Institution: University of Plymouth

Unit of Assessment: UoA14

Title of case study: Delivering Smart Ticketing in Great Britain

Period when the underpinning research was undertaken: 2006-present

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Jon Shaw	Professor of Transport Geography	2006-present
Andrew Seedhouse	Director of Transport, School of Geography, Earth and Environmental Sciences; Chairman of Smart Applications Ltd.	2010-present

Period when the claimed impact occurred: 2014-present

Is this case study continued from a case study submitted in 2014? Y

1. Summary of the impact (indicative maximum 100 words)

Smart Applications Management (SAM) is a fully commercially sustainable spin out company from the University of Plymouth which researches, develops and supports the implementation of smart and integrated ticketing in the deregulated operating environment of British public transport. Smart ticketing brings advantages for passengers as well as realising broader environmental, economic and crime prevention benefits. SAM's activities generate impact in two main ways: the development of a large-scale back office (so-called Host Operator Processing System, HOPS) capacity and associated managed services for its local authority and bus operator members, and the rollout of contactless payment across bus networks. Between 2014 and 2020, SAM has significantly increased its operations from its original base in the South West of England, to cover 77 member organisations across Great Britain.

2. Underpinning research (indicative maximum 500 words)

Shaw and Seedhouse have collaborated in this area of research since 2008. Shaw's longstanding work on transport policy provided the academic stimulus for the creation of SAM's forerunner, South West Smart Applications Ltd (SWSAL). Seedhouse's career in regional and national government and the transport sector, before taking on an academic post, brought public policy delivery expertise and senior commercial experience into the relationship.

Recommendations for the deployment of smart technology in the transport sector, as a means of delivering socio-economic benefits, have been made on the basis of research published in numerous works by Shaw from 2006. Building on his earlier research into social capital in rural areas advocating the provision of direct subsidies to passengers through smart card technology, Shaw (with Docherty) identified a number of shortcomings in UK transport policy formulation and delivery – including the lack of smartcard use – and suggested ways of addressing these [3.1 & 3.2]. One area of detailed investigation has been the introduction and

administration of the concessionary fares scheme for older and disabled people across the country [3.3 & 3.4].

Concessionary fares are most effectively delivered through smart ticketing for both administrative and operational reasons, and the benefits of speed, flexibility, and potential inter-operability of cashless public transport ticketing are easily extendable to all travellers once the system has been established. Smart technology is used in London and widely across the developed world as the preferred mechanism for public transport ticketing, but introduction in the UK provinces has been hampered by the unique deregulated environment that is designed to promote competition rather than cooperation between public transport providers [3.3].

In practice the lack of smart ticketing technology has served as an additional barrier to the provision of 'inter-operable' tickets, i.e. those which can be used on any bus company. Smartcards offer an easier way of achieving this because passengers' movements can be tracked, allowing bus companies to recover the exact amount of money owed to them. To facilitate this, a complex industry standard operating specification, ITSO, has had to be adopted to deal with UK transport governance arrangements and to enable multiple ticketing systems to exchange data using defined processes [3.5]. Seedhouse played a central role in research and development underpinning the specification of ITSO, serving on its main Board and chairing two of its research groups.

There have been significant practical difficulties faced by both policy makers and the bus industry in making ITSO function to the benefit of passengers, but it is clear that smart ticketing (and smart travel more generally) is an important policy pursuit given the prominent role that can be played by public transport in addressing key sustainability imperatives [3.3 & 3.5]. The work of SWSAL, and subsequently SAM, to promote and deliver smart ticketing has been and remains fundamental in achieving this improvement. Originally operating in the 15 local authority areas of South West England, SAM's activities have expanded during this REF period to include 77 member organisations whose jurisdictions cover 37.68m people, or around 57%, of the UK's population.

3. References to the research (indicative maximum of six references)

The publications listed underpin the impact reported in this document by establishing the case for smart ticketing in the UK transport context, advocating its development and delivery as a policy objective, and charting its changing role and future prospects as an element of UK transport policy.

