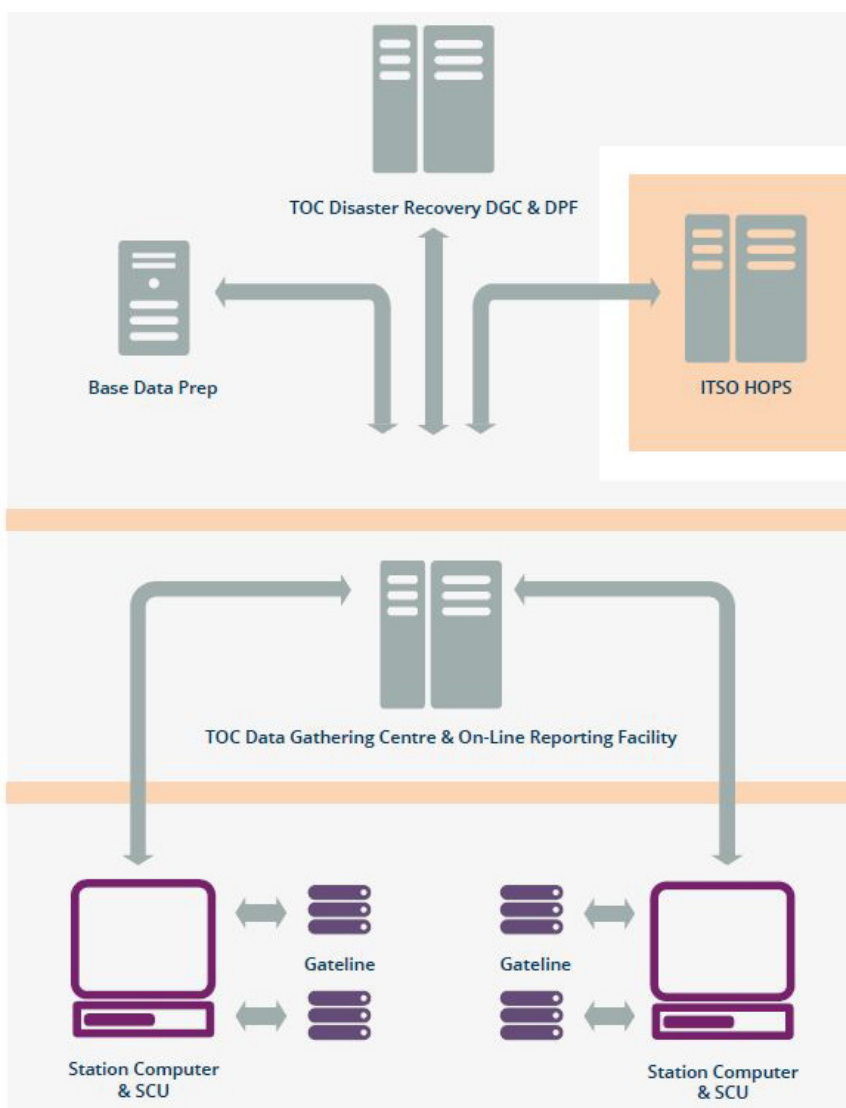
TVMs

2.7. TVMs are a self-service retail channel. They are a means by which TOCs can efficiently and cost effectively distribute tickets to passengers. As with ATGs, the hardware that passengers interact with is only the end of a complex system with a significant software element.

2.8. The hardware element of a TVM typically consists of a durable, high security steel box, with some form of input screen. There are numerous variations in what is present in terms of hardware components. This depends on the overall functionality of the machine, for example, whether it is able to accept coins/vend smart cards/print barcodes etc. There is also significant variation between machines and manufacturers as to what is displayed on graphic user interfaces screens. For example, on more basic 'ticket on demand' machines[23], the input screen can be very simple; its functionality may be limited to the input of purchase details via a code/card before tickets are printed.

2.9. The software element of a TVM is often referred to as a ticket issuing system ("**TIS**"). This is the 'brain' which informs the TVM of the full range of tickets and, if/when tickets are purchased, makes sure the correct ticket is issued in an acceptable format, and, ensures that ticket revenue is allocated to the correct TOC(s). The nature of a TVM's connectivity to a TIS is variable depending on its functionality. For example, a 'ticket on demand' machine would only need to access certain back office data feeds.

Accreditation[24]

2.10. A TVM needs to operate software that accesses data from a number of central systems hosted by RDG which control revenue allocation, reservations, and ensure fares and routes data is correct. This software has to be accredited before it can be used.

2.11. The types of accreditation relevant to TVM software are:

- **RDG accreditation.** This applies to ticket retailers including TVM suppliers, who retail tickets for the mainline network. The purpose is to ensure that the payment settlement process for travel on the mainline network is fulfilled correctly. This process is managed by RDG.

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[23] A TVM which has the sole function of facilitating the pick-up of tickets purchased by another means

[24] Further details on accreditation are set out in Annex B of the update paper: https://orr.gov.uk/__data/assets/pdf_file/0005/38993/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-annex-b-accreditation.pdf

- **ITSO accreditation.** This applies to TVMs retailing tickets in the ITSO environment. The purpose is to ensure smart ticketing equipment and systems meet the ITSO Specification and provide security for ITSO payments and transactions. ITSO oversee this process.

- **Oyster accreditation.** This applies to suppliers using Pearl readers on TVMs to offer Oyster top-up functionality. The purpose is primarily to assure that TVM equipment is connected to the Oyster system in a manner which maintains the integrity of the Oyster system. Oyster accreditation is a TfL requirement and the accreditation process is carried out by TfL's revenue collection supplier.

2.12. The particular type of accreditation depends on the commercial needs and ticket requirements of the TOC customer and, to a certain degree, on the geographic location of the equipment. For example, a TVM selling national rail tickets will require suppliers to comply with RDG accreditation. If the journey goes through London, the supplier might also need to comply with Oyster accreditation.

2.13. Further detail on accreditation is set out in Annex B of the update paper.[25]

Purchasers of ATGs and TVMs

2.14. There are two distinct types of purchasers for ATGs and TVMs: metro operators, and, mainline TOCs. These two types of purchaser take different approaches to procurement such that suppliers perceive these as two distinct routes to market; either serving the total revenue collection needs of metro operators, or providing TVMs or ATGs separately for use by mainline TOCs. Network Rail, notwithstanding that it operates 20 major stations on the GB network, does not purchase ATGs or TVMs.

Metro systems

2.15. For the purposes of this study, we define metro systems as integrated rail transport networks confined to a particular urban locality. There are currently three metro systems in the UK:

- The London Underground - operated by TfL. It has 11 lines covering 402km and serving 270 stations.[26]

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[25] ORR's update paper, Annex B: https://orr.gov.uk/__data/assets/pdf_file/0005/38993/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-annex-b-accreditation.pdf

[26] See: https://tfl.gov.uk/corporate/about-tfl/what-we-do/london-underground. We note that there are other rail transport links in London, for example, the London Overground operated by Arriva Rail London under a concession agreement with TfL, and mainline rail stations operated by TOCs or Network Rail. For the

- Glasgow Subway - operated by SPT. It has 15 stations including three park-and-ride stations.[27]

- The Tyne & Wear Metro - operated by Nexus. It has 60 stations.[28]

Approach to procurement

Single supplier

2.16. Metro operators have developed smart integrated retail/revenue collection systems. All three metro operators expressed a preference for a single supplier, citing various operational advantages and economies of scale.

2.17. TfL has an end-to-end retail contract with a single supplier, with only certain aspects (such as Oyster card production) outside the scope of the contract. Glasgow Subway and Tyne & Wear Metro procured all of their ATGs and TVMs from a single supplier. Each also contracted with their supplier to provide ongoing maintenance and support for the ticketing system, including ATGs and TVMs.

Aggregation and length of contracts

2.18. Metro operators in GB tend to procure ATGs and TVM systems as part of a wider package of retail equipment. Metro operators aggregate the purchase of both ATGs and TVMs and the management of back office systems. TfL describe what they purchase as *"a fully integrated service contract for the supply and management of TfL's ticketing and fare collection system"*.

2.19. Metro systems are typically not, nor required to be, interoperable with the wider rail network, including the mainline. This enables them to integrate a smart ticketing option without dealing with the complexity of integrating with other systems. For example:

- in 2003, TfL introduced smart ticketing in the form of plastic Oyster cards across its network (including rail and other transport options). This involved putting in place new ticket gates, TVMs, and accounting systems and computers across 270 Underground stations.[29]

- in 2012, Tyne & Wear Metro introduced smart ticketing, replacing its entire fleet of ATGs and TVMs.

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purposes of this paper, when we refer to TfL's metro system we are referring to the London Underground run by TfL under the RCC

[27] See http://www.spt.co.uk/subway/

[28] See: https://www.nexus.org.uk/themes/custom/nexus/images/metro-map-large.jpg

[29] NAO successful IT projects: https://orr.app.box.com/file/254979230208

- in 2013, Glasgow Subway implemented its smart ticketing system as part of the Subway Modernisation programme, replacing all ticket gates at its stations.

2.20. Metro contracts for revenue collection services typically have long durations. For example, TfL's current RCC is set to run for 10 years following a recent extension.[30] Tyne & Wear Metro and Glasgow Subway having introduced their integrated ticketing systems in 2012 and 2013, have not since retendered for a new supplier.

TfL

2.21. TfL is a significant player in the ATG and TVM markets, given the scale of its demand for revenue collection services. TfL's most recent RCC was viewed as a major strategic contract with a value of £660m. TfL operates around half the ATGs in GB and also large numbers of TVMs, albeit most of these are not compatible with the mainline. A brief chronology of TfL's procurement activity is as follows:

- **1998** - The first TfL contract to provide its end-to-end retailing solution was signed (the 'Prestige' contract). The contract was awarded to TranSys (a consortium of Cubic, EDS International, International Computers and WS Atkins). This was a 17-year contract. In 2008 TTL gave notice to terminate the contract five years early in 2010;

- **2008** - A bridging contract, the Future Ticketing Agreement (FTA) was signed, providing the contract to Cubic without a competitive tender. This took effect in 2010. It covered the remaining five years intended to be covered by the Prestige contract;

- **2011** - TfL and Cubic agreed that, under the FTA hand back provisions, the supply of smartcards and fixed wide area network services would be handed back to TfL in August 2013. These services are now being provided by specialist suppliers under separate contracts; and

- **2014/15** - The current contract (the RCC) was tendered competitively and awarded to Cubic in August 2015. It has a duration of 7 years with an option to extend (which was taken in September 2017) for a further 3 years.

Mainline

2.22. TOCs operate trains on the mainline network. The majority of TOCs provide their services under a franchise agreement with the DfT. Some TOCs provide passenger transport services on a commercial 'open access' basis – although these businesses do not purchase ATGs or TVMs.

