2020

Process Evaluation of Transport Data Projects

Final Report

Ipsos MORI

Department for Transport

Ipsos MORI

Contents

List of abbreviations

APDS	**Alliance for Parking Data Standards**
API	Application Programming Interface
AURN	Automatic Urban and Rural Network
AVL	Automatic Vehicle Location
BODS	Bus Open Data Service
CAV	Connected Autonomous Vehicles
C-ITS	Cooperative Intelligent Transport Systems
CYC	City of York Council
DfT	Department for Transport
DVSA	Driver and Vehicle Standards Agency
EEH	England's Economic Heartland
EV	Electric Vehicle
GDS	Government Digital Services
GHG	Greenhouse Gas
HCC	Hull City Council
iCP	Intelligent City platform
LA	Local Authority
NH report	North Highland report
OGL	Open Government Licence
SCOOT	Split Cycle Offset Optimisation Technique
SME	Subject Matter Expert
SPaT	Signal Phase and Timing
STEP	Smart Travel Evolution Programme
TfL	Transport for London
TfN	Transport for the North
TfGM	Transport for Greater Manchester
TfWM	Transport for West Midlands
ToC	Theory of Change
TTF	Transport Technology Forum
UTC	Urban Traffic Control

UTMC	Urban Traffic Management Control
VMS	Vehicle Management Signs

Executive summary

In June 2020, the Department for Transport (DfT) commissioned Ipsos MORI to conduct a process evaluation of three transport open data projects:

- The **Street Manager** service aims to transform the planning, management and communication of roadworks in England by providing accurate, near to real-time, information on street and road works.
- The **Bus Open Data Service (BODS)** project aims to increase availability of information on fares, tickets, timetables and vehicle location in England, to stimulate demand for bus services and improve transparency around ticket pricing.
- The **Opening LA Transport Data - Funding for Innovation** competition encouraged LAs to share and use high quality data on traffic management and parking[1], funding collaborative projects exploring the feasibility and benefits of opening and sharing transport data.

Evaluation aims and objectives

The evaluation aimed to assess the processes adopted in delivery of each of the projects to identify the factors that have hindered or enabled the achievement of intended outcomes. It also aims to identify key lessons for future open data projects.

Methodology

The evaluation is based on detailed case studies of the three projects. The evaluation questions were developed through an initial familiarisation exercise, involving a review of project documentation and consultations with project leads within the DfT. This culminated in the development of a theoretical framework explaining how each project was intended to produce its intended outputs, outcomes and impacts. Each case study was based on evidence gathered from ten in-depth interviews with internal and external stakeholders. Evidence across the three projects was then synthesised to identify cross-cutting themes and lessons for the design and delivery of future open data transport projects.

Cross-Cutting Conclusions

Project scoping and design

All three projects were informed by an initial scoping phase, with the publication of a detailed report including recommendations based on in-depth stakeholder consultation and a detailed needs assessment. There was universal satisfaction with these scoping phases. The design of projects reportedly responded well to the specific needs identified during them. However, some issues with duplication and loss of knowledge arose where the inception and implementation phases were decoupled.

[1] North Highland, Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf

Project management and delivery

Stakeholder feedback suggests that the projects were well implemented, with positive feedback on the role of the DfT teams. In all cases, the project lead was a consistent presence providing oversight for the day-to-day management and strategic direction of the project. This was perceived as an important step towards developing good long-term relationships with external stakeholders. The use of subject matter experts and peer-to-peer support for stakeholder groups was viewed positively. The DfT Digital Team could provide more support and coordination in future projects with technical elements and ensuring they are aligned with the Department's new Data Strategy and its wider objectives.

Outputs, outcomes and impacts

The main anticipated outputs were delivered largely on time across all projects (with some delays arising from the disruption caused by the COVID-19 outbreak). Opening of transport data was credited with reducing ambiguity around the accuracy of data, increasing transparency and providing opportunities for more effective monitoring and compliance. However, it is too early to judge what outcomes will arise from the use of the data.

Enablers and barriers to project delivery

Several common enablers and barriers were identified across the three projects.

Enablers

- **Use of legislation**: Legislation has helped secure long-term completeness and interoperability of national transport datasets. Legislation was also credited as an accelerator that put pressure on industry stakeholders to prioritise publishing and standardising their data.

- **Stakeholder engagement:** Breadth and depth of stakeholder engagement - within the DfT and relevant external stakeholders – was needed to secure buy-in and promote shared learning. Existing forums, such as the Highways Authority and Utilities Committees and the Technology and Transport Forum, helped facilitate this type of exchange.

- **Developing long-term relationships:** Consistency within project teams helped build trust and constructive dialogue with different stakeholders. The use of subject matter experts was also important in helping to build trust with industry partners.

Barriers

- **Resource requirements:** Significant resource was required to create and test digital infrastructure and ensure the quality and completeness of data. Stakeholder engagement and ongoing dialogue with different groups was also very resource intensive.

- **Data quality and completeness:** Concerns were expressed regarding the completeness of data made available and the content of data files. These were exacerbated in some cases by fears around compliance with certain standards, either due to lack of expertise or because the standards were not felt to fully reflect the intricacies of certain datasets.

Lessons learned

There is support for DfT playing a leading role in encouraging the opening of transport data. This may include demonstrating the value of open data; the development and promotion of specific standards and accompanying legislation to ensure interoperability; ensuring there is one verifiable source of information; and increasing the technical and financial capacity of LAs and the private sector to enable them to publish high value datasets using common standards.

There is support for ensuring one source of information or "one version of the truth" with regard to transport data. Proactive and ongoing engagement with LAs and private sector stakeholders from an early stage in the process of any project aiming to achieve this is an essential precondition for ensuring quality, completeness and uniformity of data.

LAs, the private sector and the DfT will require further technical and financial support to realise the potential of open data. This means supporting stakeholders with high levels of digital literacy (leaders) and those without well-developed systems for the collation and publication of data (followers).

Further capacity building within DfT, both in the form of upskilling and the provision of formal feedback mechanisms, is needed to ensure learning from projects is not lost.

1 Introduction

In June 2020, the Department for Transport (DfT) commissioned Ipsos MORI to conduct a process evaluation of three transport data projects; (i) the Bus Open Data Service (BODS); (ii) the Opening Local Authority (LA) transport data and; (iii) Street Manager project. These projects were delivered by the DfT between 2017 and 2020 and are expected to make transport data more accessible to the transport and local authorities, improve the efficiency and effectiveness of public transport network management, and give technology companies and other private sector entities access to transport data, in order to create new products which can enable economic and social benefits.

1.1 Evaluation aims and objectives

The key aims and objectives of this study are to assess the processes underlying each of the projects to identify the factors that have hindered or enabled their delivery and achievement of intended outcomes. It also aims to identify key learnings for future open data projects.

Specifically, this evaluation explores:

- How the projects were delivered and managed;
- Data issues, including quality, access, standardisation and interoperability[2], and;
- Experiences of project stakeholders, including DfT staff, implementing partners, technology developers and end users.

1.2 Methodology

The methodology for this study took the form of a process evaluation, focused around three individual project-level case studies. Process evaluations examine project delivery and implementation to assess what works in project implementation. Given the relatively early stage of this evaluation (i.e. before project delivery was complete) and the pathfinding nature of the projects, a process evaluation was deemed by the DfT as the most appropriate method to gather practical learning for the implementation of future projects.

The process evaluation was carried out in three phases, as described below:

Phase one: scoping and familiarisation

An initial review of documentation and interviews with project leads and other relevant stakeholders at DfT were used to develop an understanding of the individual intervention logic for each of the three projects accompanied by an overarching theory of change to draw out their commonalities.

These were reviewed with project leads in order to ensure their accuracy and were used to develop an overarching evaluation framework, to guide the data collection and analysis.

[2] Interoperability describes the extent to which it is possible for systems and services that create, exchange and consume data to have clear, shared expectations for the contents, context and meaning of that data. In the context of this evaluation, it refers to the possibility to combine and use data from multiple different sources.

Research tools including interview topic guides and a case study structure were then developed, mapped closely against the questions included in the evaluation framework.

Phase two: case study development

Three project level case studies were developed, exploring the implementation of each project from the initial scoping phase through project delivery before considering evidence of outputs delivered and any emerging indications of longer-term outcomes.

Each case study was based on a review of project-level documentation provided by the project teams and broader desk research, accompanied by 10 in-depth interviews (per case study) on Microsoft Teams using semi-structured interview guides, findings from which were mapped against the evaluation framework. The case studies were based around the following inputs:

1. Scoping interviews with DfT project leads;
2. Review of relevant project documentation and development of project-level theory of change;
3. In-depth interviews with different stakeholder groups;
4. Synthesis of project documentation, scoping interviews and in-depth interviews to develop three project-level evaluations (see annexes 1-3)

Phase three: synthesis of findings

The project level case studies were used as the basis of the synthesis evaluation, which kicked off with an internal workshop between case study leads to compare project findings. This was followed up with a more formalised mapping of project level findings against the overarching theory of change and the evaluation framework.

The synthesis analysis has been included in Section 4 of report to provide responses to the evaluation questions identified by DfT and Ipsos MORI at the outset, as well as an overview of the main lessons learned from across the projects.

Table 1.1 below provides an overview of the different stakeholder groups consulted to inform this evaluation.

Table 1.1: Overview of the number interviews carried out per case study

	Street Manager	Bus Open Data Service	Opening LA Data
DfT	2	2	2
Local Authorities	2	4	4
Government bodies/regulators		1	1

Data providers/integrators	1	1	2
Service providers		4	
Industry groups	2		
End user organisations	3		1
Total interviews	10	12	10

1.3 Limitations of the evaluation

The evaluation encountered no major unforeseen challenges, although the COVID-19 pandemic and accompanying lockdown in Spring 2020 meant that all data collection was carried out virtually. Additionally, COVID-19 had an impact on the timescales of the different projects under evaluation, meaning that the evaluation was carried out before certain activities were completed.

In terms of methodological limitations, the following should be noted:

- The projects had different origins, budgets, ambition levels and timescales, with implications for comparability.
- The evaluation was commissioned and took place while the projects were still being implemented. This meant it was not possible to measure longer-term outcomes or impacts and the analysis focuses primarily on outputs and early evidence of potential use cases.
- It was not possible to interview representative samples of end users (tech/data companies) or final beneficiaries (passengers) of the projects. Instead, data collection focused on in-depth interviews with a limited sample of stakeholders involved with project delivery (DfT staff, local authorities and service operators).
- The evaluation does not aim to provide an assessment of the impacts of the different projects (i.e. the extent to which the data is being used to create new added-value products and services). Nonetheless, it does provide an assessment of key success factors, challenges and lessons learned with a view to implementing further open data projects within the scope of the DfT's new Data Strategy (due to be published in 2021).

1.4 Lessons for future evaluations

This evaluation has thrown up a number of considerations which could be taken into account in future studies of this nature. These are summarised below:

- A process evaluation can be a very useful and pragmatic way to gather learning regarding what worked and what didn't early in the project cycle, which can be shared and applied to similar projects.