3.1 Docherty, I and **Shaw, J** (2011) The transformation of transport policy in Great Britain. The New Realism and Labour's decade of displacement activity. *Environment and Planning A* 43, 224-251. DOI 10.1068/a43184

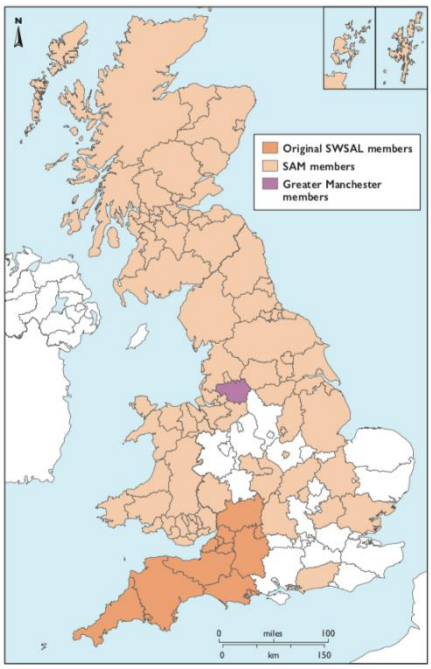
3.2 **Shaw, J** and Docherty, I (2014) *The transport debate*. Policy Press, Bristol. ISBN 978-1847428561; electronic copy available upon request. Refereed book.

3.3 **Shaw, J** and Docherty, I (2008) New deal or no new deal? A decade of 'sustainable' transport in the UK. In Docherty, I and Shaw, J (eds) (2008) *Traffic Jam. Ten years of 'sustainable' transport in the UK*. Policy Press, Bristol. ISBN 978-1-84742-072-5; electronic copy can be provided on request. Refereed chapter in an edited book.

3.4 Andrews, G; Parkhurst, G; Susilo, Y and **Shaw, J** (2012) The grey escape: investigating older people's use of the free bus pass. *Transportation Planning and Technology* 35, 3-15. DOI 10.1080/03081060.2012.635413

3.5 Parkhurst, G and **Seedhouse, A** (2019) Will the 'smart mobility' revolution matter? In Docherty, I and Shaw, J (eds) (2019) *Transport matters*. Policy Press, Bristol, 349-380. ISBN 978-1-4473-2956-5; electronic copy can be provided on request. Refereed chapter in an edited book

4. Details of the impact (indicative maximum 750 words)



SAM has become the leading membership body for delivering smart and integrated ticketing in the UK[1]. Its 77 member organisations include the DfT, the Scottish and Welsh Governments, 33 public sector organisations, 31 bus operators (including three of the 'big five' bus groups) and 10 associates including those in Greater Manchester (see Figure). SAM's activities generate impact in two main ways: the development of a large-scale back office (so-called Host Operator Processing System, or HOPS) capacity and associated managed services for members, and the rollout of contactless EMV (Europay, Mastercard and Visa) payment across the bus networks of participating members [I5.1 & 5.2].

Using £3m of new funding secured since 2014, SAM now operates on a fully commercial and sustainable basis, having been spun-out from the University of Plymouth in 2016 and awarded 'mutual' status by HMRC. The company now employs 8 people and since 2015 has generated an average annual surplus of c.£100k, which it invests back into research and development.

4.1. HOPS and associated managed services

The large-scale HOPS is fully ITSO-compliant and has provided a step-change in capacity to support users and process transactions. Whereas in 2015-16 SAM's HOPS processed 62,152,984 transactions across 17 local authority areas, for the 12 months to April 2020 it processed 116,844,099 transactions across 27 local authorities [5.3].[2] HOPS expansion has gone hand in hand with the development of associated managed services for members, including the new National Procurement Framework (NPF) for integrated ticketing goods and services [5.4]. The NPF is important because it allows SAM's public sector members to save the cost of public procurement when making all manner of smart ticketing-related investments. In parallel, the number of customer smartcard accounts directly supported by SAM nearly doubled from 1,066,342 in 2015/16 to 1,984,210 in 2019/20 [5.3].

The **impact** of these activities can be evidenced in three main ways:

- The *environmental benefits*, independently estimated in alignment with DfT methodology, derived from speeding up passenger boarding by two seconds per transaction. This enables buses to complete their routes more quickly, meaning they can spend more time at the end of their route with their engines off, and / or fewer buses are needed to work the routes. Between April 2015 and March 2020 this has saved 3740.39 tonnes of CO_2, 23.11 tonnes of NO_x and 0.47 tonnes of PM10 with a combined value, following published government emissions pricing, of £325,846 [5.5].
- The *cash saving* enabled by the capability of SAM's expanded HOPS to identify and prevent the fraudulent use of lost / stolen tickets. Given the average value of an active commercial smart card of around £320 per year, early 'hot-listing' (i.e. blocking) of lost / stolen tickets is highly desirable. SAM developed the national toolkit for hot-listing, which since its full introduction had blocked 29,852 live cards by October 2020. Assuming a saving of 30% of the average commercial card use value, this equates to a net saving (after administration costs) to the taxpayer and SAM members of £2.86m [5.6].
- The *cash saving* generated by the amount of procurement activity that has been enabled by the NPF. 64 contracts from the NPF have been generated, enabling the acquisition of: new smart-enabled ticket machines for 121 bus operators (including all supported operators in Scotland and Wales) [5.2 & 5.7]; consultancy services for Transport for the North; the provision of 750,000 new smartcards for the Welsh National Concessionary Travel Scheme [5.8]; and an ITSO multi-partition HOPS hosting in excess of 60m transactions per