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[30] http://content.tfl.gov.uk/20170927-finance-committee-item-3-rcc.pdf

Approach to procurement

2.23. Franchise commitments are the main driver for TOCs to procure ATGs and TVMs. TOCs tend to seek to procure early in a franchise term to meet specific franchise agreement commitments. When a TOC wins a franchise, its service offering includes the management of stations within the part of the network covered by the franchise agreement (other than those stations which are operated by Network Rail[31]).

2.24. Commercial procurement of ATGs is driven by a need for revenue protection. Procurement of TVMs is driven by a perception of value in providing a more cost efficient means of distributing tickets; or increasing (or maintaining, in the face of life expired equipment) retail capacity.

Single supplier

2.25. Overall TOCs described to us a slight preference for a single supplier rather than a mix of suppliers. For ATGs, only two TOCs stated that they would prefer to have a mix of ticket gate suppliers whereas seven said they would prefer to have a single supplier. For TVMs, the evidence is mixed. Some TOCs prefer to have a single supplier, whereas others prefer a mix of suppliers.

Aggregation and length of contracts

2.26. Most TOCs told us that, in relation to both ATGs and TVMs, they have a clear preference for a turnkey solution, that is, a supplier who is able to supply both hardware and software elements of a solution.

2.27. In relation to ATGs, we found no examples of separation of hardware from back office software or maintenance. The primary reasons that were cited to us were: greater value or term of the contract which provides the TOC with increased negotiating power; ease of dealing with one supplier when issues arise; and, concerns around undermining warranties.

2.28. A similar picture emerged for TVMs. There is significant integration in the supply of TVM TIS (software) and the physical TVM hardware. Two out of the three main GB TVM suppliers only provide a product which integrates hardware and software such that it must be purchased as a bundle.

2.29. Maintenance packages of both hardware and software are also key elements in the procurement of ATGs or TVMs. In the case of TOCs, these are usually relatively

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[31] List of stations managed by Network Rail: https://www.networkrail.co.uk/communities/passengers/our-stations/

straightforward maintenance packages involving access to a call centre to report incidents which are then resolved within contractually agreed time frames.

2.30. The majority of TOCs have a long-term relationship with their supplier. We saw examples of 10-year relationships with TVM suppliers, and up to 20-year relationships with ATG suppliers.

Role of group level procurement

2.31. The majority of TOCs purchase ATGs and TVMs at a TOC, rather than group level, despite most TOCs being part of larger company groups. We were told that the main reason for TOC level procurement is that the needs of TOCs differ, and therefore, local knowledge is required for procurement. However, there are a number of exceptions and we understand that some TOCs are starting to think about whether there are benefits in procuring at group level or consolidating procurement and would consider aggregating purchases in the future.

Importance of interconnectivity

2.32. TOCs have obligations to be interoperable with the rest of the mainline rail network so that customers can travel on an integrated network.[32] While TfL's metro system is not under an obligation to be interoperable with the mainline, where TOCs operate stations in London, they need to be able to offer interconnectivity with the London network. 70% of journeys start or finish in London, and 10 out of 16 national rail franchises include a London terminus. They therefore have a commercial imperative to be able to connect to TfL's back office systems.

2.33. As illustrated by Figure 2.2, below, depending on the geographical location of an ATG and the needs of the customer, it may need to be connected to: TOC central system(s) for mainline ticket data; the ITSO central system for smart ticket data on the mainline network; and the TfL central system for Oyster ticket data:

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[32] TOCs are obliged, under the Ticketing and Settlement Agreement (https://www.raildeliverygroup.com/files/Publications/services/rsp/TSA_V10.1_Main_Agreement_Volume_1. pdf) to offer inter-available fares (this enables passengers to use the same ticket for different TOCs, flows and terminals) and through tickets (this enables passengers to travel across the network using only one ticket) for mainline tickets.

Figure 2.2: ticketing systems on the mainline network
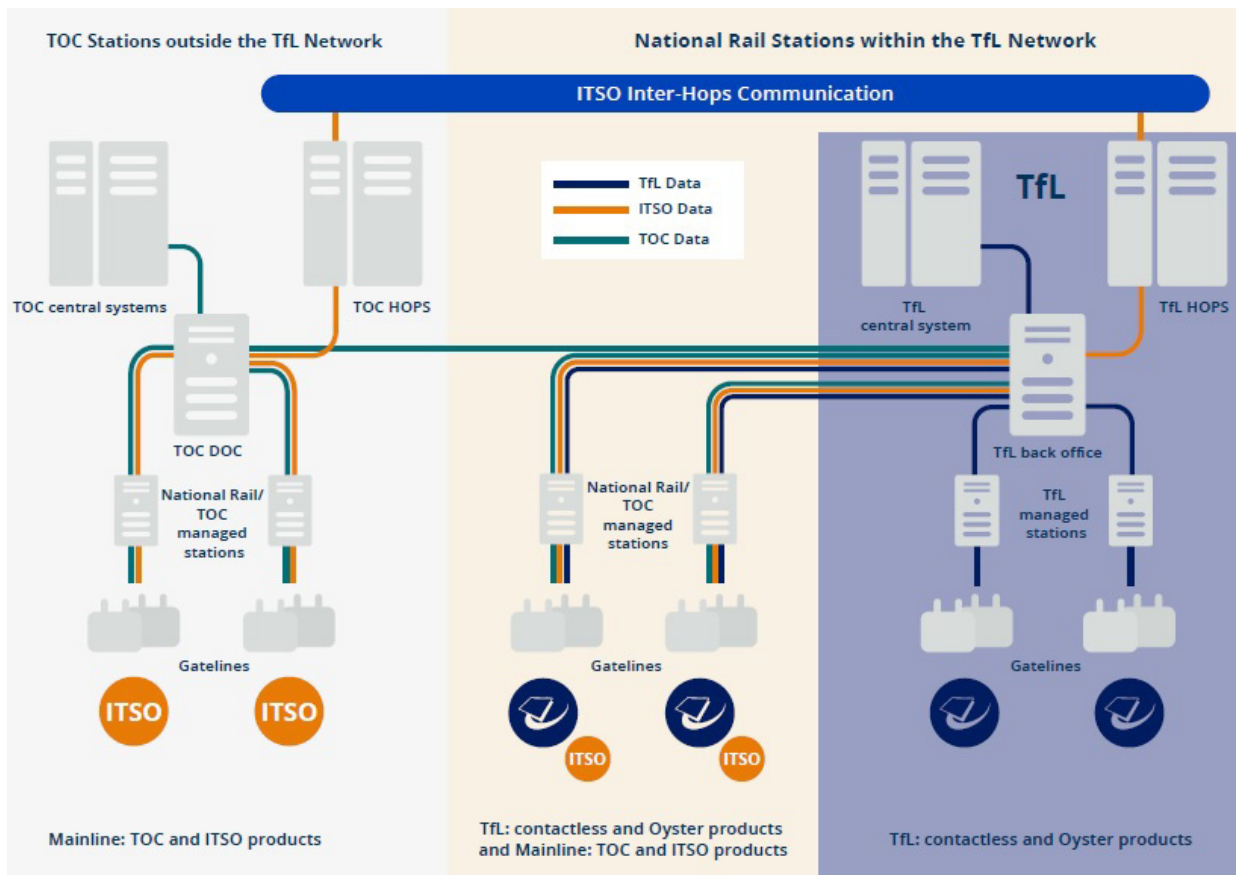
2.34. Similar interoperability issues apply to TVMs. Metro operators typically only need to retail tickets for their own 'closed' networks. TOCs, however, who wish to retail mainline tickets and onward journeys/journeys that connect through London, have a commercial imperative to also be able to sell tickets for journeys which traverse the TfL network.

2.35. In order to achieve this, TVMs both in terms of hardware and software, need to incorporate the functionality to retail TfL products.

3. Findings on strength of competition and barriers to entry

3.1. As there are two distinct types of purchasers for ATGs and TVMs, and suppliers perceive these as two distinct routes to market, the competitive conditions for serving the demand of metro operators and TOCs are different.

3.2. We have reflected the two distinct routes to market in our approach to analysing these markets. Whilst there are some similarities between the respective sources of demand, where appropriate, we have undertaken competition analysis separately for the following '**market segments**':

    A. ATGs and TVMs – metro demand

    B. ATGs – mainline TOC demand

    C. TVMs – mainline TOC demand

3.3. In this chapter, we set out our findings on how competition works, both historically and currently, in each of the three market segments. We set out the level of concentration in the market and the strength of competition. We go on to explain the barriers to entry that operate in the market and outline the key issues preventing or restricting innovation in the market.

Concentration and strength of competition

3.4. The active suppliers for ATGs in GB are:

- Cubic, owned by a listed US corporation which is a global provider of systems and services in transportation and defence markets; and

- S&B, owned by a German company which is active across a range of European markets, including rail, petrol stations, car parks, and leisure centres.

3.5. There are ATG suppliers active in the rail sector in other countries, including: Thales, Gunnebo and Conduent.[33]

3.6. For TVMs, the suppliers currently active in GB are:

- S&B;

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[33] We note there are gate manufacturers in other sectors, such as sports stadia and offices, those these are of less relevance to our competition assessment, in our view, given the unique demands and complexities of the rail sector

- Worldline, a firm owned by the French technology company ATOS;

- Parkeon (Flowbird), a French company that specialises in payment and ticketing systems, principally for car parks and public transport systems;

- Sigma, a recent entrant to the market; and

- Cubic. However, Cubic only supplies TVMs to TfL. It does not currently supply TVMs to the mainline railway.

3.7. In GB, ATGs and TVMs are procured through structured tender competitions. Consideration of these tender exercises is key to understanding how competition currently works.[34]

A. Metro systems

3.8. All three of GB's metro operators use a single supplier for all of their revenue protection services, namely Cubic in the case of TfL, and S&B in the case of the Glasgow Subway and Tyne & Wear Metro.

3.9. We reviewed recent procurement evidence for all of these services, which showed in all cases that the metro operators have been successful in attracting multiple bidders to supply them.

3.10. To date, TfL's demand has been almost entirely served by Cubic, notwithstanding ongoing efforts by TfL to ensure that Cubic faces competition when it undertakes large procurement exercises. Other metro services, which are smaller in scale, have demonstrated that there is some competition for wider metro demand through their selection of an alternative supplier of bundled ATG, TVM, and other revenue management services.

B. ATGs: Mainline TOCs

3.11. Concentration data, intelligence from recent procurements, and stakeholder feedback suggest that one supplier, Cubic, has a very strong position in the mainline ATG market both historically and in recent competitions. Other companies are active in competing for tenders, but have rarely been successful.