- While it was relatively easy to observe the outputs of the different projects, the projected longer term outcomes and impacts were much more ambitious. This will make it harder to establish a causal chain from inputs to projected impacts. In order to overcome this, more intermediate measures of success will need to be considered to be able to establish a clear line of causation from the individual projects to the overarching objectives described in the intervention logic.

- Monitoring and evaluation of project outcomes needs to be considered and incorporated at an early stage in order to capture robust evidence of longer-term impacts. While this process evaluation was able to identify clear evidence of data being published, project teams were struggling with how to measure the extent to which data was used by potential end users. This low observability of users and use cases will present a challenge for any future evaluation of longer-term impacts.

1.5 Structure of this report

This report provides:

- A **Background section**, providing an overview of the policy and strategic context in which the three data projects are developed;
- A **Project Delivery section**, providing an overview review of progress made at individual project level;
- **Common Findings**, providing an analysis of the main findings that have emerged across all three projects
- **Cross-Cutting Conclusions**, summarising how the three projects performed against the different evaluation questions
- **Recommendations** to aid the successful implementation of future open data projects.

The Annexes comprise the findings from the three individual case studies that have been conducted as part of this evaluation.

2 Background

This section provides an overview of the strategic, operational and economic context for the three open data projects and programmes forming the focus of this evaluation. It covers the rationale and key objectives of each project, and providers an overarching logic model that explain how the three initiatives were expected to deliver their intended outputs, outcomes and impacts. The section concludes with an overview of the key evaluation questions to be addressed. This section is based on a review of documentation provided by DfT, accompanied by broader desk research, which have been used to inform the evaluation as a whole and to understand the contract within which the three projects were operating.

2.1 The UK transport sector

The governance of the UK transport system is complex with responsibilities divided between the central government, local governments, and the private sector[3]. Overall, the division of responsibilities can be described as follows:

- Central government sets overall transport policy, and is responsible for the creation and monitoring of relevant statutory and legislative frameworks;
- Local governments plan transport networks at LA level;
- Private companies own and operate certain public transport systems, such as the bus network (which is mostly privately owned outside of London).

Rapid and unprecedented changes over the last two decades have created challenges for the sector. These include a decline in public transport use, an increase in road traffic congestion, and a resultant increase in air pollution[4]. From 2002 to 2017, trips per person per year on public transport fell by 9% in England, mainly due to a decline in commuting. At the same time, the use of roads and private vehicles has been increasing. According to DfT figures, motor vehicle traffic increased by 16% between 2009 and 2019[5]. Growth in road travel demand is expected to increase over the coming years, driven by anticipated population growth[6]. This trend is particularly concerning as cars (and taxis) made up 55% of domestic greenhouse gas emissions in 2017, compared to a 3% contribution by bus travel and 2% by rail travel[7]. Overall, the transport sector was ranked as the largest contributor to UK GHG emissions, overtaking the energy sector in 2016[8].

[3] The history of transport systems in the UK. Government Office for Science, 2018. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/761929/Historyoftransport.pdf
[4] Future of Mobility: Urban Strategy, DfT (2019). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/846593/future-of-mobility-strategy.pdf
[5] Road Traffic Estimates Great Britain 2019. DfT (2019) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/916749/road-traffic-estimates-in-great-britain-2019.pdf
[6] As above
[7] Energy and Environment Statistics. DfT (2019). Available at: https://www.gov.uk/government/statistical-data-sets/energy-and-environment-data-tables-env
[8] Transport Statistics Great Britain 2019. DfT (2019) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/870647/tsgb-2019.pdf

The value of data-based solutions

The UK Government is committed to promoting sustainable, inclusive and innovative transport options that will improve quality of life in towns and cities and embrace the Mobility as a Service model[9]. Data-based solutions are recognised by the Government as a vital tool to support in achieving its goal of delivering an intermodal, efficient and responsive mobility system. In a speech in October 2016, the Secretary of State for Transport made a clear link between effective use of data and improved transport services in England, when he declared his vision of 'Making Britain the best place in the world to do transport digitally'.[10] This was followed by a round table on data, which identified a number of obstacles to achieving this vision, concluding that local transport data is often siloed, of poor quality and has limited accessibility.

The three data projects in the scope of this evaluation fall under remit of the DfT's Future of Mobility Urban Strategy and the wider Future of Transport Grand Challenge, which aim to position the UK at the forefront of mobility innovation. The overarching goal of the Challenge is to support innovation in the transport sector, to reduce carbon emissions and congestion, and further improve the mobility of goods and services. One of the key priorities of the Challenge is to encourage the sharing and harnessing of data to support industry and local leaders. In line with this priority, the Strategy aims to encourage sharing of transport data by local authorities and private sector providers and its use by technology companies. To achieve this, the Strategy seeks to promote the creation of standards and platforms that facilitate data accessibility amongst different stakeholders including, local and transport authorities, app developers and, ultimately, transport users. It is expected that increased availability and connectivity of data will allow optimisation of fleet and network management, and access to real-time data is expected to facilitate customer access to journey planning tools and tailor their travel choices to their needs and preferences.

The value of opening transport data has been demonstrated at sub-national level. In 2007, Transport for London (TfL) made a decision to open up over 80 data feeds covering operational and corporate information across all modes of transport, with around 75% of data available via application programming interfaces. TfL demonstrated the potential of open data to create value, with more than 12,000 registered developers accessing their data, 42% of Londoners using an app powered by TfL data, with estimated annual economic benefits and savings of up to £130 million.[11] However, there have been a limited number of projects focusing on opening transport data – although numerous social, economic, and environmental benefits (as well as challenges) of doing so have been identified (as summarised in the following table).

[9] Mobility as a Service (MaaS), HC (2018) definition: MaaS is the term for the digital platforms (often smartphone apps) through which people can access a range of public, shared and private transport, using a system that integrates the planning, booking and paying for travel.
[10] https://www.gov.uk/government/speeches/plans-for-an-effective-and-reliable-road-network-in-the-decades-ahead
[11] Deloitte (2017), Assessing the value of TfL's open data and digital partnerships, available at: http://content.tfl.gov.uk/deloitte-report-tfl-open-data.pdf

Table 2.1: Summary of the barriers and potential benefits of opening transport data

Barriers to open transport data	Potential benefits of opening transport data
▪ Responsibility for the transport system is as complex as it is fragmented and divided between public and private sector, different operators and services providers ▪ There is a lack of guidance around data standards and best practice that hinders the interoperability and interconnectedness of data ▪ Local Authorities (LAs) show concerns around data privacy and GDPR compliance ▪ There is complexity around data ownership within LAs and there are some difficulties accessing data stored by third parties ▪ Transport operators have varying levels of digital and data literacy and limited access to the data creation tools required to publish data	▪ Improved policymaking and transport network efficiency, including minimisation of services disruptions ▪ Improved air quality due to improvements in traffic management and public transport services ▪ Improved user experience and journey planning due to improved availability and accuracy of transport information ▪ New revenue streams due to the creation of new product or services ▪ Promotion of transport growth and innovation agenda

Sources: Bus Open Data Discovery. Final Report (February 2018); Local Transport Data Discovery. Final Discovery Report (March 2018)

The DfT supports a collaborative approach to opening data, requiring significant cooperation between central government, local authorities and the private sector. These stakeholders are required to work together to ensure a consistent approach to open is data adopted across the transport industry, including standards, guidance and best practice, and ultimately ensuring that open data can be used to offer innovative, customer-facing and efficient solutions.

The DfT's responsibilities include creating an enabling legislative and policy framework for the opening of transport data, coupled with the provision of guidance, technical and financial assistance to LAs, transport operators and the private sector to promote the creation of open data projects. The timely and accurate provision of transport data – by transport operators and LAs – is expected to foster innovation and economic growth, as it offers the private sector the opportunity to develop new goods and services, such as user-centric apps for journey planning, and thereby generate new revenue streams.

The first open data projects implemented by the DfT focused on increasing the accessibility and usability of bus, street work, parking and traffic management open data. Opening these datasets is expected to improve public transport network management and policymaking by allowing transport authorities to use data to identify areas of improvement within the transport system, boost demand for public transport services – specifically the demand for bus services, which has been in decline since 2008/09 - increase connectivity across England, and ultimately generate social and environmental benefits.

2.2 Rationale for the open data projects

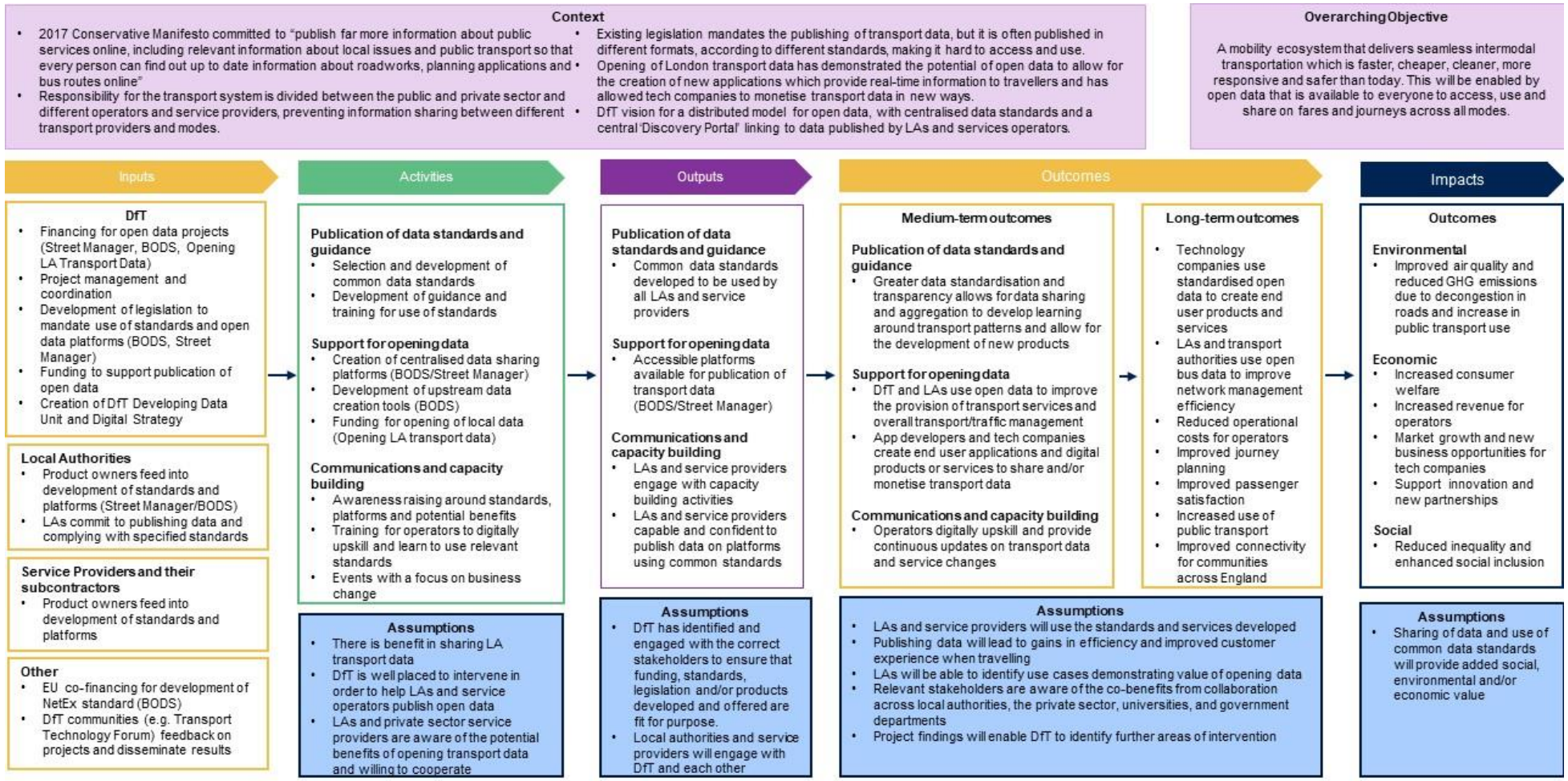
The projects covered by this evaluation were expected to contribute to the DfT's Future of Mobility Urban Strategy's priority of sharing and harnessing transport data, and further advance the data objectives of the Future of Transport Grand Challenge in the following ways:

- The **Street Manager** service aims to transform the planning, managing and communication of roadworks in England. It intends to minimise disruption caused by roadworks and help improve journey planning by providing accurate information in as near to real-time as possible.
- The **Bus Open Data Service (BODS)** project aimed to increase availability of bus data across England, including information on fares, tickets, timetables, vehicle location and punctuality data. By improving data access for app developers, the project aims to improve bus journey planning, stimulate demand for bus services and drive greater transparency around ticket pricing for passengers.
- The **Opening LA transport data – Funding for Innovation** competition encouraged LAs to share and use high quality data on traffic management and parking[12]. This project took the form of a competition launched in 2018 by the DfT to fund projects adopting collaborative approaches across LAs and third parties to unleash the potential benefits of opening and sharing transport data. These two datasets were identified as high value in the North Highland "Local Transport Data Discovery".

A Theory of Change (ToC) model was developed as part of this evaluation to explain how the three open data projects were expected to deliver their intended outputs, short-term and medium-term outcomes, and longer-term impacts (see Figure 2.1). As highlighted, projects have involved the delivery of a variety of activities including the publication of data standards and legislation, direct support to open data, communication and capacity building activities. The delivery of these activities has realised several outcomes, including the creation of added value from transport data in the form of increased knowledge, efficiency gains for LAs, and the development of products by technology companies. Ultimately, all these outcomes are expected to have environmental, economic and social benefits.

[12] North Highland, Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf

Figure 2.1: Overarching Theory of Change (ToC) to show how open data can improve the transport system



2.3 Evaluation questions

This evaluation seeks to answer the following overarching evaluation questions, which track the project implementation process:

Project scoping and design

- How effective was the approach taken to inform the concept and design of the projects?
- Were the project management methods chosen suitable for effective and efficient delivery of the projects?

Project Management and Delivery

- How well was the project management and delivery implemented?
- Was the level of commitment from partners sufficient? How were differences in expectations from different partners managed?
- Was there sufficient oversight to ensure that the project was carried out in an effective and efficient manner?
- How effectively did the projects interact with Government Digital Services and DfT's Digital Team?
- To what extent has interoperability been considered (and achieved) in the development of the projects?
- What lessons can be learned regarding what worked, and what didn't, in terms of project management and delivery?

Outputs, outcomes and impacts

- How well are the projects meeting their objectives? To what extent do project stakeholders agree on the success (or otherwise) of the project?
- What are the short and long-term outcomes of making transport data available?
- How well do the projects contribute to the aims of the Future of Mobility: Urban Strategy and broader government policy priorities?

Responses to each of these questions can be found in the recommendations section (Section 5) of this report.

3 Project delivery

This section provides a brief overview of the three open data projects which are being evaluated, including a summary of the activities taken to deliver each project as well as a brief overview of how the three projects against the overarching theory of change.

3.1 Project overview

As can be seen from Table 3.1, the projects are very different in terms of their overall scope, delivery timeframe, budget and the activities which were used to deliver the outputs and outcomes foreseen. There are some commonalities in the projects' overarching objectives to open transport data and similar expected benefits such as improved network efficiency, improved air quality through reduced emissions, lower journey times and improved customer experience.

Table 3.1: Overview of the three open data projects

	Street Manager	BODS	Opening LA Transport Data
Objective	Development of single source of accurate, up-to-date data on live and planned street and road works	Improve the availability of key bus data to help address the challenges faced by the industry and allow passengers to make informed travel decisions based on complete, accurate and timely data	Promote the opening and sharing of local authoritytransport data; and further remove barriers to effective data use.
Timeframe	February 2017 - July 2020	November 2017- January 2023	April 2019 - March 2020
Budget	£10+ million plus £1.2m TfL and Kent County Council Lane Rental Scheme funding	£6 million, increasing to £7.5 million in 2021	£955,360
Activities	▪ Needs assessment and user research ▪ Initial stakeholder engagement and prototype development ▪ Development of working pilot	▪ Introduction of new legislation ▪ Development of a portal for the publication of routes, timetable, location and fares data ▪ Definition and creation of common data standards ▪ Provision of tools and training to support operators when publishing data	▪ Launch of funding for innovation competition ▪ Evaluation of bids and allocation of project funding ▪ Delivery of pilots and ongoing stakeholder engagement ▪ Collation of learning and dissemination of project results
Main stakeholders	▪ DfT; ▪ Highways Authorities; ▪ Utilities Companies; ▪ Technology providers / data suppliers;.	▪ DfT ▪ Local authorities ▪ Service providers, including bus operators, data brokers, ticketing companies and others ▪ Technology companies	▪ DfT; ▪ LAs; ▪ Technology providers / data suppliers; and ▪ End user organisations.

To balance the specificities of each project with their common goals, three individual logic models were used to draw out the common elements across the three projects in terms of inputs, activities and outputs associated with project delivery. In this section, we summarise the findings of each case study, before considering how the three projects delivered their common elements:

- Publication of data standards and guidance
- Support for opening of data

- Communications and stakeholder engagement

3.1 Street Manager

The Street Manager Service aims to provide a single source of accurate, up-to-date information on planned street and road works nationally. Street Manager is the successor to the Electronic Transfer of Noticing (EToN) system, which was used to manage and coordinate street works since the 1990s.

Street Manager was developed between February 2017 and July 2020, with delivery focused on the following activities:

Needs assessment and user research

An initial scoping exercise (or Discovery Phase) was carried out to capture the views of key stakeholders in the street works sector on the existing EToN system and develop an understanding what would be needed from a potential replacement. This involved a needs assessment with all stakeholder groups that had a significant influence on the overall design of the project. User research was carried out to understand whether the current system met user needs (and was cost-effective), or whether it has become too inflexible, inefficient and costly. Consideration was also given to what new or replacement systems might be required to meet the user needs identified. The main issues identified were:

- **Lack of consistency and no single version of events:** a result of differing interpretations of the statutory requirements between major suppliers. Interviews with Highway Authorities (HA) and utilities for this case study identified a clear desire to establish a database that would provide 'one version of the truth'.
- **Lack of confidence in data:** Linked to the above, questions regarding the accuracy of data being provided using EToN fostered a lack of confidence amongst a significant number of users.
- **Outdated specifications**: The EToN system did not allow for some aspects of modern ways of working to be incorporated, such as the potential for monitoring of performance.
- **Supplier led development:** There was also a perception from interviewees that the development of EToN was somewhat led by suppliers, meaning the users were having to adapt their approaches to what suppliers would offer rather than having a system which met their needs.
- **Overhead costs:** Users were required to pay subscriptions to EToN suppliers for the use of their platforms which were considered a significant cost.

Stakeholders from both Highways Authorities (HAs) and utility companies expressed satisfaction with this process. The needs assessment was considered to have been carried out in a thorough and professional manner, with no gaps identified by stakeholders interviewed for this case study in terms of the organisations consulted or the seniority of the individuals engaged with the process. The combination of approaches (a combination of 1:1 interviews, a

broader stakeholder survey and workshops) used to gather information for the scoping phase was highlighted by stakeholders as a strength of the approach. There was a general consensus amongst stakeholders interviewed for this evaluation that the needs identified during the scoping phase were reflective of their experiences and support for the development of Street Manager.

Development of Street Manager Platform

The Street Manager platform prototype was driven by the need for a one-stop-shop to exchange and provide accurate and up-to-date information on street and road works, whilst ensuring that the new service can include (or being interoperable with) additional datasets related to traffic management.

The prototype of the system was built during the Alpha phase. Research with end-users ensured that the feedback obtained from end-user engagement events fed into the development of the platform. The Agile[13] way of working allowed the team to adapt to changing priorities and user needs, although DfT staff and subject matter experts (SMEs) reported quite significant knock-on effects in terms of resource requirements for the project. Nevertheless, (and despite initial scepticism regarding the DfT's ability to deliver Street Manager on time), the minimum viable product was launched within three months of the initial projected launch date.[14] This was believed to vindicate the choice of an Agile approach to project delivery.

User testing

Subject matter experts were seconded to the DfT to help with the development of a prototype platform. This was then tested with a small user group to understand the extent to which it responded to user needs and identify further areas for development.

Stakeholders appreciated the extensive nature of stakeholder engagement and the use of ongoing feedback to continuously assess the effectiveness and relevance of the platform. Significant changes were introduced because of this iterative approach. While this did lead to overspend against the initial project budget, the final product was viewed as much more effective and well-suited to user needs. Following the initial round of feedback, the initial prototype was further developed into a working pilot which was tested with a wider pool of users in public beta. Development activities continued in parallel with user testing and the beta phase resulted in the launch of a minimum viable product. While some functionalities are still being developed, Street Manager is now live and being used to publish roadworks data.

[13] Agile is a method of project management, used particularly for software development, that is characterized by the division of tasks into short phases of work (or sprints), ongoing user engagement and frequent reassessment and adaptation of plans. For more information, see: https://www.gov.uk/service-manual/agile-delivery

[14] DfT explained that the three month delay was a direct result of the COVID-19 outbreak and the accompanying lockdown in March 2020, which delayed user training and transition to the new platform. The 3 month delay was due to Covid & lockdown. Were it not for this outbreak, Street Manager would have gone live as originally planned on 1 April 2020.

Management of transition period

A transition plan for moving stakeholders from EToN to Street Manager was agreed with many organisations based on the findings from user research conducted during the Private Beta[15]. The transition period aimed to provide business change support whilst ensuring that end-users had enough training and guidance materials to adapt to the new system, for example by engaging with existing EToN vendors and by keeping an open channel of communication with end-users.