year. Using the NPF has resulted in members saving £765k in procurement costs on a total contract spend of more than £23m [5.9].

4.2. Rollout of contactless EMV payment

Contactless EMV does not rely upon the existence of a dedicated transport smart card, providing passengers instead with the ability to pay in real time by tapping their bank / credit card or smart phone onto a ticket machine or entrance barrier. Overall, around 25% of all ticketing transactions on the UK bus fleet were made by contactless EMV in 2019[3]. SAM's activity has focused on smaller operators, with over 80 bus operators having introduced the facility through the company and its NPF. Equipment provided through SAM and its NPF now supports over 15m contactless EMV transactions per year.

The **impact** of SAM's activities in relation to contactless payments by smartcards and EMV can be evidenced in three main ways:

- *Integrated, pay-as-you-go capped ticketing* outside London. In collaboration with LittlePay Payment Services, SAM has developed and in 2018 launched in Cornwall the first live use of a single finance key, which enables payment capping where more than one operator provides services in the county. This is essentially the same customer-facing proposition as pay-as-you-go in London, where the system stops charging passengers paying with bank cards / mobile phones once they have reached a certain cap for travel over a given time period (e.g. a day or a week). Such a system has been difficult to deliver in the deregulated public transport environment outside of the capital, but the result is now that SAM enables Cornwall Council to underpin its One Cornwall bus network with fully integrated pay-as-you-go, contactless ticketing across all operators [5.10].
- The *material upscaling of business* for Ticketer. SAM's partnership with Ticketer, a supplier of smart ticket machines, has resulted in the company increasing its turnover by over £8.5m through sales to more than 135 bus companies and public sector organisations who are SAM Members [5.11]. The number of operators Ticketer supplies through SAM's National Procurement Framework contracts represents around 60% of its total client base.
- Contactless EMV provides *an additional means of conducting smart ticketing transactions*. The increasing uptake of contactless EMV payments accounts for a growing proportion of benefits, because dedicated smart card products can co-reside with EMV transactions within a multi-channel Account Based Ticketing environment. This provides customers with the security of a best value or capped fare regardless of how they choose to transact.

Notes

[1] Reflecting the expansion in its operations, the former South West Smart Applications Ltd brand was replaced by SAM in 2017.

[2] This represents an annual financial value in 2017 prices of £272,246,751, given the average single bus fare of £2.23 (TAS Partnership (2017) *National bus fares survey 2017*. TAS Partnership, Preston). The overall number of 116.8m transactions would have been significantly higher but for the impact of Covid-19.

[3] UK Finance (2019) *Contactless transit – implementation in the UK*. https://www.ukfinance.org.uk/system/files/Contactless%20Transit_v4_FINAL.pdf Accessed 14 December 2019.

4. Sources to corroborate the impact (indicative maximum of 10 references)

5.1 Letter from Nexus demonstrating SAM's impact in relation to managed services.
5.2 Letter from Transport for Wales demonstrating SAM's impact in the roll-out of contactless EMV payment.
5.3 SAM summary data sheet showing growth of various delivery metrics.
5.4 www.talktosam.co.uk/framework
5.5 Environmental and associated cash impact of saving two seconds per boarding as a result of smart ticketing transactions in England, Scotland and Wales directly supported by SAM, 2015-2020 (includes methodologies as embedded documents).

5.6 Hotlisting figures by Local Authority. (Includes *National Hotlisting Strategy* as embedded document.)
5.7 Letter from Transport Scotland confirming number of bus operators equipped with new ticket machines in Scotland.
5.8 Letter from Systra demonstrating SAM's role in the rollout of smartcards in Wales.
5.9 NPF savings, average per member multiplied by total number of contracts.
5.10 Letter from Cornwall Council emphasising SAM's impact in delivering ticketing innovations for its One Cornwall bus network.
5.11 Letter from Ticketer stating the impact of SAM's activities on its business.