3.12. The following table sets out the share of ATGs on the basis of the number of installed units:

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[34] Where competition takes place 'for the market', static information on current volumes of business (for example in this case the number of units currently installed by each of GB's current suppliers) only provides part of the picture. Winners of major contracts could potentially have high shares of the total base without this necessarily providing an accurate reflection of the level of competition, since it may be the case that competition at the time of bidding was strong. For example, see: https://www.dotecon.com/assets/images/biddingmarkets.pdf

Figure 3.1 – Mainline ATG shares, based on fleet as of January 2018

Operator	Cubic	S&B
National rail	94%	6%

3.13. These figures show a high degree of concentration, with Cubic a near-monopolist for the supply of ATGs in GB.

3.14. We obtained data on 12 separate ATG procurements by mainline TOCs made since January 2015. This showed that, within our sample:

■ there were usually multiple bidders; but

■ Cubic was the winning bidder in every instance.

3.15. None of these procurements involved ATGs within the TfL network. Where available, evidence showed that contracts were awarded based on an assessment of both bid quality and price.

3.16. All stakeholders who expressed clear views tended to characterise the supply of ATGs as a "monopoly" or "near-monopoly". For example, one stakeholder told us that: *"…There is currently only limited competition for gateline procurement, … only Cubic can tender for the provision of or replacement of gatelines at a station which requires Oyster validation… the lack of competition in the ATG market in particular is of some concern…"*. Another purchaser stated: *"…There is currently no serious competition for gateline procurement…"*

C. TVMs Mainline TOCs

3.17. The following table sets out the market shares of TVMs on the basis of the number of installed units

Figure 3.2 – Mainline TVM shares, based on fleet as of January 2018

Operator	S&B	Worldine	Parkeon
National rail	69%	15%	16%

3.18. The figure in figure 3.2 above, shows that S&B has a high share of the supply of TVMs for the GB mainline. Parkeon is a relatively new player, having entered the GB market after 2009, and has become relatively well established in the time since. One stakeholder told us that Parkeon "*…shook up the market by introducing more TVM options."*

3.19. We note that since these figures were obtained, a new entrant Sigma has entered the market, by obtaining a major TOC contract, making it the fourth largest player in GB.

3.20. We reviewed data for 13 TVM procurement exercises conducted by mainline TOCs since January 2015. This data showed that S&B was successful in fewer than half of these competitions, consistent with a downward trend in its overall market share. Taken at face value, this suggests that market share estimates for S&B, such as those summarised in figure 3.2 above, may tend to overstate the strength of its position in the market.

3.21. We asked all stakeholders for their views on the level of competition. The picture for TVMs was more positive than for ATGs. Before Sigma entered, most respondents identified three main competitors (with Cubic a possible fourth) in the market without identifying S&B (or anyone else) as holding a particular advantage within this group for the supply of TVMs on a standalone basis. For instance, one TOC stated *"…The key suppliers are Scheidt and Bachmann, Parkeon and Worldline. There appears to be equal competition between these suppliers with numbers of TVMs supplied varying as new contracts are won and lost…".*

3.22. Overall, the evidence for TVMs points towards a moderate level of current competition. Although there are relatively few suppliers in the GB market and one of these suppliers, S&B, has a persistently high share of installed machines, there does appear to be reasonably strong competition for tenders, which in recent years have been awarded to multiple players. Customer perceptions are of a reasonably competitive marketplace.

Barriers to entry and expansion

3.23. Barriers to entry and expansion are a way of describing the challenges faced by new companies entering the market or existing companies expanding their share of the market.

A. Metro systems

3.24. There is some common ground in the barriers to entry that affect metro and mainline systems. Notably, market size is a key issue for the mainline and is also relevant to, in particular, the smaller Glasgow Subway and Tyne & Wear Metro systems, which each operate a relatively small number of devices.[35]

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[35] Glasgow Subway has 83 ATGs and 35 TVMs, and Tyne & Wear Metro has 86 ATGs and 60 TVMs

3.25. However, metro systems appear to be largely unaffected by some of the other key barriers to entry that, as explained later in this report, characterise the mainline network. As outlined above, ATGs and TVMs on metro systems are not subject to requirements to be interoperable with other parts of the rail network. This enables them to purchase equipment that only needs to facilitate their own smart ticketing solutions. Would-be suppliers to metro systems are, therefore, largely insulated from issues relating to both interoperability, and, RDG accreditation. The key issues we identified that do affect this market segment are set out below.

Contract aggregation

3.26. The current GB metro operators integrate the supply of their ATGs and TVMs, together with the running of their end-to-end retail back office systems, including sourcing ongoing maintenance from the same supplier.

3.27. The use of a single supplier under an aggregated contract can provide efficiency benefits. For example, economies of scale provides greater negotiating power, ease of developing and monitoring a relationship, and allows for a single point of contact for dealing with issues. We also note that there is a balance to be struck between generating sufficiently frequent and manageable opportunities for suppliers to compete, and, creating a procurement large enough (in size or duration) to attract interest and investment, and generate competition.

3.28. Contract aggregation can however, have a potentially adverse effect on competition in the wider supply chain. For example, it can prevent smaller or specialist suppliers from bidding for the contract thereby limiting the number of suppliers that are able to bid for the tender and thus enter the wider market to compete for other demand.[36]

TfL

3.29. When TfL scoped its current contract, the RCC, it identified seven categories of service covered by the RCC. It removed two of these from the scope of the RCC (Wide Area Network and smart card supply)[37] with a view to disaggregate the contract where possible. However, they retained core services all within the RCC. TfL told us that, whilst a greater degree of separation would be technically possible, its view is that an 'all in one' approach optimises value for money and is overall the best

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[36]   OFT report, public sector procurement on competition: http://webarchive.nationalarchives.gov.uk/20140402182823/http://www.oft.gov.uk/shared_oft/reports/comp_policy/oft742a.pdf

[37] TfL Projects and Planning Panel paper: Procurement of the Revenue Collection System and Services, dated 26 February 2014: http://content.tfl.gov.uk/ppp-20140226-item05-electra.pdf

solution to meet its need to supply a seamless integrated retail offering to its passengers.

3.30. TfL had received only one final bid for its previous retail contract (the Prestige Contract). TfL knew that few suppliers would be able to feasibly or successfully bid for the tender.[38]

3.31. We recognise that TfL took steps to stimulate competition in its most recent RCC, intensively engaging the supply chain. Six expressions of interest were received for the RCC. Of the three parties who ultimately pre-qualified to the ITT stage, two entered final bids.

3.32. Another risk of aggregation and long term sourcing from a single supplier is that the customer becomes tied or reliant on that supplier. TfL recognised this and has taken steps to reduce ties to Cubic, notably by securing intellectual property rights to its back office systems.

3.33. A related issue raised by stakeholders, is the incentive to award ancillary deals to the current supplier. An example of this is TfL's decision to purchase Crossrail TVMs through a variation order in the RCC rather than through open competition.[39] One alternative TVM supplier was particularly unhappy that it was not able to bid for the 200 Crossrail TVMs, highlighting that TfL's decision further limited opportunities to compete in an already limited market. However, we understand that TfL considered this to be the quickest, most affordable and least risky solution.

Contract duration

3.34. Opportunities to tender for metro ticketing systems are limited. In the past 20 years there have only been two opportunities for new suppliers to compete for TfL's revenue collection demand. When asked about the duration of the RCC, TfL explained that it was standard to have a 7-year contract as it takes two years to run the procurement process and two years to transition the vendor. TfL therefore needs to allow time to "bed in" a new provider.

3.35. The Tyne & Wear Metro and Glasgow Subway introduced their integrated ticketing system in 2012 and 2013; they have not changed supplier as of the date of this report.

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[38] TfL Projects and Planning Panel paper: Procurement of the Revenue Collection System and Services, dated 26 February 2014: http://content.tfl.gov.uk/ppp-20140226-item05-electra.pdf

[39] TfL Projects and Planning Panel paper: Procurement of the Revenue Collection System and Services, dated 26 February 2014: http://content.tfl.gov.uk/ppp-20140226-item05-electra.pdf

3.36. Long term contracts self-evidently limit the number of opportunities for new suppliers to enter the market. During our market study, one would-be supplier specifically described to us the way in which it is been deterred from attempting to enter the London market by a lack of public procurement opportunities.

B. ATGs Mainline TOCs

3.37. Key barriers identified in this market segment are set out below.

Demand

3.38. Most stakeholders told us that the limited size of GB markets for ATGs acts as a barrier to entry in GB markets. In respect of gates, there are three sources of demand:

- gating previously ungated stations. Whilst most stations in GB remain ungated, these tend on average to have lower passenger counts than those that are currently gated. This is significant for the following reasons:

    - From a TOC perspective, the revenue protection business case for installing ATGs in a small station can often be weak; and

    - From a supplier perspective, the relatively small number of gates that would require installation at these stations makes them unattractive as a business proposition.

- replacing life expired gates. We have found that ATGs, if well maintained, can remain in service for more than 20 years. This means that there are limited opportunities for new suppliers. However, we have evidence that TOCs do replace gates.

- adding additional gates to stations already gated. We have found that there can be a business case for additional ATGs at an already gated station, for example, to deal with increased crowds or a new station design.

3.39. Set against these factors, we take the view that there is considerable scope for the development and introduction of new technology to replace existing infrastructure entirely. Key potential examples of this include 'gateless gatelines', gates using near-field communication technology, and gates using biometric ticketing. In each of these cases, should a product be successfully developed and deployed, passenger flow rates could be markedly increased with corresponding significant economic benefits.

Fragmentation

3.40. Most opportunities that arise to tender for the supply of ATGs to TOCs are linked to the franchise system, with any residual demand sourced sporadically and at short notice. As a consequence, new sales opportunities typically arise at the point of a new franchise bid process; this is linked to the franchise calendar. One stakeholder argued to us that changes to the franchise programme further reduced the number of opportunities, creating a 'start/stop' environment.

3.41. The most recent 12 contracts for gates varied in size (between less than 10 and over 400 gates). The value of these contracts correspondingly varied from less than £250,000 to over £9.5 million. This fragmentation, when combined with a lack of sufficient lead in times for suppliers, means that alternative suppliers are dis-incentivised from investing in developing a product compatible with the GB network and capable of competing with the incumbent supplier.

3.42. A potential supplier of ATGs told us that *"Demand for new TOC ATGs is sporadic and difficult to predict. They often are included in a TOC's franchise bid and the quantity/location will differ between different bidding TOCs. So, in these circumstances it is not clear what the demand will be until the successful TOC has been selected."*

3.43. Stakeholders told us that it is difficult to invest in developing new products without guaranteed orders or an understanding of the future demand. Stakeholders also firmly suggested that the lack of a centralised or coordinated strategy on ATGs and their role in ticketing significantly reduced incentives to invest in innovation or new product development for use on the mainline.

Aggregation

3.44. The majority of TOCs aggregate the purchase of hardware and software. This approach has the potential to close the markets and prevents smaller specialist providers i.e. those wishing to supply hardware or software only, from entering the UK market/ providing a competitive constraint on incumbents.

3.45. Similar to the issues with metro systems, an aggregated approach has the potential to tie in TOCs to a particular supplier, particularly if the IP for the back office is licensed rather than purchased, which we understand that the majority of TOCs do not do.