Feedback from utilities companies, in particular, suggested disappointment with the need to continue using EToN and other systems, thus duplicating the cost of compliance, while some of the functionalities of Street Manager are not yet in place. A view was expressed by some stakeholders that transition to complete usage of Street Manager could have been delayed until some of the additional functions were implemented and working smoothly. A transition period may well be viewed as an inevitable element of this type of project, however, as the shift from one system to another will inevitably require a period of adjustment for all stakeholders.

Outputs

Table 3.2 provides an overview of the anticipated outputs against those originally identified:

Table 3.2: Summary of progress against anticipated outputs

Anticipated outputs	Progress
Replacement of EToN system with ready-to-use Platform	Street Manager replacement live and in use since 1st July 2020. Punctual development and delivery of Street Manager as a minimum viable product (with the exception of delays related directly to COVID-19)
All users using it in line with legal requirement	All users required to under legislation using SM. Acceptance and compliance with GDS standards by all stakeholders
Single set of data regardless of technology required to access it	Provides a single source of data
Single view of the street network	Achieved to some degree but functionality missing for some management and coordination use of HAs[16]
Open data published	Open data available but limited fields at present. Ongoing publication of roadworks information by all stakeholders on the Street Manager Platform[17]

Moving forward, the DfT retains responsibility for maintaining and developing SM, whose costs are, since July 2020, covered by payments from HAs and utilities using the Street Manager system. A user Governance Group decides which functionality is added and in which order as part of the continuous improvement. Stakeholders interviewed reflected positively on the

[15] Private beta is user testing with a limited number of people, in order to gather feedback and further improve the service before a larger roll-out (public beta). For more information, see: https://www.gov.uk/service-manual/agile-delivery/how-the-beta-phase-works

[16] This functionality will be added as part of the DfT's commitment to continuous improvement

[17] As of September 2020, all fields are available. The governance group is used as a forum for users to discuss and agree what data is published.

Governance Group and its make-up, despite highlighting the relatively early stage of its development.

3.2 Bus Open Data Service (BODS)

The Bus Open Data Service is intended to create a one-stop-shop for data on bus routes, timetables, fares/tickets and live locations. By improving the availability and standardisation of bus data, the project aims to ultimately improve passengers travel experiences through the provision of complete, accurate and timely information. BODS is currently in Beta stage, with ongoing user testing. Project delivery has focused on the following main activities:

Introduction of new legislation.

The project was underpinned by two pieces of legislation: the 2017 Bus Services Act and the 2019 Public Service Vehicle (Open Data) (England) Regulations. These require bus operators to publish routes and timetables, fares and tickets data, real time information and punctuality data on BODS from 2020 using specified standards. The legislation was delivered in line with the original project timeframe. Most interviewees across all stakeholder groups expressed strong support for the legislation, considering it necessary to ensure a full and fully interoperable national dataset in order to improve access to information for passengers.

However, some concerns were raised by stakeholders in relation to the content of the legislation. They felt that there was a lack of detail with regard to issues such as enforcement, how far in advance schedule changes should be communicated and the frequency with which data should be published. These perceptions were contested by DfT, which considered the legislation to provide sufficient clarity. – for example, the legislation specifies that timetable changes must be communicated 28 days before they are due to take effect.[18][19] More detailed definitions in certain areas, such as the types of data under consideration, were requested by LAs and bus operators in particular. Fears were also raised regarding the financial and resource burdens which the new requirements would place on smaller operators.

Development of a portal for the publication of open data.

BODS is intended as a one stop shop, providing a national repository of standardised data on routes and timetables, fares and real time information for buses across England. The BODS portal was officially launched in beta in (August) 2020. This means that, while not all functions have been introduced, users are registering and uploading data. 2020 was described as a "transition year", to ensure all bus operators were registered and allow for the portal to be tested and finetuned before the requirement to publish data comes into force in January 2021.

Publication of data to the portal was intended to be introduced in phases, starting with the publication of timetable data, before moving onto location data and then fares data.

LAs and service providers uniformly appreciated the ability to test the process for uploading and publishing data prior to roll-out. As the BODS platform is currently in beta, there are still some outstanding issues which are causing concern. While much of these were relatively minor

[18] The Public Service Vehicles (Open Data) (England) Regulations 2020, available at: https://www.legislation.gov.uk/ukdsi/2020/9780111196021

[19] The concerns raised by operators and LAs around timings may be a reflection of the specific context of 2020, when COVID-related lockdowns led to more regular timetable changes (some stakeholders reported making changes weekly). In an average year, timetable changes would be expected to occur every 6-12 months meaning that the timing described in the legislation could be expected to be appropriate.

issues (such as error messages triggered during testing), a consensus emerged around two specific issues:

- Lack of communication regarding how technical issues reported on the platform are being addressed and limited visibility of the short to medium term timetable for future developments;
- Concerns regarding the verification of data quality, particularly with regard to duplication of timetable information and the omission of specific elements such as stops.

COVID-19 was viewed as an exacerbating factor, in terms of both reducing the financial and human resources bus operators, local authorities and service providers had available for BODS and significantly increasing the frequency of bus timetable changes.

Bus operators seeking to maintain and update their data via the URL link feature experienced difficulties with expired files. The Business Change Team for the service routinely engaged with the big five bus operators via the Operator Digital Initiative. However until the issue was resolved, any technical glitches or errors being faced when uploading files had to be navigated on a regular basis which, combined with a perceived lack of communication with medium and smaller operators who also experienced this issue regarding how these reported errors were being addressed and a sense of being blamed for errors which had not originated with them, created an aggravating factor for service providers publishing data during the beta.

Definition and creation of common data standards.

To ensure data is published in a compatible format, BODS specified the use of the following standards:

- **TransXchange 2.4** (a commonly used industry standard) for timetable data
- **NetEx** (an EU standard not currently in use in the UK) for fares data
- **SIRI** (a commonly used industry standard) for real-time vehicle location information

The process for selecting, developing and defining data standards was relatively well received. The decision to adopt commonly-used industry standards for timetable and real-time data was welcomed and the introduction of a new standard for fares data was seen as a necessary and useful step.

Some concerns were raised regarding the detailed requirements of the TransXchange standard being used by BODS, some of which were viewed as unnecessary additions. The use of NetEx also worried stakeholders, largely because this is a new standard which is not familiar to many in the industry and is not currently used by all ticketing companies. While DfT's role in standardising fares data was welcomed, many service providers expressed doubts that they would be able to comply with NetEx requirements by the January 2021 deadline.

Concerns raised regarding compliance were exacerbated by perceived delays to the publication of specifications. The TransXchange and NetEx requirements were published late in the

summer, leaving stakeholders with a fear that they would not be able to adapt their systems to comply with the requirements in time for the January 2021 deadline.

Provision of tools and training to support operators when publishing data

These were intended to provide support converting data files into the formats required for upload to the BODS platform and help verifying the quality and completeness of the data being provided. The main tools and training developed to support BODS compliance are:

- A TransXchange tool, created by KPMG to help convert timetable data into a TransXchange file;
- A fare data build tool, created by Transport for the North (TfN) to help convert fares data into a NetEx file;
- A BODS Implementation Guide, published by DfT in January 2020;
- A number of quality assurance tools are under development, although none of those interviewed had yet used them.

Feedback from stakeholders on the tools provided so far has been varied, with the timetable tool, in particular, being described as “basic” and “clunky”. The Create Fares Data Service received a generally more positive response, with a number of stakeholders describing it as relatively easy to use. The main issue raised with regard to the tools was that they do not help save time as often data has to be entered line by line (i.e. it is not possible to paste in a whole dataset to convert it).

In the longer term, the team intend to extend the Create Fares Data Service to become a Create Data Service and provide a web based tool for the creation of timetable data to improve the upstream data creation experience for bus operators and local authorities.

Outputs

The following table provides an overview of progress to date against the project’s anticipated outputs:

Table 3.3: Summary of progress against anticipated outputs

Anticipated outputs	Progress
Bus Services Act and supporting legislation passed	Bus Services Act and Implementing Act passed. Successful adoption of both. Creation of NetEx standard for tickets and fares data
Bus Open Data Service launched publicly by January 2020	BODS service developed and registrations open – phased introduction of functionalities, service launched in Beta mode
All bus operators registered to platform	333 registered bus operators out of an estimated total of 600, of which 109 actively publishing data
Datasets for 52 operators published by DfT in a standardised format	782 datasets uploaded onto platform, of which 405 published.

Training and support tools for data publishers	TransXchange tool and NetEx tool developed and implementation guide published. Successful adoption of TransXchange as well as SIRI standards for timetable and real-time data
Automated validation checks to assess data quality	Data validation checks under development.

Additional outputs reported by the DfT include the launch of a closed test site for location data, with 20 operators providing feeds to service and the creation of a new Analyse Bus Data Service to provide location data monitoring, punctuality reports and enhanced statistics for government all based on location data feeds. Overall, while progress towards anticipated outputs has been made, LAs and service providers raised concerns around technical problems and highlighted the lack of certain functionalities and data quality, which should be further strengthened in the future. The DfT is currently in discussion with government regulators to establish an enforcement strategy for 2021 to ensure data is further shared in the appropriate formats. A key focus for the programme during 2021 is the data quality workstream working with suppliers, data standards experts and statisticians as well as the wider industry.

3.3 Opening LA Transport Data

The Opening LA Transport Data – Funding for Innovation Competition was used to support LAs in identifying and publishing potentially high value datasets related to traffic management and parking at local level. The competition promoted the use of common data standards and collaboration between LAs and between public and private sector stakeholders. The competition consisted of the following activities:

Launch of funding for innovation competition

The Funding for Innovation competition was designed to encourage local authorities to open high value datasets related to real-time traffic information and parking data. A call for applications and accompanying competition guidance was launched in November 2018 and disseminated on the DfT website and through formal and informal networks. To ensure that data was not restricted by local authority boundaries, bidders were required to demonstrate a collaborative approach to opening their data. Projects were also encouraged to use the following standards:

- CEN Datex II[20] for traffic management data
- APDS[21] for parking data

There was agreement amongst stakeholders that the competition was well managed and coordinated by the DfT. LAs, in particular, felt supported throughout the process from application to project delivery. In addition to providing positive feedback regarding the clarity of

[20] For more information on this standard see Table 3.4
[21] For more information on this standard see Table 3.4

the guidance provided, competition applicants reported that the DfT was quick to respond to queries from LAs and provide support as required.

Evaluation of bids and allocation of project funding

After securing an additional £500,000 of internal research funding, a total of £995,360 was awarded to eleven pilot projects in the form of capital grants, with amounts ranging from £50,000 to £100,000 Applicants were required to contribute at least 5% of the total scheme costs, from local authority and/or other third-party funding. A number of LAs utilised in-kind contributions of time or database access from suppliers as well as internal contributions from some LAs significantly excess of the minimum 5% contribution requirement.

LAs, DfT and wider stakeholders considered the size of the grant funding available to each LA to be the minimum investment level required to make the pilot projects viable and the limited budgets were described as “significant constraints” on the scope of individual pilots. Whilst the allocated funding was seen as sufficient given the ambitions of the competition, it was explained that significant additional funding would be required to further develop the use cases into business cases.