Access to the TfL network

3.46. As noted above, TfL's procurement decisions are able to influence the wider mainline market. This is because of London's significance to the remainder of the network.

3.47. TOCs whose networks include a London terminus require at least some of their ATGs to be compatible with the TfL network. TOCs with stations within the TfL network described such compatibility as *"an absolute requirement"* or *"essential"*.

3.48. Cubic is currently the only supplier that is able to supply ATGs which link up to the TfL network. TOCs told us that this means they have *"no option"* but to purchase Cubic ATGs, and one told us that its contractual requirements with TfL mandate them to purchase from Cubic. Given the strong preference of TOCs to have a single supplier of ATGs, the need to be interoperable with London has the potential to affect competition for the whole of a TOC's demand.

3.49. Suppliers told us that whilst a 'Pearl reader' is available for TVMs, Pearl readers (or an equivalent product) are not available for ATGs. One supplier said that an equivalent reader available for ticket gates would create a more level playing field.

3.50. Notwithstanding the above, we did not find any evidence of an active 'refusal to supply' access to the TfL network for ATGs. It appeared to be the case that whilst potential new entrants view compatibility to be a key barrier to entry, no alternative ATG supplier (or TOC wishing to utilise one) has pressed the case for access to TfL systems, perhaps due to the aforementioned lack of incentives to enter the market.

C. TVMs mainline TOCs

3.51. Barriers to entry in this market segment are set out below.

Demand

3.52. Stakeholders told us that the monetary value of the GB market for TVMs acts as a barrier to entry.

3.53. We obtained conflicting evidence regarding the future of TVMs. A number of stakeholders told us that the future of ticketing is in mobile solutions, obviating the need for TVMs. However, others saw a continuing need for TVMs, if not in their current form, then as part of a more interactive 'self-service retailing' solution.

Aggregation

3.54. Similar to ATGs, TOCs aggregate the purchase of TVM hardware with back office software and maintenance resulting in the same risks as outlined for ATGs above. This was recognised by suppliers specialising in TIS software.

3.55. We understand however, that some owning groups of TOCs are now vertically separating the procurement of back office software and hardware. This is to enable

them to integrate various downstream sales channels (e.g. website, ticket office, mobile and TVMs), with one software solution.

Access to the TfL network

3.56. TOCs connecting to London have a commercial imperative to secure compatibility with TfL's Network for TVMs. This issue is mitigated through the availability of the Pearl reader for use on third party TVMs. TOCs who want a TVM which sells Oyster products can therefore purchase a TVM from any supplier, which incorporates a Pearl reader from TfL, supplied by Cubic. Notably Cubic are not present in the market for the supply of TVMs to the mainline rail network.

3.57. The functionality of Pearl readers is, however, limited to the ability to top up an Oyster card. They lack the full functionality of TfL TVMs, e.g. to be able to issue refunds, accept payments, and view journey history.

3.58. Stakeholders have told us, that there are some issues with the supply of Pearl readers. The process for obtaining a reader is complex, involving TfL, Cubic, the TOC and the TVM supplier. The TVM supplier will also need to go through Oyster accreditation, which some stakeholders have described as expensive. We have also been informed of issues with delivery, for example, one stakeholder pointed to a 9-month wait for Pearl readers to be delivered.

3.59. In contrast, TfL highlighted extensive efforts on their part to facilitate, manage and rectify solutions to the Pearl reader system (which they gain little direct benefit from).

RDG accreditation[40]

3.60. RDG accreditation fulfils an important purpose within the industry. It ensures that: when a ticket is sold, the revenue collected is distributed to the correct TOC; tickets are sold accurately (for the right price, time etc.); and, the integrity of the back office data feeds supplied by RDG are protected. Further information on RDG accreditation is set out in the update paper.[41]

3.61. Stakeholders highlighted the importance of these objectives, noting the reputational and financial risks to industry should there be a significant error in retail systems due to inadequate superintendence of retailers.

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[40] While this market study focuses on TVMs only, we note that any intervention to address this barrier to entry would have wider impacts on all sales channels that TIS are used for e.g. web, ticket office, handheld devices etc.

[41] ORR's update paper, Annex B: https://orr.gov.uk/__data/assets/pdf_file/0005/38993/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-annex-b-accreditation.pdf

3.62. Set against this however, is the need for the process not to be overly complex and burdensome so as to disproportionately discourage new entry. Equally, requirements and standards should not be so prescriptive so as to prevent new or innovative approaches to retail.

3.63. Stakeholders identified the following issues:

- **The scope of RDG accreditation is too broad and extends beyond the ticketing and settlement purpose.** At a workshop on accreditation[42], the majority (9 of 15) of the stakeholders said that scope of RDG accreditation is not clear. There is some concern that RDG accreditation objectives, and associated standards, cover a wide range of areas that, in some cases, stray well outside of the core needs to protect ticketing and settlement processes and into the retailer's user interface design.

- **RDG accreditation standards are not clear.** 8 out of 15 stakeholders said that rules and standards regarding accreditation are not clear, inconsistent and generally difficult to understand by suppliers. One stakeholder told us: "*For new entrants, in particular, navigating around is not easy and would likely need to be guided by experienced users.*"

- **Standards change too frequently.** There are currently 61 standards and since 2014 they have been revised around 250 times.[43] Suppliers have to be re-accredited to check compliance with the standards within a certain time period. One stakeholder said: "*RDG have produced reams of standards […]. These standards are tweaked and updated frequently, requiring further tests and changes from suppliers/retailers*".

- **Full accreditation every three years is unnecessary.** An accreditation certificate is valid for three years, at the end of which the full accreditation process has to be repeated. Stakeholders thought this was unnecessary, particularly as changes to the product are required to be re-accredited (referred to as interim accreditation).

- **The process of standards setting and governance is not clear.** The majority of workshop attendees agreed that it is not clear who is responsible for setting the standards, what the approach is, and the underlying process. In addition, suppliers are not given sufficient opportunity to input into standards setting. Stakeholders noted that they were not 'at the table' when standards were being developed.

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[42] Held at ORR offices on 8 June 2018 attended by key stakeholders

[43] For example, standard "RSPS3018: Ticketing Specification - CCST X", which ensures print formats to be used by TIS when operating with **C**redit **C**ard **S**ized **T**icket stock, has been revised five times since its introduction in 2013

- **RDG accreditation process is not agile enough to support the introduction of new products.** Suppliers are required to re-accredit their TIS each time they make a small change. TIS suppliers told us that this was appropriate when companies tended to operate using large, infrequent, software releases. However, companies are now increasingly 'agile', often favouring multiple small releases that, they believe, do not always merit full accreditation.

- **Suppliers were concerned that the RDG accreditation process is often too lengthy.** Stakeholders have raised concerns about the length of time it takes to be fully accredited, which can vary from 2-3 months to two years. Similarly, time taken to complete an interim accreditation varies across companies depending on the scope of the changes: from a few days up to 11 weeks.[44]

3.64. We compared the RDG accreditation procedures with other similar accreditation processes, including Oyster accreditation, and the financial payments industry, given the similar purposes and objectives of these respective processes. We found examples of potentially more efficient processes, for example, a narrower scope of accreditation focused on technical aspects and involving all affected stakeholders in the development of standards (therefore reducing the number of times standards are amended).

3.65. Stakeholders argued that the accreditation regime in other European countries is less complex and costly than in GB. This in part reflects the, typically, lower complexity in these countries (resulting from, amongst other things, a typically smaller number of train companies per country). In addition, train companies in Europe have developed their own TIS system to which other retailers have connected via an application programming interface (commonly referred to as an API).

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[44] We also looked into issues with slots booking, and potential discrimination i.e. whether some retailers were better able to secure time with RDG staff than others, however, our emerging analysis does not show significant concerns.

4. Findings on market outcomes

4.1. Evidence on outcomes is key to understanding the extent to which our findings on the strength of competition matter in terms of their implications for passengers and taxpayers. This includes determining whether prices are too high and the levels of service quality and innovation.

4.2. Unless otherwise specified, we primarily set out evidence on metro and mainline markets in aggregate. This approach reflects:

- Similarities in the identities of the suppliers for each market segment;

- Limitations to data availability, whereby some information that we obtained from stakeholders, notably on the financial performance of suppliers, was not available for either metro or mainline market segment on a standalone basis; and

- The need to maintain confidentiality when summarising stakeholder responses.

ATGs

Price

4.3. The balance of responses regarding the price of ATGs in GB was negative, in that customers did not appear convinced that they had been able to obtain a good deal on price. One told us that, *"… there are only a few manufacturers to choose from… [f]or ticket gates…. Cubic and S&B…. in [their] experience both are very expensive."*

4.4. Another stakeholder described ATGs as *"eye wateringly expensive*…"; One stakeholder, arguing that the prices of GB ATGs are high, provided us with a comparison between prices it had paid for barcode readers and highlighted that the price of similar equipment in the UK bus industry was around 15-20% of the level prevailing in rail. Without providing specific details, the same stakeholder argued that maintenance was similarly expensive. The stakeholder drew a comparison with the TVM market, suggesting that value for money was better in that sector. They cited the greater number of players, and suggested that Parkeon had 'shaken up' the market by introducing more TVM options.

4.5. A potential new entrant supplied us with information showing us how it prices its ATGs in other jurisdictions, together with anecdotal evidence that, in its view, suggested, on a like for like basis, its prices were significantly lower than those currently charged for ATGs in GB. We were, however, unable to make a direct comparison between this data and the prices currently paid by GB customers, due to a range of differences in the respective product offerings.

4.6. One stakeholder told us that there were significant differences in the prices of the two GB suppliers, with one charging "typically an additional 20-30%", when compared to the other.

4.7. Suppliers of ATGs described their pricing models to us and argued that they sought to ensure value for money for customers, both in GB and across global markets.

Profitability

4.8. Using Bloomberg data sourced by the consulting firm CEPA, we compared data on the profits earned by suppliers in the GB market, over the last 3-4 years, for ATGs with that of other UK companies. We drew one set of comparators from the manufacturing industry.[45] We also considered data on the returns of software companies and of the entire FTSE 350 (non-financial) index. Having taken into account stakeholder feedback and given the lumpy nature of demand in these markets we also made reference to longer term data sets in the form of public company accounts as a means of 'sense checking' our results for the shorter term data set. Given the need to take a proportionate approach to evidence gathering we relied on the companies providing information to arrive at an allocation of common costs and revenues to product groups.[46]

4.9. Having adopted this approach to profitability analysis and, in our view, appropriately adjusted the weight afforded to this class of evidence, overall we found that the evidence on profitability was in our view consistent with the concerns and other evidence supplied by stakeholders, namely, that prices for ATGs in GB are higher than might prevail under effective competition.

4.10. We should be clear, however, that we do not consider the evidence supports any suggestion that the prices charged in the GB ATG market are so high so as to raise a suspicion of illegality under competition law.[47]

Service quality

4.11. We assessed the service quality of ATGs across five metrics: reliability; availability; safety; accessibility; and, innovation.