Delivery of pilots and ongoing stakeholder engagement

Following the announcement of the competition winners, the DfT organised a workshop for beneficiaries of all five competitions being run by the DfT. They were invited to engage with beneficiaries of previous competitions and members of the TTF to share feedback and identify similarities between projects at the outset of the competition.

Beneficiaries were also expected to join the TTF’s Connected Technologies and Data user group, which acted as a continuous point of contact and an arena for ad-hoc support and peer to peer knowledge sharing throughout the competition. LA stakeholders welcomed the opportunity to share knowledge and learning across pilots and appreciated the substantial effort made by DfT to promote exchange of experiences, shared learning and develop synergies between projects (and between Local authorities more broadly).

The transition to virtual meetings which resulted from the COVID 19 outbreak and ensuing national lockdown in March 2020 led to a tangible decline in the perceived value of the TTF user group. Despite conducting a number of virtual meetings, LA stakeholders noted a significant decrease in interaction and engagement between LAs since shifting to online delivery.

Collation of learning and dissemination of project results

On completion of their projects, competition beneficiaries were required to submit a closing report detailing project activities and expected outputs. At the time of writing, seven of the eleven projects had officially completed their projects. Five of the completed projects were presented to the broader TTF Forum and three were included in the TTF’s State of the Connection Nation Report.

Although delivery of the pilot projects was due to be completed by the end of April 2020, four projects had yet to deliver their closing report by August. The timeframe for project delivery was

identified as a significant challenge for LAs, with a number of projects reporting delays due to issues in relation to the procurement of datasets. LAs identified two major challenges: the first related to delays in acquiring data, with knock-on effects for its publication the second related to the integration of the data once it had been acquired, with a number of datasets described as incomplete or poorly organised and in need of significant additional data cleaning. One LA reported significant issues related to the consistency of data between datasets supplied by different vendors, while others reported a reluctance from LAs to release certain datasets.

LAs also reported encountering technical challenges which required them to seek alternative solutions and amend the initial project specifications, causing delays or failure to achieve some outputs. One LA discovered through the course of implementing their pilot that the increasingly demanding nature of the datasets to be published would require an upgrade of their open data platform.

COVID-19 presented a challenge to a number of beneficiaries because of resource availability and priority changes. A number of project elements were put on hold, creating delays and bottlenecks in the delivery of pilot projects.

Outputs

A total of eleven projects received support from the DfT, of which seven were completed and four still ongoing at the time of reporting. The following table highlights the progress of the project as a whole against the anticipated outputs as defined in the project-level ToC.

Table 3.4: Summary of progress against anticipated outputs

Anticipated outputs	Progress
LAs and service operators publish open parking and traffic management data	Development of data sharing platforms and other efforts to facilitate data publication by five LAs; and use of existing platforms by others. Publication of a significant number of previously closed real-time traffic management and parking datasets by 10 out of 11 projects in human and computer readable formats to other service users and third parties
Adoption and use of common standards for opening data	Adoption of CEN Datex II, a well-established industry standard, for publication of real-time information and data by a significant number of LAs; Adoption of APDS parking standard by two local authorities, although others struggled with the standard's specified technical requirements
DfT develop business cases to demonstrate benefits of opening transport data; collates and shares best practice with broader transport community	Development, demonstration and dissemination through the Transport and Technology Forum of three proof of concepts, or use cases.

Whilst all projects looked set to deliver against their expected outputs, albeit with some delays, the nature of the competition meant that these were relatively modest in scope. Uptake of common standards was patchy, with high levels of compliance with CEN Datex II but limited

success in uptake of the APDS parking standard, linked to a lack of understanding and technical challenges encountered in formatting datasets.

Although three of the projects have been awarded funding by DfT for further development activities, there is still some way to go before the majority of projects are at this stage. The main obstacles identified relate to poor data quality (both in terms of completeness and content), limited technical ability within LAs and delays related to overall procurement timeframes (i.e. some requirements cannot be included halfway through a contract) and the knock-on effects of the COVID 19 outbreak.

3.4 Overall progress against the Theory of Change

This section provides an overview of the progress that has been made at overall project level against the three main elements which were identified as common to all three open data projects.

3.4.1 Publication of data standards and guidance

All three projects focused on ensuring the interoperability of data being opened by requesting compliance with specific standards. For Street Manager, where information was being input into a central Platform manager by DfT, this meant complying with GDS standards to ensure the data would be published in an accessible way. For BODS and Opening LA Data, however, this meant specifying standards to be used for the publication of different datasets. Both BODS and Street Manager used a mixture of pre-existing standards (where existing standards were used by the industry) and the creation of new standards (where no existing standard was available).

In both cases, the choice of well-known industry standards was largely welcomed by all stakeholders and adoption was expected to be relatively successful (although in BODS some questioned the decision to introduce what were viewed as additional interpretations of the existing standard). Compliance with new standards (NetEx and APDS) was somewhat more complicated, with stakeholders from both BODS and Opening LA Data expressing concerns about their understanding of the standard and their ability to adapt existing systems to comply. In BODS, DfT staff are working with third party suppliers to overcome these issues and expect significant progress by the end of 2021. In Opening LA Transport Data, limited support was available (due primarily to the limited budget and the decentralised nature of the competition) and more support would be needed going forward to ensure increased uptake of the standard.

3.4.2 Support for opening transport data

Support for opening transport data was provided through three key mechanisms:

- Street Manager and BODS developed online platforms for the publication of national datasets related to street works and bus journeys.
- Opening LA Data provided financial support in the form of grant funding to allow LAs to identify and publish potential high value datasets.

- All three projects developed written guidance to allow LAs and other stakeholders to understand the requirements associated with the three projects.
- BODS further developed tools to help convert timetable and fares data into the standard required for upload to the BODS platform.

While all of these support activities have achieved their primary goal of facilitating the opening of transport data, stakeholders have identified a need for further technical and financial support in order to help LAs and private sector service providers update their systems and upskill employees to provide data which meets the specified standards and formats. Additionally, a long-term resource deficit has been identified by LAs and SMEs, in particular, for whom the additional burden associated with meeting the data requirements being requested by DfT is perceived to be significant. This type of support has not been identified as necessary within Street Manager, but this can be traced to the fact that data providers are inputting the data via an online form rather than uploading datasets to a service (as with BODS) or publishing them themselves (as with Opening LA Data).

3.4.3 Stakeholder engagement and communications

The three open data projects used different methods for stakeholder engagement and broader communications:

- Street Manager initially reached out through industry associations to develop a core user group, using a snowball approach to further increase their outreach. This was accompanied by the secondment of subject matter experts (SMEs) into the project team, who were also asked to reach out to their own contacts and provide their own expertise to ensure the project was well suited to user needs.
- BODS held a number of stakeholder engagement events, including workshops and consultations. Those who expressed interest were invited to participate in the implementation working group (for implementation experts), the Programme Board (at senior level) and/or user testing during the alpha/beta phase. The team have also worked with data standards experts on an ad hoc basis across the duration of the programme.
- The Opening LA Transport Data Competition was publicised via DfT's pre-existing networks and via their website. Additionally, the Technology Transport Forum was used as an ongoing venue for stakeholder engagement, promoting shared learning between projects and encouraging participants to identify areas of future collaboration.

Additionally, both BODS and Street Manager used a range of digital and in-person activities to communicate progress in terms of project delivery and provide avenues for stakeholders to reach out with any questions or queries. Both projects identified the need for a range of outreach activities, with a particular emphasis on face to face/in-person communications. Digital communications, including the use of a slack channel[22] (Street Manager), the use of a Twitter channel (Bus Open Data), and online newsletters were viewed as helpful but ultimately not as

[22] For more information on how slack channels work, see: https://slack.com/intl/en-gb/help/articles/360017938993-What-is-a-channel

useful as might have originally been foreseen. Trade and national press have also been utilised extensively by the Bus Open Data programme to mark key milestones in the programme for example launching the Timetables Service in January 2020. DfT staff highlighted the need for digital transformation projects to engage via digital channels and migrate audiences slowly into such channels from traditional paper based channels, despite the initial pushback such digital communications might incur initially.

3.5 Common themes

This section presents the common findings emerging across all projects, based on a synthesis analysis of the individual project case studies. These findings are details below.

3.5.1 There is clear support for DfT to play a leading role in open transport data

There is a clear mandate as well as strong support from local authorities and industry for the DfT to play a leading role in encouraging the opening of transport data. This can take multiple forms:

- Demonstrating pathfinder[23] projects and the potential value of specific datasets, and sharing this learning with LAs and other stakeholders nationally;
- Increasing the technical and financial capacity of LAs and the private sector to enable them to publish high value datasets using common standards.
- Development and promotion of specific standards to ensure interoperability, including the introduction of legislation to mandate use of the standards;
- Ensuring there is one verifiable source of information, which can be used to improve monitoring and compliance (for example, with regard to streetworks notifications or punctuality data for buses)
- Ensuring transport operators and local authorities have access to digital tooling to both create data and exploit data.

3.5.2 Engagement with LAs and private sector stakeholders is an essential precondition for ensuring quality, completeness and uniformity of data

All stakeholder groups interviewed across the three case studies recognised the value of having one source of information, or “one version of the truth”. Additionally, there was strong support for DfT to play a leading role in developing and promoting data standards to ensure interoperability of transport datasets.

However, due to the complexity of the transport sector and the multiplicity of data standards currently in use, the successful publication of standardised high-quality data which can be exploited to create additional value requires significant levels of buy-in and long-term relationship building between DfT, LAs and the private sector.

[23] Pathfinder projects is a term used to describe projects which are the first of their type and for which no clear blueprint exists. Pathfinders are often experimental in nature. They used to demonstrate the value of a certain approach and to gather learning for others. In this instance, pathfinder projects tend to be those implemented by more digitally advanced organisations investigating the possible use cases for different types of transport data and demonstrating how they may be used to create added value.

- Reaching out to stakeholders during the inception and planning phase of the project (at Discovery phase or earlier) is important in ensuring they are bought in to the process. Additional value can be gained from early consultations, as this can help alert project staff to potential flashpoints at the outset and ensure the product is designed in a way which responds to user needs, preventing any misunderstandings from becoming “baked in”;

- Proactive communication is welcomed by project stakeholders, particularly in response to feedback received and in communicating timeframes for the implementation both of next steps and more forward-facing activities. One very specific example of this relates to the transition period between legacy and replacement systems, when clear upfront communication could help ease frustration around perceived duplication in terms of publishing data.

- If compliance with a specific standard is required, or legislation is being introduced, early engagement can also help avert potential alienation or resistance. Giving stakeholders the opportunity to raise any sticking points early in the process and giving a clear rationale for decisions taken.

- Engagement should be clear and consistent through all stages of the project. It may be useful to include nominated contact points, either within the core delivery team or by nomination project “champions” to coordinate dialogue with stakeholders and facilitate peer to peer learning.

- The use of subject matter experts (i.e. representatives from different stakeholder groups who are seconded into the project team) can help to ensure products take into account the complexities of a given sector, and may help build trust and facilitate dialogue with different stakeholder groups.