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[45] Bloomberg - Industrial Machinery Manufacturing (IMM), Electrical Equipment Manufacturing (EEM), and Other Machinery Manufacturing (OMM)

[46] We noted that data was provided in response to a formal information request. We therefore consider, that the companies concerned are sufficiently incentivised to ensure that the data they provided, including on cost allocation, was reasonably accurate. Alternative approaches to cost allocation were subsequently highlighted that would have pointed towards lower profits than assumed in our analysis. However we consider the approach we adopted to be both plausible and reasonable, and, as stated below, was supportive of stakeholder views on high prices

[47] E.g. So as to amount to an abuse of dominance by virtue of excessive pricing

Reliability

4.12. Overall, we found that TOC customer satisfaction with reliability of ATGs was good on a consistent basis, with notable positive feedback attributed to the products supplied by Cubic. One stakeholder told us that: *"Service quality is generally good from Cubic in most cases, they tend to react quickly to most things, though sometimes software issues can take them longer to address. Reliability is good, with them generally meeting their SLA's…"*. Another stakeholder told us that it was: *"… generally satisfied with the value for money obtained from CUBIC ATGs maintenance, reliability, response to service issues and speed of action are acceptable."*

4.13. However, in relation to an alternative ATG supplier one stakeholder stated: *"…Low degree of satisfaction - long delays in rectifying… software faults are common... Strong reliance on one or two technical experts so disruption during periods of leave / sickness. Seemingly low technical knowledge in relation to ITSO smart ticketing."*

Availability

4.14. Data on gate availability appeared to show that purchasers receive a good service from their ATG suppliers. Their service levels appeared to us to be high in absolute terms, and were objectively high when compared to the targets in their contracts.

4.15. We found that TfL often exercises contract penalties, whereas TOCs do not. However, in relation to the TfL contract, we note (and have accounted for) the fact that some service parameters are attributable to wider aspects of revenue collection processes (not specifically gates).

4.16. In terms of negative feedback, one stakeholder raised issues with service delivery in relation to installation, and another raised issues about whether one supplier was sufficiently scaling its operations to meet increasing demand. Issues were also raised about correct attribution for service quality issues.

Safety

4.17. Passenger safety represents a key aspect of service quality. We therefore carried out an analysis of ATG service quality, using RIDDOR[48] data spanning the last three years. We found that ATGs have a good safety record in GB, with an average of one ATG-related incident per year recorded on the RIDDOR database. This figure is low relative to the more than 4 billion per year passenger entries and exits on GB's mainline. It is also low relative to the total number of recorded incidents on RIDDOR

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[48] Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013:
http://orr.gov.uk/rail/health-and-safety/reporting-riddor-incidents

(over 20,000 in 2016/17 alone) per year, representing a negligible proportion (0.004% based on 2016/17 data) of all GB incidents.

Accessibility

4.18. Train and station operators are required by their operating licences, to establish and comply with a disabled people's protection policy ('DPPP'), which must be approved by ORR.[49] A DPPP sets out, amongst other things, the arrangements and assistance that an operator will provide to protect the interests of disabled people using its services and to facilitate such use. ORR experience of, and data on, passenger complaints suggests that the ATGs are not one of the primary concerns facing passengers including those with accessibility needs.

Innovation

4.19. We asked stakeholders for their evidenced views on the level of innovation in the market for ATGs. We received some positive comments but overall stakeholder comments on innovation were negative, such as: *"[i]nnovation has been extremely challenging for both the Cubic and S&B infrastructure. For S&B, we have found that their gates have not been developed to be as flexible as we would expect.*

4.20. The balance of feedback indicated a slow pace of innovation in the market and slow response to attempts to introduce new functionality. TOCs also had concerns that new innovative ideas were not being put forward by suppliers but driven by buyers. For instance one purchaser stated: "*Neither S&B nor Cubic have shown much proactivity to improve ATGs or offer new solutions. Any recent developments, for example Barcodes and eTVD, have been driven by RDG and through encouragement of the Secretary of State*."

TVMs

Price

4.21. We received a mixed response from stakeholders regarding TVM prices. For example:

- One stakeholder told us*: "The cost to purchase TVMs has increased over time and this is primarily due to suppliers adding costs for project management, profiling machines, etc….. The unit costs haven't really increased.";* while

- Another stakeholder stated that its relationship with its TVM supplier had been *"financially advantageous".*

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[49] ORR website, disabled peoples protection policy: http://orr.gov.uk/rail/licensing/licensing-the-railway/disabled-peoples-protection-policy

Profitability

4.22. We carried out a similar exercise to the analysis used for ATGs summarised above in relation to TVM prices. Data supplied to us by market participants did not appear to show profits that were unusually high (or low) by comparator standards. This profitability analysis of TVM manufacturers, (like the stakeholder feedback), was indicative of a market where prices were neither particularly high nor low against comparable 'competitive' markets.

Service quality

4.23. We assessed service quality of TVMs across five metrics: reliability; availability; safety; accessibility; and, innovation.

4.24. Views on the service quality offered by TVMs were, overall, suggestive to us of reasonably widespread concerns, albeit not without a degree of positive feedback. We received 11 clear responses regarding TVM service quality. Of these, 3 were overall positive, with the remaining 8 being overall negative. We observed a marked tendency for customers of one supplier to provide more negative responses than customers of the other manufacturers.

Reliability

4.25. One stakeholder referred to long lead times for new orders. Another stakeholder told us that its past experience with its supplier was *"poor"* regarding the provision of maintenance. Another stakeholder expressed fairly strong dissatisfaction with TVMs, describing a recent *"nightmare"* with its supplier. The stakeholder outlined issues with, in its view, the supplier failing to meet its SLA within the past two years, and described ways in which it thought TVM technology could be readily improved, including better information screens which provide more clarity around ticket restrictions.

4.26. However, one stakeholder told us that its supplier *"…has a great reputation"*.

Availability

4.27. We gathered quantitative information on TVM availability. Manufacturers' performance against contractually agreed availability targets was mixed for the sample of contracts we looked at between January 2015 and March 2018. Overall, suppliers met or exceeded targets on 20 out of 27 (74%) contracts. The largest discrepancy between agreed target and out-turn performance was 1.6 percentage points.

4.28. Quantitative evidence on TVM service quality showed that between January 2015 and March 2018, availability was below agreed levels on some 26% of TVM

contracts. The margin by which suppliers missed their targets was, on average, modest and, in all cases, performance levels did not appear very low in absolute terms.

Accessibility and customer complaints

4.29. During 2017/18, TOCs received 18,334 complaints about TVMs, amounting to 3.2% of all complaints received over this time period. Of the TVM complaints, 22% related to information provision by TOCs, and as such would appear not to relate to the quality of the equipment itself. We are aware of some concerns in the area of TVM accessibility.

Innovation

4.30. On innovation, most stakeholder feedback that we received was negative. Stakeholders said that the incumbent TVM suppliers lack incentive to innovate independently, in part due to the fragmented way in which demand is released to market. The stakeholder also said that issues with the accreditation process create a drag on innovation.

4.31. Despite the above, one supplier did receive positive feedback from purchasers of TVMs due to the development and introduction of a number of new products to market.

Partial contrast for TfL

4.32. A partial distinction can be drawn to outcomes achieved by TfL in contrast to the rest of the market in relation to both ATGs and TVMs.[50]

4.33. The clear view of TfL was that, notwithstanding issues in generating competition for its RCC, it considered it had obtained a strong deal for ATGs and TVMs as part of its wider revenue collection service demand. Indeed, we observe that TfL has obtained favourable terms in terms of securing rights to its back office intellectual property; putting in place a mechanism for price and profit transparency; and implementing a firm performance monitoring regime. Evidence also indicates that TfL may have secured better outcomes than mainline TOCs, including in relation to price.

4.34. We also note a general perception that TfL's revenue protection system is highly regarded internationally, and has been used as a vehicle to implement its innovative integrated smart ticketing solutions. This was firstly through the introduction of Oyster, and, more recently, the introduction of payment through contactless cards.

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[50] To be clear, these distinctions apply to TfL only, not other metro operators

4.35. We note that TfL may be able to exercise buyer power in relation to securing its revenue collection demand, due to economies of scale.

5. Case for intervention

5.1. This chapter sets out why, in light of our findings, set out above, we consider there is a case for ORR to take action to address issues we identified in these markets.

5.2. In summary, our view is that the markets for the supply of ATGs and TVMs are not functioning as well as they could be if barriers to entry were lower and competition between suppliers was stronger.

Market Size

5.3. Taking ATGs and TVMs together, there are currently around 10,000 installed units in GB. Demand for equipment is not consistent and is "lumpy". In some years, there is significant installation and investment, with very little in other years. As such, whilst calculating market size for this equipment is not straightforward, we consider we can reasonably estimate that the annualised value of the markets for the supply of ATGs and TVMs is £50-£100 million per year.

ATG market

5.4. The evidence suggests that one supplier, Cubic, has a near monopoly both in relation to metro system[51] and mainline demand.

5.5. There are barriers that deter new entrants to the market. There is significant stakeholder concern about high prices, though in relation to service quality, both stakeholder feedback and analysis of available data suggested positive outcomes. Importantly, the evidence suggested that innovation is primarily driven by purchasers, and industry bodies, rather than being delivered through 'natural' competition in the supply chain.

5.6. We consider that there are two key factors, capable of being addressed by regulatory intervention, which combined create a situation where alternative suppliers are dis-incentivised from investing in developing a product compatible with the GB mainline, capable of competing with the incumbent supplier:

- **The way demand is brought to market**. The fragmentation of tender opportunities exacerbates the fact that the overall potential market is small relative to the investment necessary to develop a product. That said, there is some residual demand for new and replacement ATGs, and, we consider,

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[51] With the key exceptions being the Glasgow subway and Tyne and Wear Metro, although the scale of their demand is insufficient to significantly affect overall market shares of Cubic across GB

potential for the introduction of innovative approaches to revenue protection using new technology; and,

- **Issues with access/interoperability with the TfL network**. There is currently no option for a third party gate supplier to connect to the TfL network. However, we note that no third party supplier has pressed TfL for access to its system in the same way that they have for TVMs. The lack of any mechanism for third parties to supply products which connect to the TfL network has resulted in only one supplier being able to supply ATGs to TOCs who require compatibility with TfL systems. Compounding this problem is the fact that TOCs prefer to 'single source' their entire gate estate. As such if an ATG supplier cannot offer a London compatible product, it is effectively excluded from supplying most, or indeed any of a TOC's demand.

TVM market

5.7. There is evidence of moderate competition and entry including a new player, Sigma, entering the market. Although this market experiences similar barriers to entry to the ATG market, they do not impact on outcomes to the same extent. Notably, access to the TfL network is mitigated by the availability of the Pearl reader.