- The provision of opportunities for peer to peer learning and exchange was highly valued, particularly by LAs who viewed this as a mechanism to increase capacity and encourage potential future collaboration.

- Ensuring a range of paper-based and digital communications as well as direct engagement through in-person workshops, presentations and roadshows can help ensure maximal engagement;

- Online workshops can be useful for activities with a clear goal, such as gathering feedback on specific developments or discussing the implementation of data standards. They work less well, however, for more informal communication activities such as peer to peer exchange.

3.5.3 In order to realise the potential of open data, further support is needed for LAs, the private sector and within the DfT

There is **significant variation** between LAs and service providers in digital literacy, resource availability and openness to sharing data. The need for additional support to facilitate the

opening of data has been identified across all projects and all stakeholder groups. Options suggested include:

- Complementing mandatory compliance measures with additional financial support for local authorities and service operators to support the adaptation of existing systems and other changes needed to meet any new standards being introduced.
- In addition to creating tools such as those developed to support the creation of data files within BODS, inclusion of optional technical support may be required. One method suggested for this was the procurement of technical expertise through a framework contract or similar mechanism, which can be put at the disposal of local authorities who may need additional capacity to support their transition.
- Pilot projects have also been shown to be well suited to demonstrating the possibilities of open data in areas where the potential of available datasets may not yet have been realised, whilst financial and technical support may be required to accelerate adoption amongst those who are lagging behind.
- Additionally, a need has been identified for further capacity building within DfT, both in the form of **upskilling DfT staff** and the provision of **formal feedback mechanisms** to ensure learning from projects is not lost.

3.5.4 COVID-19 had differing implications for the delivery of all three projects

The COVID-19 outbreak in early 2020 led to the implementation of a national lockdown in March 2020, with significant impacts for the transport sector as a whole. The bus sector was particularly impacted, with bus operators reporting a sharp decline in passenger numbers and a concurrent increase in the frequency of timetable changes. In the area of roadworks, lockdown was viewed as an opportunity in some areas to carry out urgent roadworks with less disruption, thanks to the decrease in overall circulation on the roads.

These changes impacted the project in different ways:

- Although the pilot projects funded by the Opening LA Transport Data Competition were due to be completed by the end of March 2020, the COVID-19 outbreak led to some delays in delivering some final outputs with knock-on effects for the delivery of closing reports (marking the official closure of the projects)
- COVID-19 led to delays in the roll-out of Street Manager. This was viewed as helpful, overall, as it gave time for existing EToN suppliers to adapt their APIs to communicate with the platform – something they wouldn't have achieved by the original go-live date.
- The impact on BODS was perhaps the most significant, as the national lockdown led to severe disruption on routes and had significant negative impact on the turnover of service providers. Ongoing uncertainty in relation to service provision has implications for the data being uploaded to BODS and has exacerbated concerns regarding the administrative and financial burden of compliance.

The national lockdown also necessitated a shift to online delivery of meetings, workshops, trainings and other dissemination activities had mixed results.

- For BODS and Street Manager, the move to digital delivery was broadly welcomed as it allowed those who were working from home to attend training sessions, workshops and project meetings more easily.
- For Opening LA Transport data, however, this transition was much less successful and was felt to significantly reduce the value of exchange between different participants.

3.5.5 Enablers and barriers to the achievement of outcomes

Several key common enablers and barriers were identified across the three projects:

Enablers

Three key enablers have been identified to support the long-term success of open data projects:

- **The use of legislation**: Legislative requirements to publish data according on the BODS and Street Manager platforms ensured long-term completeness and interoperability of national transport datasets. Legislation was also credited as an accelerator which put pressure on industry stakeholders to prioritise publishing and standardising their data.
- **Stakeholder engagement:** Ensuring a range and depth of stakeholder engagement activities was necessary in order to ensue buy-in from a range of stakeholder groups. Stakeholders identified the significant role played by their peers in providing support and promoting shared learning. The user of existing forums such as the Highways Authority and Utilities Commissions and the Technology and Transport Forum helped facilitate this type of exchange.
- **Developing long-term relationships:** The project lead in each project remained stable throughout all phases of project delivery. The need for consistency within project teams was seen as very valuable in terms of building trust and constructive dialogue with different stakeholders. Finally, the use of subject matter experts as well as those with technical expertise in IT systems helped to create strong links with industry partners, in particular.

Barriers

Building upon findings from the different projects, three barriers have been identified:

- **COVID-19:** The clearest threat to timely delivery of the projects the COVID-19 pandemic, which took hold in the UK in early 2020. This created varying levels of disruption within the transport industry and acted as an obstacle to the ongoing development of data platforms, as well as the adaptation of systems needed for publication of certain datasets in compliance with the required standards.
- **Resource requirements:** All three projects required significant resource, not just for the creation and testing of digital infrastructure (BODS, Street Manager), but also to ensure

data published did not contain errors, duplication or gaps (BODS, Opening LA Data). Additionally, given the complexities of the different sectors, stakeholder engagement was a very resource intensive activity requiring significant resource for stakeholder identification, dissemination activities and ongoing dialogue.

- **Data quality and completeness:** Concerns were expressed regarding both completeness of data available and the content of data files, which was believed to contain many potential errors and duplications. Concerns about data quality were exacerbated in some cases by concerns regarding compliance with certain standards, either due to lack of expertise or because the standards were not felt to fully reflect the intricacies of certain datasets. This led to fears being raised that the data, even if published to the correct standard, might be misleading or hard to interpret by third parties.

4 Cross-cutting conclusions

In this section, we assess the progress of the projects against the overarching evaluation questions. These track the projects' implementation from their initial inception through to the identification to identified outcomes and contribution to the DfT's broader strategic objectives.

The main conclusions can be summarised as follows:

- Project scoping and design was well suited to the differing needs of the different projects and well received by stakeholders.
- The use of Agile to deliver BODs and Street Manager allowed the projects to be responsive to user needs and was efficient in terms of delivering significant digital infrastructure projects in a relatively short timeframe, however this approach was resource-intensive and open to project creep (due to the responsive and adaptable nature of the Agile methodology).
- The projects were judged to have been well implemented overall, with positive feedback around the role of the DfT teams, in particular.
- The main outputs foreseen across all projects were delivered largely on time, with delays primarily due to complications associated with the COVID-19 outbreak.
- Stakeholder engagement was a vital part of project delivery, but required significant investment in coordination and communication efforts.
- While local authorities and service providers engaged positively with the projects in general, significant differences emerged in terms of digital expertise, resourcing constraints and financial capacity. The quality of data being published emerged as a particular concern.
- All three projects delivered against their projected outputs, however there is limited evidence at this stage that these will be converted into more concrete outcomes in the longer term.

4.1 Project scoping and design

4.1.1 How effective was the approach taken to inform the concept and design of the projects?

The approach taken to inform the concept and design of the different projects could be described as quite effective overall, with the choice of project design shaped by the specific needs identified during the scoping phase for each project. However, some issues did arise with regard to potential duplication and loss of knowledge, resulting from the decoupling of the inception and implementation.

Two different approaches were taken in the design and conceptualisation of the three open data projects, resulting primarily from their differing objectives. Street Manager and BODS could be

described as significant IT infrastructure projects, intended to deliver centrally managed databases for the publication and sharing of datasets. Opening LA Data, however, was intended as an exploratory project, thus it was run in the form of a competition, with seed funding provided in the form of capital grants to LAs in order to encourage them to publish high quality datasets and identify potential areas for future investment.

All three projects were informed by an initial scoping phase, with the publication of a detailed report including recommendations based on in-depth stakeholder consultation and a detailed needs assessment. There was universal satisfaction with the scoping phases which informed all three open data projects. These were viewed as useful both for engaging the relative stakeholders early on (through workshops, interviews and other consultation activities), developing a detailed understanding of how the different sectors worked and correctly identifying the needs faced by different parts of the transport sector with regard to the opening and exploitation of existing high value datasets. In addition to the formal Discovery activities, the decision by those involved in BODS to engage with the Street Manager team in order to benefit from their experiences of delivering a similar project was a very sensible approach to avert potential pitfalls and ensure lessons learned from the previous scheme.

It is noteworthy that for all three projects, the project scoping phase was decoupled from its implementation. This was due to the differing requirements of the different elements of the projects, with significant technical knowhow required for the implementation of Street Manager and BODS, and the management and coordination of the Opening LA Data project requiring limited administration which could be overseen directly by DfT. This decision did cause some issues in the context of BODS specifically, as stakeholders involved in the initial scoping phase felt that information was lost between scoping and implementation, leading to duplication and misunderstanding around some of the specificities of the bus industry.

4.1.2 Were the project management methods chosen suitable to effective and efficient delivery of the projects?

In general, the project management approached chosen for the projects can be deemed suitable to the nature and activities in scope. All three projects were run by very small core teams within DfT, with responsibility for delivery on BODS and Street Manager outsourced to external subcontractors.

While both BODS and Street Manager were highly resource intensive in their delivery, given the ambition of the two projects, the level of human resources dedicated to their implementation by the DfT appears relatively modest. Stakeholder feedback from BODS, in particular, suggests that more dedicated resources – for example, named regional contact points – would have been usefully in ensuring the effective dissemination of project-level information beyond DfT's channels and providing support to smaller or less digitally advanced LAs and bus operators. Within Opening LA Transport Data, the TTF was used as a forum for ongoing exchange, informal monitoring and the presentation of final results. This can be judged as an efficient and effective method for providing informal support, promoting project results and encouraging learning to be shared.

In line with GDS recommendations, both Street Manager and BODS implemented their projects using Agile principles. The Agile approach seems to have been quite effective in allowing the projects to be responsive to user needs as the projects progressed and in allowing for significant digital infrastructure projects to be delivered in a relatively short timeframe, however this did raise an accompanying risk of project creep and increases in overall expenditure.

In contrast to BODS and Street Manager, the Opening LA Transport Data competition required a relatively light-touch approach to project management. As the project was intended primarily as a distribution mechanism for seed funding to help LAs publish their data, this approach seems appropriate in light of both the overall project budget and the decentralised nature of the activities. The decision to use the Transport and Technology Forum for dissemination, ad-hoc support and monitoring was a sensible method of ensuring value for money in terms of providing a self-governing feedback mechanism.

All projects successfully delivered outputs in line with initial expectations, with some signs of longer term outcomes emerging. They can therefore be judged as suitable for both efficient and effective delivery within the remit of the project.

4.2 Project management and delivery

4.2.1 How well was project management and delivery implemented?

Stakeholder feedback suggests that the projects were well implemented overall, with positive feedback around the role of the DfT teams, in particular. The main outputs foreseen across all projects were delivered largely on time, with delays primarily due to complications associated with the COVID-19 outbreak. Given the complexity of BODS and Street Manager, in particular, the delivery of most major outputs on schedule can be viewed as evidence of good management.