5.8. The evidence we found on price was mixed, with profitability analysis suggesting that current prices are consistent with a reasonable degree of competition. Service quality metrics in the round produced negative results. Broadly, evidence regarding innovation was negative, although some stakeholders citied new products being brought to market, and alternative means to purchase tickets which could provide an additional competitive constraint and source of product development.

5.9. The scope and process of RDG accreditation was an issue consistently raised by stakeholders. We considered that RDG accreditation processes are not adequately balancing legitimate objectives (such as protecting the integrity of fares data and ensuring correct revenue allocation) with reducing complexity in order to support innovative new entry.

Decision on a reference to the CMA

5.10. On 13 September 2018, notwithstanding the aforementioned issues identified in the markets, we decided not to make an MIR to the CMA. Our full decision not to make an MIR is set out at Chapter 7 of the update paper.[52]

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[52] ORR's update paper: https://orr.gov.uk/__data/assets/pdf_file/0006/38985/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-september-2018-update.pdf. In consulting on this decision, we received no representations suggesting that an MIR should be made

5.11. In short, we took the view that whilst an MIR would undoubtedly further improve the understanding of the operation and issues in these markets, and open the scope for legally enforceable remedies, we did not, on balance consider it to be proportionate to make an MIR. Importantly, given the concerns we identified were primarily on the demand side of the market, we considered the best option for tackling these issues was for ORR to work with industry to develop a package of remedies.

Conclusion

5.12. We consider there to be a particularly strong case for intervention in relation to the market for the supply of ATGs where evidence suggests weak competition and potential for improvement in relation to a number of market outcomes including price and innovation. We are particularly concerned that the market conditions do not facilitate fair and robust rivalry between suppliers. Further, they do not promote natural innovation from the supply chain to allow for the introduction of dynamic new entry.

5.13. We consider the case for intervention in the market for the supply of TVMs to be less clear as the process of rivalry does appear to be driving better outcomes (albeit slowly), though improvements could be made in relation to specific identifiable issues, namely accreditation processes.

6. Remedies

6.1. This chapter sets out the package of recommendations we have chosen to adopt in order to address the key issues we identified through our market study. We start by explaining the objectives and factors we take into account when determining appropriate market remedies, then outline our recommendations and explain why we consider these options are the most appropriate and proportionate course of action.

Objectives of our recommendations

6.2. Our objective was to seek remedies to improve the functioning of the ATG and TVM markets through increasing rivalry, improving value for money, and, importantly, in the long term, increasing the potential for innovation and the introduction of new approaches to retail and revenue protection.

6.3. In pursuing our objective, we were mindful of the entrenched and long-standing nature of the market issues (particularly in relation to ATGs), such that any remedies would be unlikely to be a 'silver bullet' that would immediately bring about full reform. We therefore focused on solutions that would kick-start/catalyse the market by improving incentives for new businesses (currently active in other jurisdictions) to compete for demand in GB and introduce new technology.

6.4. When choosing what remedial actions to take[53], we considered the following factors:

- Our prioritisation criteria[54];

- The most appropriate tool(s) available to us to address a particular issue;

- How the remedy addresses the barriers and the detriment we have identified;

- How effective and proportionate the remedy, or package of remedies, would be;

- How the different remedies are effective as a package of interventions to help make competition work effectively; and

- How the remedy, or package of remedies, supports other ORR work in the ticketing sector.

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[53] As noted above, market studies have a number of possible outcomes, these include: a clean bill of health for the market; consumer focused action; recommendations to business or Government; competition enforcement action; the use of regulatory powers where available; to engage with industry to develop an industry-led solution to an issue; and/or an MIR to the CMA. We decided not to make an MIR to the CMA.

[54] ORR's approach to monitoring and reviewing markets Annex A, paragraphs 1-3: https://orr.gov.uk/__data/assets/pdf_file/0004/22495/orrs-approach-to-monitoring-and-reviewing-markets.pdf

6.5. As we did not make an MIR to the CMA, any market solutions we chose to adopt required support and cooperation from industry to ensure effective implementation. A key factor in considering what our remedial package should be was, therefore, the level of stakeholder support.

Approach

6.6. In order to develop a package of remedies we held a number of industry workshops, convened an internal panel and engaged in bilateral meetings with key stakeholders.

6.7. In particular, we worked with TOCs and RDG to consider how to obtain better outcomes and incentivise potential suppliers to enter the GB ATG market; in doing so we explored possibilities for consolidated buying to reduce fragmentation and better manage the release of demand. We continued to work with RDG specifically on its delivery of commitments to improve its accreditation processes. We also worked with TfL to understand how third parties could feasibly access TfL's systems and improve outcomes for the mainline without exposing TfL to excessive risks or costs.

6.8. In January 2019, we published a discussion paper inviting comments from across industry on our emerging proposed recommendations. We received 11 responses to our discussion paper. Overall respondents were supportive and in many cases willing to engage with our recommendations.

6.9. On the whole, we are encouraged by the level of engagement by industry, the recognition and acceptance of our analysis, and, the desire by market participants to improve competitive conditions in these supply chains. We consider that the package of recommendations we outline below is the most viable, proportionate and effective response to the identified market issues.

Recommendations

6.10. The recommendations below have been developed and refined following engagement with stakeholders through workshops and in response to our discussion paper.

1: Industry working group on ATGs

6.11. We recommend that RDG facilitate an industry working group dedicated to considering issues regarding ATG procurement, interoperability and options for consolidating procurement.

6.12. We consider that the working group will provide a forum for industry parties to come together to set a vision for the network, providing clarity to the supply chain, and

incentivising new suppliers to develop innovative products to enter the market. The working group will also be able to fully consider the value of consolidating demand and explore options to do so.[55]

6.13. The core working group should be made up of representatives from the TOC owning groups and transport networks. It is also key that ORR, RDG, and the DfT and TS are represented at the working group. The working group should also draw on expertise of other stakeholders where required, for example, current and prospective ATG suppliers, Third Party Rail Retailers Association, and ticket retailers. We note that some of the issues discussed may not be relevant to all parties, for example, consolidating procurement is unlikely to be of interest to transport networks such as TfL. Continued ORR participation will be used to ensure the group has clear deliverables to improve market conditions.

6.14. We consider that the participants of the working group are best placed to set formal objectives for the group. However, at a minimum, in order to address the issues identified in our market study, we consider its objectives should include:

- Exploring how to incentivise new entrants to develop innovative products to enter the GB market, and developing new ideas for emerging technology;

- Providing a forum for alternative revenue protection product providers (including ATGs) to engage with the whole industry;

- Exploring options for consolidating procurement. Consolidation, where appropriate, could deliver better outcomes for TOCs; and

- Exploring options for greater levels of interoperability between the mainline and metro systems, including discussion of recommendation 2 (see below).

Stakeholder feedback and risks

6.15. We consulted stakeholders on the question of an appropriate remit for the working group. Stakeholders raised a wide range of issues, including exploring how to incentivise new entrants to enter the GB market, exploring emerging technologies, and how to promote a healthy supply chain. The key issue raised by the majority of stakeholders was interoperability across the whole network. As stated above, we consider the working group is best placed to set its objectives, however, the working group should retain a core focus on the topics we set out at paragraph 6.14 above.

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[55] Our finding was that TfL achieves better outcomes than TOCs on the mainline network. This is in part due to its ability to exercise buyer power and achieve economies of scale. We consider that larger orders with proper lead in times could also provide sufficient incentives for alternative providers to compete in the GB market.

We consider it particularly important that the working group discusses interoperability as this is a key concern for all stakeholders who engaged with our market study.

6.16. Two respondents suggested that the working group also cover issues with TVMs. We consider that there could be instances where the working group considers issues that go wider than ATGs, (for example, when looking at emerging technologies), where it would be useful to discuss wider products including TVMs. However, we consider that this group, at least initially, should principally focus on ATGs in order to maintain its focus on the market where ORR's concerns are most prevalent.

6.17. A risk highlighted by TOCs is that the group could stray into 'anti-competitive' discussions. Two stakeholders considered revenue protection strategy and technology to be a unique selling point for TOCs in franchise bids, and therefore commercially sensitive information. In order to mitigate this risk, we recommend that the working group puts in place a competition compliance policy and RDG ensures all members are aware of what is and is not able to be discussed to prevent commercially sensitive information being shared. The CMA has a range of guidance on its website on how to comply with competition law, including "do's and don'ts" for trade associations.[56]

6.18. Two stakeholders also raised the risk that this working group becomes one of many groups, in an already saturated field, which does not deliver anything of value. We consider that the aforementioned tightly defined success parameters, objectives and a clear delivery plan, together with the continued participation and market monitoring of ORR, should mitigate the risk that the group is not effective. We also consider the objectives and progress of the working group should be reviewed after a year of operation.

Implementation

6.19. RDG has agreed to facilitate the group and has agreed to:

(a)   Host the first meeting by the end of April at which an agenda item will cover the Terms of Reference with Objectives; and

(b)   Commit to holding meetings no less than quarterly.

6.20. Stakeholder engagement in this group is key to its success. TfL, DfT and TS have committed to active participation in the group, as well as a number of TOC owning groups. New entrant gate providers have expressed an interest in playing a role in

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[56] CMA website, competition guidance: https://www.gov.uk/government/collections/competition-and-consumer-law-compliance-guidance-for-businesses

the group. Importantly, all respondents to our discussion paper expressed some level of interest in engaging with the working group.

Costs

6.21. We consider that the costs of implementing this recommendation are low, notably, RDG has told us that is it able to facilitate this working group with its current complement of staff without any material impact on other activities. We therefore consider that the costs are proportionate to address the harm.

2: Improved access to TfL's Network

6.22. We recommend that TfL, industry and alternative ATG suppliers (such as those currently active in other countries) work together to develop both short term and longer term solutions to provide 'interoperable' access to TfL systems for third parties.

6.23. We consider that TfL and industry participants are best placed to work out the detail of how third party suppliers can best interface with the TfL network. However we note, and endorse TfL's suggestion that in the short/medium term this solution could take the form of an 'open interface' yellow reader supplied by TfL which can be deployed on third party equipment, together with the provision of interoperability specifications to ensure functionality and compatibility. This solution is similar to the 'Pearl' reader[57] that is currently available for TVMs, albeit for gates.

6.24. We understand, having held discussions with TfL and Cubic that this solution is technically feasible. It is a standard operating model in a number of other jurisdictions. We also note that:

- TfL already has an interface specification for the reader (its current 'TR3' model) which could be adapted for use by third parties; and

- TfL has already facilitated an arrangement by which third party TVM manufacturers can obtain a license for "Pearl" readers. Something similar could be put in place for TfL ATG readers.

6.25. This solution means that alternative gate suppliers would, for the first time, be able to supply a product that is capable of reading and accepting TfL products. This will benefit TOCs, as it will generate viable alternative technological options to meet their

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[57] Although we highlight that the reader provided for ATGs will have the full range of functionality. Pearl readers functionality is limited to Oyster top ups.

needs, and in the longer term, also TfL as it could increase the pool of suppliers bidding for future revenue collection contracts.

6.26. Whilst alternative suppliers would not, in the short term, be able to supply their own reader capable of processing TfL products, we consider this option will still generate opportunities to supply innovative hardware/alternative revenue protection technologies. Additionally, we consider that increasing the pool of suppliers working with TfL and familiarising themselves with its systems, will improve the levels of experience of other businesses and increase the potential of them working with TfL in the future.

6.27. In the longer term, we understand that TfL is planning to develop a new reader – its 'TR4' model. At present, this reader is in development and there is no fixed timetable to bring it to rail (it will be introduced to buses first). Recognising the opportunity to improve the 'openness' of this market, TfL has agreed that interoperability should be a key design criterion of the new reader's functionality, subject only to the need to ensure retrospective compatibility with existing systems where necessary.

6.28. We consider that greater interoperability could be achieved by taking a modular approach and by ensuring that interoperability considerations are taken into account in future procurement exercises. We also consider that the engagement of the working group outlined in recommendation one, would be of significant benefit in influencing the design of the TR4 reader and developing interoperable systems.

Stakeholder feedback and risks

6.29. A risk raised by stakeholders was the incumbent supplier's role in providing the reader. Cubic may not be incentivised (given its vested interest in supplying its own hardware) to supply the interoperable reader at a reasonable price and on reasonable terms within a commercially acceptable time period. In response to the discussion paper, three stakeholders raised concerns about the supply of the 'Pearl' reader for TVMs, particularly around long delivery times, high costs and maintenance issues (see also paragraphs 3.57 and 3.59 above). We consider that this risk could be mitigated through TfL closely controlling Cubic's conduct and the accreditation process, and through ORR and TfL playing a key role in ensuring that access issues are resolved fairly.

6.30. Four stakeholders suggested that the solution should allow alternative suppliers to access the TfL network using their own readers. TfL and Cubic highlighted a number of risks and challenges with this approach, in particular:

- readers are an integral part of TfL's revenue collection system, and therefore, third party suppliers would have to accept significant liabilities for commercial risk;

- TfL's revenue collection is subject to payment industry accreditation, adding a third party would create significant cost and complexity in the accreditation process; and

- it would add significant complexity to Tfl's revenue collection monitoring.

6.31. Two stakeholders told us that the separation of the gate and reader would enable new innovative multi-functional readers to enter the market, allowing for competition and innovation across a larger proportion of the value chain.

6.32. As noted above, we consider that TfL and industry participants are best placed to work out the detail of how third party suppliers can best interface with the TfL network. Whilst we agree that full access would provide a greater opportunity for alternative suppliers, including reader manufacturers to enter the market, we consider that providing access through TfL's current reader is a good first step towards interoperability. In the longer term, we anticipate the working group outlined in recommendation one will be in place to influence the development of interoperable systems across the whole network.

6.33. Two stakeholders considered that the solution should seek alignment and interoperability across the whole GB network. Interoperability has been a key issue throughout our market study. We consider that exploring options to improve interoperability across the network should be a key objective of the working group outlined in recommendation 1. Additionally, ORR will engage with other metro operators and transport networks to encourage the early consideration of interoperability issues in the development of otherwise 'closed' transport systems.

Implementation

6.34. TfL has agreed to take the following steps towards implementation of this remedy:

- Host a workshop whereby TfL and Cubic will explain the options and technical feasibility of access solutions via a supplied reader. This workshop will be open to TOCs, RDG and potential new gate providers and provide an opportunity to challenge and make suggestions towards scoping of an open interface access solution; and

- Prepare a version of the interoperability specifications required for third party gate providers to build or design equipment that would be compatible with TfL's reader, and share those specifications with such providers subject to recipients showing a serious intent in using the specification and appropriate non-disclosure agreements being agreed.

6.35. We consider these to be important first steps to stimulate interest in the supply chain (and industry) towards developing a cost effective, open interface access solution.

6.36. ORR will continue to be involved to ensure that this remedy is progressed forward to a solution, and to raise awareness of the importance of ensuring that future procurement takes into account supply chain considerations, particularly competition and interoperability

Costs

6.37. The development of a full interoperability solution will require resource and incur cost. However, we consider that the potential benefits for industry by way of improved competition and innovation clearly outweigh that cost.

6.38. We consider that it should be feasible for TfL, Cubic, industry and potential third party gate manufacturers to agree a reasonable model for cost recovery based on principles determined in other regulatory contexts. These principles include having consideration, in terms of the determining the distribution of costs, to who are the likely beneficiaries of proposed investment (amongst other principles).[58]

3: RDG accreditation

6.39. When we published our update paper in September 2018, RDG provided nine commitments to significantly improve and simplify their procedures for accrediting new and innovative retail products (including TVMs but also applying to other retail channels such as websites/mobile etc.). These commitments were published as an Annex to our update paper[59].

6.40. The commitments are aimed at making RDG accreditation processes less complex and more effective and efficient for prospective and existing rail retailers, and making it easier for new entrants to both engage with RDG and enter into the rail retailing market with new technological propositions.

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[58] OFCOM's six principles of cost recovery are:

- Effective competition - the mechanism for cost recovery should not undermine or weaken the pressures for effective competition;
- Cost causation - costs should be recovered from those whose actions cause the costs to be incurred at the margin;
- Cost minimisation - the mechanism for cost recovery should ensure that there are strong incentives to minimise costs;
- Distribution of benefits - costs should be recovered from the beneficiaries especially where there are externalities;
- Practicability - the mechanism for cost recovery needs to be practicable and relatively easy to implement; and
- Reciprocity - where services are provided reciprocally, charges should also be reciprocal.
  For example, see https://www.ofcom.org.uk/__data/assets/pdf_file/0022/105682/Recovering-the-costs-of-investment-in-network-expansion.pdf

[59] RDG letter dated 13 September 2018: https://orr.gov.uk/__data/assets/pdf_file/0011/38999/orr-market-study-letter-of-commitment-from-rail-delivery-group-2018-09-13.pdf

6.41. We recommend that RDG continues to deliver its commitments until at least 30 June 2019, when RDG is obliged to report to ORR under the commitments regarding their work and its impact on the market.

6.42. We have monitored the delivery of these nine commitments against the target dates in bi-monthly reviews with the RDG accreditation team. RDG have formally outlined the progress they have made to date in letters dated 23 January 2019[60] and 13 March 2019[61]. We outline below the commitments and the progress to date.

Commitment 1: Revise Accreditation Mandate

6.43. RDG revised the Accreditation Mandate to clarify the purpose of RDG accreditation, including the approach to innovation and a governance escalation route covering non-compliance.[62] A link is available on RDG's website.[63]

6.44. On 24 January 2019, RDG presented a new approach to governance around non-accredited retail systems to its internal Fares & Retail Group ("**FRG**") to address issues with suppliers failing to comply with all standards. This approach was endorsed and full details will be published on the RDG website on 31 March 2019.

Commitment 2: Update RDG Website

6.45. RDG updated its website[64] to provide a simple and easily accessible overview of accreditation, helping new entrants, in particular, to both engage with and gain an understanding of the process that they will need to follow.

6.46. The latest addition to the website is the 'Accreditation Video' which explains what accreditation is, why it is necessary and the steps to go through to gain accreditation. Initial feedback suggests that the video has been very helpful.[65]

Commitment 3: Improve Onboarding Guidance

6.47. RDG reviewed its existing guidance and developed a new guidance document aimed at providing new entrants with more accessible information about the accreditation process. The release of the new guidance is currently on hold awaiting the outcome

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[60] RDG letter dated 23 January 2019: https://orr.gov.uk/__data/assets/pdf_file/0010/40312/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-january-2019-discussion-paper-annex-b.pdf

[61] Annex A: https://orr.gov.uk/__data/assets/pdf_file/0003/40629/market-study-into-the-supply-of-ticket-machines-and-ticket-gates-2019-final-report-annex-a.pdf

[62] The Fares and Retail Group within RDG endorsed the revised mandate on 22 November 2018

[63] RDG website: https://www.raildeliverygroup.com/our-services/rdg-accreditation.html

[64] RDG website: https://www.raildeliverygroup.com/our-services/rdg-accreditation.html

[65] RDG website: https://www.raildeliverygroup.com/our-services/rdg-accreditation.html

of a proposal submitted to the FRG on the introduction of 'On going Accreditation'. A decision is expected by 14 March 2019.

Commitment 4: Create Pre-Accreditation Process

6.48. RDG is putting in place a pre-accreditation process to promote earlier engagement between new entrants and the RDG accreditation team and enable a more efficient process. RDG has appointed an Accreditation Support Manager who is now leading in this area and working closely with the RDG Licensing team so there is clarity over what a new entrant is being licenced to retail and what that would involve in terms of applicable standards and accreditation.

Commitments 5: Review Governance of Standards

6.49. Following a consultation with stakeholders, RDG published a new approach to governance of standards [66] It covers the development and update process for RDG standards, governance, document naming, and internal RDG monitoring and management processes.

6.50. RDG has also set up an internal Retail Steering Group to identify a subject matter expert for each standard. This person will be accountable and responsible for that standard's creation and maintenance. The purpose of this is to provide more transparency around changes to standards so that stakeholders can actively get involved with their review. One stakeholder said that earlier involvement of third parties in the RDG consultation process would be beneficial.

Commitment 6: Review Standards

6.51. To address concerns that standards and tests that are perceived to be confusing, duplicated and/or go further than necessary, RDG carried out a review of all of its standards. This review concluded in October 2018. It found that the majority of standards are fit for purpose, however, the analysis also revealed that not all standards are relevant to all retailers, as their retail offerings may differ.

6.52. At present all retailers (including new entrants) are required to accredit against all standards even if they do not use them. RDG is looking to introduce a more bespoke approach where standards are categorised and retailers only need to accredit against a set of standards specific to their retailing activities. This is likely to make accreditation easier and potentially cheaper for new entrants and existing retailers and ensure a more appropriate level of accreditation.

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[66] The approach is set out in Standard RSPS 9000. RSPS 9000 can be found in Assist, the RDG Accreditation and Standards portal.

6.53. This will be piloted on completion of an internal system enhancement (Lennon) which is scheduled to deliver by Q3 2019.

Commitment 7: Pilot Streamlining Testing

6.54. RDG is currently working on streamlining its testing process to make it easier for suppliers to maintain compliance with standards in the most cost-efficient way.

6.55. The scope of what can be automated has been identified. Work is now underway to design and create the automated test scripts/processes. In parallel RDG will identify and approach supplier(s) who would like to take part in a pilot. Two pilots will be run with an evaluation during May 2019 to ascertain if this is of benefit to suppliers.

Commitment 8: Pilot Retrospective Accreditation

6.56. Retrospective accreditation is where suppliers accredit software changes after they have been made. The aim is to support to more agile forms of development, where software changes are released regularly, rather than in one big release. This work is currently on hold as RDG is considering a move to ongoing accreditation.