All projects included engagement with a range of stakeholder groups, necessitating significant ongoing coordination and communication efforts. Evidence from BODS and Street Manager suggests that stakeholder engagement needs to be carefully considered in Agile projects, as early exposure to partially developed products can lead to concerns around elements which contain minor errors or are viewed as sub-optimal due to their current stage of development. It is therefore important to ensure clear communications both with in communication the current stage of development to users and in explaining how future development activities will address any issues raised.

Stakeholders welcomed the ability to input into the projects from Discovery and to participate in early testing of the new systems being introduced within BODS and Street Manager, but this did lead to concerns from users with regard to elements which were still under development or not yet available. One of the key issues raised was around communication with stakeholder groups. While this worked well in Street Manager, stakeholders within BODS raised concerns that responses to stakeholder feedback on the project's design and solutions to errors and glitches identified testing activities were not always clearly communicated

4.2.2 Was the level of commitment from partners sufficient? How were differences in expectations from different partners managed?

The projects engaged with a range of LA and private sector partners, representing the primary stakeholder groups implicated in the different sectors being targeted. Additionally, other teams within DfT provided a level of informal support and efforts were also made to engage with interested third parties (for example, the DVSA, Traffic Commissioner and tech developers) in order to support the use of the data being published to create added value in areas such as compliance and the development of apps etc.

In general, partners displayed significant levels of commitment to the projects. Local authorities, in particular, were very engaged across all three projects. In the case of BODS, even those who did not necessarily support the project's rationale nonetheless engaged with the Management Board and implementation working group. Private sector stakeholders and LAs alike noted that it was in their interest to engage with these projects, as they were to some extent reflective of the long-term direction of data within their specific sector. BODS stakeholders expressed some concern regarding the project team's knowledge of the transport sector, a feeling which led to some distrust of the team's ability to deliver a project which would meet stakeholder needs. The secondment of subject matter experts in Street Manager was viewed as a significant step in ensuring user needs were reflected and gaining the trust of different stakeholder groups.

Some issues were identified, however, with regard to those responsible for supplying the data. In both BODS and Street Manager, a level of reluctance could be identified amongst some parties both with regard to publishing the data and adapting existing systems to ensure interoperability with the new platforms being developed. Issues identified in the pilot projects funded through the Opening LA Transport Data competition also related to delays in the provision of certain datasets and issues with the quality of data provided.

4.2.3 Was there sufficient oversight to ensure that the project was carried out in an effective and efficient manner?

Oversight for the different projects was provided at a number of different levels. In all projects, the project lead remained a consistent presence providing oversight for the day-to-day running and strategic direction of the project. Additionally, GDS provided oversight of the technical implementation for both BODS and Street Manager through the mechanism of the formal assessments which were carried out at the end of the alpha and beta phases. Additionally, BODS was subject to a Cabinet Office spending review. As Opening LA Project Data did not create or maintain any centralised digital infrastructure, there was no oversight from GDS on this project. However, the TTF was used as a forum for ongoing monitoring of the different pilot projects (although this was relatively light touch, which reflects the relatively small sums of money involved in each project).

Nonetheless, there is potential for the DfT Digital Team to provide more support and coordination in future projects with regard to the specific technical elements of the different projects, particularly in terms of ensuring they are well aligned with the Department's new Data Strategy and wider objectives. Additionally, both DfT staff involved in BODS and Opening LA

Transport Data acknowledged that more attention could have been paid to monitoring and evaluation of project

4.2.4 How effectively did the projects interact with Government Digital Services and DfT's Digital Team?

Interaction with Government Digital Services was only required for BODS and Street Manager, as the role of DfT in Opening LA Transport Data was limited to administration of the competition. In both cases, communication with GDS related to the formal assessments were required at the end of both alpha and beta stages of the projects.

Digital Service Partners were deemed very helpful both in supporting DfT teams in the preparation of their (reviews) and in facilitating access to training to build capacity, for example with regard to the use of Amazon Web Services. DfT staff involved in BODS found the virtual review organised by their Digital Service Partner particularly helpful in helping to improve the quality of the product being delivered.

Interaction with DfT's digital team was relatively limited across all three projects. While DfT staff involved in project delivery did not view this as having any significant negative impacts on the projects, the Digital Team identified a need for more coordinated support in delivering these types of projects going forward.

4.2.5 To what extent has interoperability been considered (and achieved) in the development of the projects?

All three projects worked to guarantee interoperability by specifying data standards to be used when publishing data outputs. Street Manager and BODS both introduced legislation, which mandated compliance with the standards and/or formats specified for each platform. Legislation would not have been appropriate in the case of Opening LA Transport Data, but named data standards were nonetheless specified for specific types of data in order to promote interoperability.

There was uniform support for DfT's efforts to ensure interoperability, but this was not always achieved in practice. The decision in BODS and Opening LA Transport Data to use existing industry standards, where possible, was also welcomed by stakeholders, although some raised concerns regarding the particularities of DfT's interpretation of these standards. Where new standards were introduced (for example, NetEX and APDS) more significant difficulties were encountered.

Common obstacles raised include the limited technical capacity of some LAs and service providers, particularly those with limited resources; technical difficulties in adapting existing technology to meet the requirements of new standards and associated costs; and the ability of some stakeholders to fully understand the requirements of certain standards.

4.2.6 What lessons can be learned regarding what worked, and what didn't, in terms of project management and delivery?

The following lessons can be drawn from across the three projects with regard to project management and delivery:

- The inclusion of subject matter experts, in addition to project management and technical expertise, can be a very useful tool for building stakeholder confidence that the end product will be suitable for their needs.

- A range and depth of communication and stakeholder engagement activities is vital to ensure all those with an interest in project outcomes are able to follow progress and provide constructive inputs. Learning from across the projects suggests that a mix of national, regional, face-to-face and online geographies and mediums is the most effective in bridging urban/rural, north/south and digital divides.

- Additionally, efficient use of existing relationships and collaborations, e.g. through existing industry bodies or stakeholder associations could help represent multiple stakeholders and signpost relevant individuals in the industry.

- As well as mandating compliance with specific standards, support in the form of financial resource, capacity building and technical expertise may be required to upskill public and private sector stakeholders and ensure they can achieve the standards required.

- Internal knowledge-sharing (between teams and between consultants working on different phases of projects) is key to ensure lessons learned are not lost. Informal methods such as show and tells could be accompanied by more formal documentation of the different phases of each project as well as a final team debrief, including a review and feedback session.

- Finally, there is a need to outline development pathways for the development of project outputs and a clear vision for how the data could be used to create additional value. A role for the DfT in future would be to develop strategy for promoting the open data and work with potential users to further understand need to ensure what is made available meets these needs.

4.3 Outputs, outcomes and impacts

4.3.1 How well are the projects meeting their objectives? To what extent do project stakeholders agree on the success (or otherwise) of the project?

The objectives of each project can be divided into two elements, which are broadly similar across all projects:

- The first element can be characterised as increasing the availability, accessibility and accuracy data. All three projects can be judged to have effectively met this objective, if their current stage of implementation is taken into account.

- The second element relates to the additional value which is expected from the data once published, improving decision making, providing opportunities for innovation and increasing people's quality of life through the increased accuracy, accessibility and transparency of the information available. While it is too early to judge the extent to which

this objective has been achieved, project stakeholders identified a number of project outcomes which demonstrate progress towards this goal.

In general, stakeholders across the three projects were positive about their overall progress towards the objectives outlined above though. Street Manager, in particular, appeared to have been viewed by all stakeholders as successful. However, some strongly diverging views were expressed by stakeholders within the BODS project in particular. These centred on concerns around the completeness and quality of the data eventually published on BODS, particularly given the ambitious timeframes and the transition away from using LAs to assess, complete and sense check the data before publication. To some extent, these concerns should be understood as a result of the current stage of project development, with the BODS platform in beta phase and still undergoing user testing. Doubts raised regarding the usability of some of the support tools and a lack of clarity regarding how automated quality assurance would be implemented may, however, point to some difficulties in ensuring the availability, accuracy and accessibility of the data published at least in the short term.

Concerns about data quality were also echoed by some of those responsible for delivering pilot projects within the Opening LA Transport data project. In this case, however, the quality of the data had not necessarily prevented the project from achieving its objectives but had led to delays in stakeholders' ability to publish the data.

4.3.2 What are the short and long term outcomes of making transport data available?

The timelines of all three projects mean that it is difficult to discern clear evidence of outcomes. Nonetheless, stakeholders were able to point to some indications that more concrete use cases may materialise over the longer term. In the short term, the opening of transport data was credited with helping to reduce ambiguity around the accuracy of data, increase transparency and provide opportunities for more effective monitoring and compliance. In some cases, potential efficiencies were also expected by allowing providers to publish and quality check their own data without the need for third parties to play this role.

The primary long-term outcome expected across all projects was the use of the newly opened data to create additional value either for LAs themselves or through the development of new products. Some examples of the additional value created by the three open data projects are:

- The ability to remove unnecessary links in the data chain and publish data directly was valued by some HAs within Street Manager and was also an expectation of some of the bus operators involved with BODS.

- The DfT recorded a total of 570 unique visitors to the BODS platform so far, including data consumers such as google, moovit and citymapper. One pilot funded through the Opening LA Transport Data competition also reported that the data opened by their project had been had been viewed over 9,000 times by 725 users by the time of reporting.

- Operators who were registered on BODS at the start of the COVID-19 outbreak were able to provide real-time data to google and others regarding timetable changes during the national lockdown which followed.

- Pilot projects supported through the Opening LA Data competition reported a range of outcomes including the use of public data feeds to disseminate information about available parking spaces, the automation of data formatting and publishing procedures

Additionally, projects had begun to consider potential longer-term uses of the data and reported making contact with technology companies and other potential users to investigate further opportunities for creating additional value.

4.3.3 How well do the projects contribute to the aims of the Future of Mobility: Urban Strategy and broader government policy priorities?

As described in the introduction, all three projects fall within the remit of the Future of Mobility Urban Strategy. The specific objectives of each project are broadly similar and explicitly align with the Future of Mobility Urban Strategy's stated goal of "Improving access to and availability of local transport data".

The projects are expected to contribute to three aims identified within the Future of Mobility: Urban Strategy, namely: social benefits (including safer streets, inclusive transport, active travel and increased use of public transport) and environmental benefits (such as reduced emissions, decrease in noise pollution, unlocking spatial opportunities and tackling congestion); and financial benefits (improved productivity and job creation).

In theory, all three projects can be expected to contribute to some extent to each of these aims. Stakeholders across the three projects agreed that it was too early to gauge the extent to which this has happened and there is currently no robust data to prove any impact of the three projects on these broader aims.

However, a clear inference can be made from project outcomes such as increased clarity around roadworks, bus timetables and parking availability and a concurrent decrease in congestion, particularly in urban areas. Additionally, if – as expected – the projects do allow tech companies to unlock additional benefits from real-time data (particularly around the location of buses, for example) and more accurate information about where and when roadworks are taking place, this could be expected to contribute to increased safety – both on behalf of road users, who may be more likely to know in advance of people working in the road, and on behalf of bus passengers, who may be able to better monitor bus traffic and therefore spend less time (particularly late at night) waiting in bus stops, for example.