Ongoing accreditation

6.57. Suppliers are currently required to be accredited every three years. RDG is considering removing the automatic three-year accreditation requirement and replacing it with ongoing annual accreditation of standards that have changed during the preceding 12-month period. Under this new, annual accreditation approach, retailers would not be required to be re-accredited against standards which have not changed. The aim is that this approach will be better suited to agile software development models which underpin modern retailing solutions.

6.58. In responses to our Discussion Paper, some stakeholders welcomed the move towards annual accreditation, however, two of the three TIS suppliers who responded considered retrospective accreditation would be preferred because it would utilise resource in the most efficient way, and make accreditation process faster to better align with agile delivery methods.

6.59. RDG have told us that moving to ongoing accreditation would remove the need for retrospective accreditation, as suppliers will be annually accredited only on changes to standards or changes to their software. In addition, ongoing accreditation has advantages over retrospective accreditation, for example, ongoing accreditation will be applied to all retailers. Retrospective accreditation could only be offered to a limited to a number of TIS suppliers. We consider that the annual accreditation approach could be implemented much faster and likely to reduce the time and cost of RDG accreditation.

6.60. As a next step, RDG is seeking approval from FRG by 14 March 2019. This will be followed by a pilot trial with identified suppliers, before RDG seek formal approval to use this approach going forward.

Commitment 9: Drive Continuous Improvement

6.61. RDG is putting in place a continuous improvement regime to ensure that RDG embed the new ways of working into the organisation. As part of moves to support new entrants, RDG has introduced accreditation surgeries for new entrants to obtain free advice on accreditation and what it takes to become accredited. RDG have already held three accreditation surgeries.[67] A further surgery is planned for 26 April 2019.

Stakeholder feedback

6.62. All respondents to our discussion paper welcomed work in this area. The majority of stakeholders considered that it was too early to consider whether the commitments had any impact to date, however, evidence shows that since November 2018 three new entrants have engaged with RDG to explore becoming accredited in GB.

6.63. Two stakeholders said they would like to see further technical improvements. We consider that RDG and the stakeholders are best placed to consider which improvements are necessary. We would encourage all interested stakeholders to engage with RDG directly regarding these.

6.64. Three stakeholders highlighted a lack of transparency regarding RDG's work in this area. In response to this, RDG published information about their review on the RDG accreditation website.[68] Each TIS supplier has a Single Point of Contact ("**SPOC**"), RDG encourages TIS suppliers to engage with the review through their SPOC. In addition, RDG plans to introduce a SPOC for TOC members.

6.65. Two stakeholders suggested that the workstreams should focus on existing suppliers as well as potential entrants. We consider that the focus of this work should be on promoting and facilitating new entry, however, the changes that RDG is making will apply to all retailers, therefore, making the process of re-accreditation simpler and easier for existing as well as new suppliers. In addition, RDG told us that it engages with existing TIS companies through regular meetings, and highlighted that existing suppliers are welcome to attend the accreditation surgeries.

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[67] The first one was held 23 November 2018, attended by two potential new entrants, with a subsequent one held 11 January 2019 attended by an existing supplier. A further surgery was held 22 February 2019 attended by a new potential entrant.

[68] https://www.raildeliverygroup.com/our-services/rdg-accreditation.html

Costs

6.66. We consider that the costs of implementing this recommendation are low, notably RDG's review is being carried out using its current complement, entailing, as we understand it, an overall modest level of resource. We therefore consider that the costs are proportionate to address the harm.

Conclusion on the package of remedies

6.67. We consider the TfL access remedy, the establishment of a working group, and the work on RDG accreditation should be viewed as a package. The issues in this market are long-standing and are not, in our view, likely to be resolved by an immediate 'quick fix'. Nonetheless, we consider that the proposed package will improve interoperability, and generate stimulus and incentives for third parties in wider international markets to engage with and ultimately compete for demand in the GB market.

6.68. We consider that the common thread identified in this study is the lack of incentives for alternative suppliers to enter, invest in, innovate and compete for demand in supplying ATGs and TVMs in GB. We consider that these recommendations are a good first step towards addressing this issue.

6.69. On balance, we consider that the benefits of the proposed recommendations will comfortably outweigh cost. If our intervention succeeds in facilitating a new competitor to gain a toe-hold in the ATG market in particular, that could subsequently be used as a basis for expansion, there would be scope for much greater benefits, including the possible introduction of new ideas and innovation in GB.[69]

6.70. We also consider there is an ongoing monitoring role for the ORR to ensure that these recommendations are delivered and improvements to the market are realised.

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[69] For instance, even a very small improvement in the throughput of passengers through stations would generate substantial economic benefits, including by speeding up journey times

7. Next steps

7.1. The publication of this paper and adoption of its recommendations concludes our formal market study into the supply of ATGs and TVMs. However, we will continue to take an active interest in these markets.

Recommendations

7.2. We intend to continue to be involved in the delivery of each of the recommendations to ensure that the recommendations are progressed and improvements in the market realised. In particular, we will:

- Participate in the industry working group on ATGs;

- Monitor the progress of developing a solution to access the TfL network; and

- Continue to monitor RDG's delivery of its commitments on accreditation.

Other issues identified

7.3. Our study identified other, cross-industry issues that affect ATG and TVM markets (as well as the wider rail retail sector). These issues primarily relate to the complexity of fares and the continued prevalence of the use of orange 'mag-stripe' tickets, which, in some cases, is holding up the introduction of more advanced technology in other areas.

7.4. Our package of remedies reflects the fact that whilst we recognised these issues we decided to focus our recommendations on the key issues in the ATG and TVM markets where we considered that our intervention could make a real difference and deliver on our objective of effectively 'kick-starting' these markets. This section outlines the cross-industry issues we identified and wider work being undertaken by industry and government which seeks to address these issues by simplifying fares and modernising rail ticketing ongoing work in the sector.

Complexity of fares

7.5. GB rail's retail market is complex, with some 55 million fares[70] available to purchase at any one time. Its ticketing system is also complicated, with a wide range of available ticket types. In terms of 'format', there are five types of ticket on use in the railway, namely: mag-stripe; barcode; ITSO; Oyster; and, CPC.[71] ATGs and TVMs

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[70] RDG website: https://www.raildeliverygroup.com/media-centre/press-releases/2018/469773920-2018-05-08.html

[71] Contactless Payment Card

may need to process any or all of these formats of ticket, depending on their location. This creates complexity for both hardware and software.

7.6. ATGs and TVMs require access to central data systems controlling revenue allocation, revenue collections, reservations and fares. Complexity of fares compounds the problem and stakeholders considered complexity of fares a key issue. This is particularly relevant to TVMs as they retail rail tickets. Fares are complex as it enables TOCs to provide customers with choice. However, TIS suppliers told us that this can significantly increase the time and expense to develop an accredited TIS product (the software that sits behind a TVM). High development costs can deter new entrants from investing in the market.

Mag-stripe tickets

7.7. In relation to hardware, stakeholders told us that the physical tickets used in GB ATGs and TVMS create complexity. In particular, the use of mag-stripe requires complex mechanics for processing and associated machinery and is more likely to require maintenance. For example, one supplier told us: *"In terms of functionality, the main difference is the requirement to support magnetic media. This is always the most unreliable component in the gate. International deployments by and large use smart card or barcode based inspections. This does offer better reliability and therefore longer intervals between servicing."*

7.8. Stakeholders also, however, highlighted the successes of mag-stripe: it enables customers to purchase tickets for the whole network, is easy to understand and provides a walk up ticketing option available to everyone (including children, tourists, those without contactless bank cards or smart phones etc). Any replacement would also have to meet these requirements.

On-going action in the sector

7.9. We highlight below ongoing work in the sector that is aimed at addressing issues with complexity of fares and removing the prevalence of mag-stripe tickets by introducing smart ticketing across the network.

Smart Ticketing

7.10. DfT has worked with the industry to roll out smart ticketing solutions so that barcode and/or smart card tickets are accepted across almost all the network. The Government invested £80m in accelerating smart ticketing through smart cards in addition to funding the £18.5m first phase of Transport for the North's smart ticketing programme. This programme of work included over 5,000 upgrades to ATGs, TVMs

and ticket office machines, as well as rolling out new smart cards across the country. This was coordinated with the rail industry's delivery of barcode ticketing.

7.11. We understand that TfL has been able to significantly reduce the number of magstripe users on the TfL network by rolling out a smart ticketing solution (Oyster) and providing pricing incentives for customers to switch to Oyster.

Pay as you go

7.12. The TfL network provides customers with the option to pay-as-you-go ("**PAYG**"). PAYG systems automatically charge the fare for the journey without needing the customer to buy a ticket. TfL has a set price per journey with fares capped on a daily and weekly basis. Customers travel using PAYG on the TfL network pay using either Oyster cards or contactless payment cards.

7.13. In February 2019, DfT released a consultation on proposals to extend PAYG from London on to rail in the South East. The extension of PAYG may also mean changes rail fares, which could make fares simpler and easier to understand, for example, helping customers choose the right fare and providing flexibility.[72]

Fare Reform

7.14. The DfT is committed to reviewing rail ticketing, removing complexity and perverse pricing. Its Rail Review[73] will consider how the fares system can deliver value for money for both passengers and taxpayers.

7.15. In June 2018, RDG released a consultation on rail fares regulation and reform. The results along with proposals from TOCs on fare reform were published in February 2019 as a response to the Rail Review.[74]

7.16. The proposals suggest that ticketing be reformed by moving to a 'single-leg' pricing structure, as currently operates within London, so that customers are able to choose the most appropriate ticket for each leg of their journey. RDG has said that fare reform would support: 'tap-in, tap-out' pay as you go being rolled out across the

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[72] DfT, Pay-as-you-go on rail consultation, 2019: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776998/payg-rail-consultation-doc.pdf

[73] DfT, Rail Review: https://www.gov.uk/government/groups/rail-review

[74] Easier fares for all The Rail Delivery Group's proposal for a more transparent, simpler to use, modern system of tickets and fares: https://www.raildeliverygroup.com/files/Publications/2019-02_easier_fares_for_all.pdf

country; enable greater local control over fares in devolved areas; and better integration of rail fares with those for other modes of transport.[75]

7.17. We consider that these initiatives have the potential to reduce the complexity of fares and prevalence of mag-stripe across the network, and therefore, make it easier for new entrants to enter the markets for both ATGs and TVMs.

Continued monitoring

7.18. We will continue monitor the progress of competition in these markets in accordance with our legal duty to monitor the competitive situation in rail markets.[76]

7.19. Should stakeholders wish to raise any issues in relation to this market study, particularly in relation to the implementation of our recommendations, they should not hesitate to contact the competition team on **Ticketing.Supply@orr.gov.uk**.

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[75] RDG, Fare Reform press release: https://www.raildeliverygroup.com/media-centre/press-releases/2019/469762745-2019-02-18.html

[76] Section 69 of the Railways Act 1993