BODS, particularly, is expected to improve overall passenger numbers (or the modal share of passengers) on buses through increased transparency and reliability around timetable, location and fares data, assuming that the decreases in passenger numbers resulting from the COVID-19 pandemic in 2020 are not converted into a long-term trend.

It should be noted that these projects outcomes are at this point highly speculative. They prove only that there is a possibility of the three projects contributing to the Future of Mobility: Urban Strategy's broader aims, rather than any evidence – as yet – of project impacts.

5 Recommendations

Based on the conclusions outlined above, the following recommendations are put forward to inform future projects in the field of open transport data:

- **DfT should continue to promote the use of open data**, taking particular responsibility for the development and promotion of common standards in different sectors and the creation of national datasets.
- **In addition to technical Discovery reports, future projects could explore the possibility of using a Policy Alpha** to ensure coherence with policy/legislation and identify the need for any additional legislative processes.
- **DfT should investigate the use of a range of support mechanisms** to build capacity within government and in key stakeholder groups and facilitate both the quality and completeness of open data.
- **Internal learning within the DfT should be gathered, documented and shared** between projects, departments and with other government stakeholders to reduce the risk of duplication and enable colleagues to avoid potential pitfalls in future open data projects.
- **Consideration should be given to the management and financing of Agile projects, in particular.** The inbuilt flexibility and adaptability required during project implementation may necessitate some changes to how such projects are governed within DfT. For example, it may be appropriate to build in additional funding to allow project managers the flexibility to make changes in response to user testing and consultation.
- **DfT should invest in ensuring depth of knowledge with regard to the design and delivery of digital projects,** through the use of internal digital champions, more knowledge-sharing opportunities and the possibility of training in the use of Agile methodologies. This would help to build in resilience to ensure continuity in the event that key personnel are not available.
- **DfT should work to develop relationships with LAs and private sector stakeholders at sectoral level**, leveraging existing Forums where possible, in order to develop a long-term partnership approach to opening transport data and to ensure the Department is able to engage with the relevant stakeholders early in the project design and initiation process.
- **DfT should carry out regular data maturity assessments** to identify the type and level of support needed by different local authorities. Findings from these assessments could be used to update and tailor DfT's Local Authority Open Transport Data Guidance (currently under development) to ensure it meets the needs of local authorities with differing levels of data and digital literacy.

- **Pockets of excellence should be identified** at LA level and in the private sector. Further support to given to enable the development of lighthouse projects, which can help identify and test the potential uses of open data.
- **There is potential for DfT to engage with the broader open data community,** in order to gain a broader understanding of and participate in the larger conversation around the potential uses of open data and the development of data action plans.
- **DfT should develop a monitoring and evaluation framework,** under the auspices of the new Data Strategy, to measure the contribution of different data projects to the Department's overall strategic objectives. Additionally, DfT should consider commissioning an impact evaluation to gather more robust evidence on whether opening data does indeed translate into the development of added value products or services, and the nature of the benefits arising from this. This evidence could then support the prioritisation of future projects.

Annexes

Annex 1: Street Manager

Introduction

This case study aims to evaluate the development of the Street Manager (SM) platform. It describes the process through which the platform was developed and identifies the different factors that have hindered or enabled its delivery, and the extent to which it has achieved its intended outcomes. The case study is structured as follows:

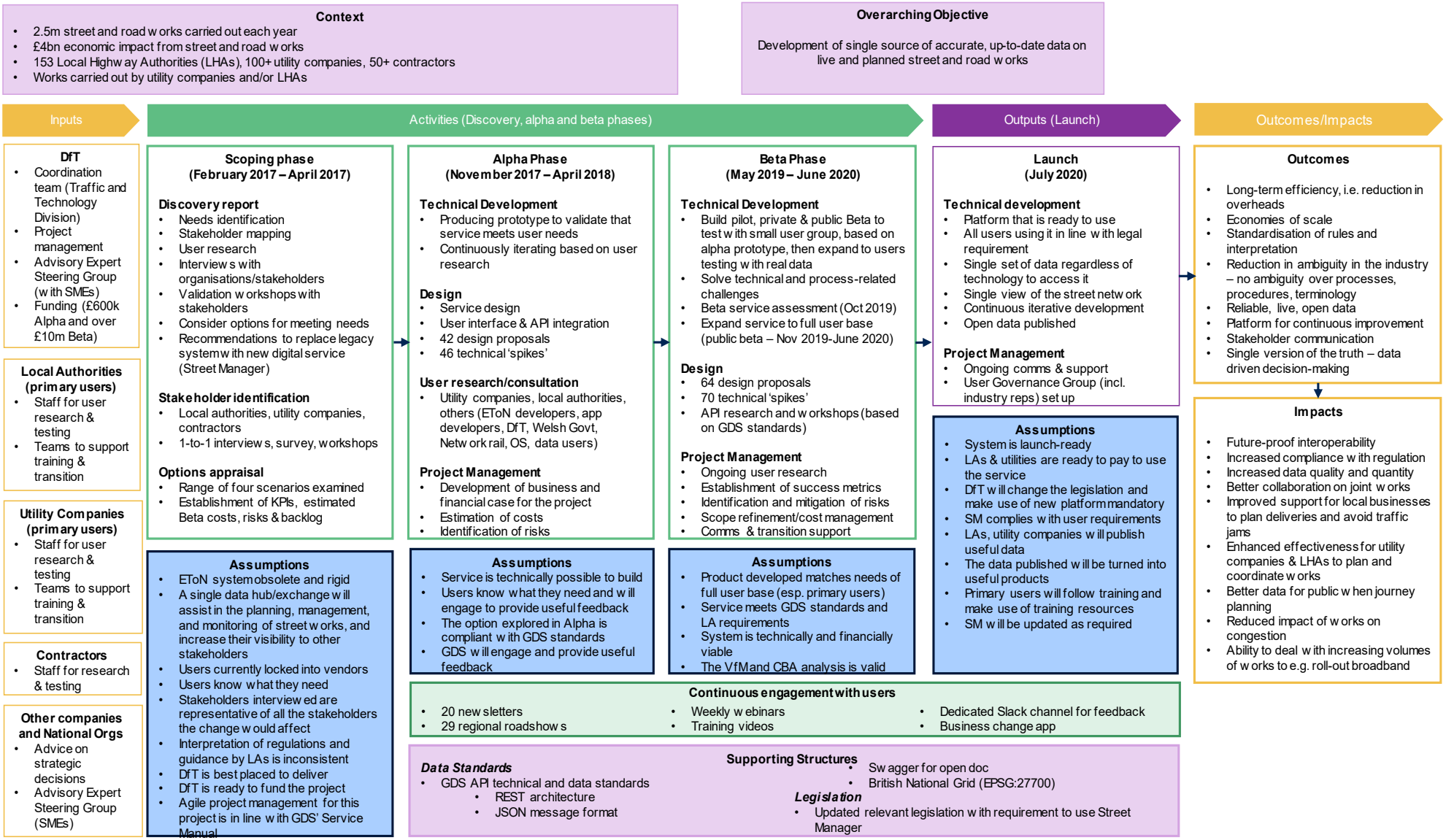
The case study is based on desk research, analysis of application and monitoring data provided by the Department for Transport (DfT) and Local Authorities (LAs), as well as 11 in-depth interviews with relevant stakeholders including members of the DfT's Street Manager team, Highways Authority (HA) staff, technology providers, utility providers and other strategic stakeholders. A brief overview of SM is provided in the table below.

Table 5.1: Overview of Street Manager project

	Overview
Objective	▪ Development of single source of accurate, up-to-date data on live and planned street and road works
Total funding	▪ £12 million plus £1.78m TfL and Kent County Council Lane Rental Scheme funding
Main activities	▪ Defining user journeys ▪ Platform development ▪ User testing ▪ Management of transition period
▪ **Timetable**	▪ February 2017 – July 2020
Main stakeholders involved in delivery	▪ Highways Authorities (HAs); ▪ Utilities Companies (Utilities); ▪ Department for Transport (DfT); ▪ Technology providers / data suppliers;.
Types of data being shared	▪ Road and street works

A logic model describing the main inputs (in terms of human and financial resources) and activities associated with Street Manager, as well as the expected short-term outputs, medium-term outcomes and long-term impacts is provided in Figure 5.1 (overleaf).

Figure 5.1: Street Manager logic model



Context

There are an estimated 2.5 million road and street works carried out in England each year with some estimates of the cost from congestion resulting from street works in the region of £4.3 billion per year in 2004 prices[24]. Demand, in part as a result of other Government policy priorities, for new utility infrastructure, housing development and the roll-out of faster broadband, has contributed to marked increases in the number of street works being planned and coordinated nationally. Better management of associated works would reduce the costs of these infrastructure investments through reduced congestion during their course as described above.

The Department for Transport is responsible for developing and implementing policy and legislation in the sector, with the long-term strategic aim of reducing the impact of street and roadworks on congestion, thus improving journey planning and decreasing delays for road users. Street and roadworks are governed by the New Roads and Street Works Act (NRSWA) 1991, the Traffic Management Act (TMA) 2004 and associated regulations. These define processes that must be followed in order to apply for and receive a permit to carry out utility street and Highway Authority road works, carry out reinstatements after works have been completed and inspections of those reinstatements. Additionally, they specify the information that must be shared between utilities and Highways Authorities in order to ensure that there is an accurate register of works being carried out in each street.

The systems used by local highway authorities (HAs) and utility companies to manage road and street works were introduced in the 1990s and were viewed by many in the industry and local government as out-of-date and unfit for purpose. They were also limited in terms of what they could provide, particularly with regard to planning and coordinating works, monitoring of compliance with legal requirements and issues such as the overall quality of the works.

[24] DfT, (2004). Halcrow Reports. Available at: https://www.gov.uk/government/publications/extent-of-road-works-and-monitoring-disruption

Project design

Origins and genesis

The origins of Street Manager's commitment to opening data published on the platform can be found in the 2017 Conservative Manifesto commitment to "publish far more information about public services online, including relevant information about local issues and public transport so that every person can find out up to date information about roadworks, planning applications and bus routes online, without the hassle and delay that currently exists."[25] Street Manager also fits with wider Government commitments to publishing open data in relation to traffic and other infrastructure priorities.

Street Manager is the successor to the Electronic Transfer of Noticing (EToN) system, which was used to manage and coordinate street works since April 1999. EToN comprises a common XML language backed by an XML schema (issued by the DfT) and a set of rules for its operation and implementation in various software packages including asset and works management systems used by Local Highway Authorities (LHAs), utilities and contractors to manage the highways. EToN was not a centralised database but a set of protocols for the transmission of data. EToN products were used by utilities and highways authorities and were licensed from a small number of suppliers. In 2017, there were around five major providers of software using EToN on behalf of different Highways Authorities and utility companies. EToN has undergone various revisions since the turn of the century, with requirements being gradually modified over time. As of 2013, EToN was on its sixth iteration, with the new system requiring more formal notifications and information exchange but the data model and technological basis had not fundamentally been changed since the late 1990s.[26]

Challenges with EToN

By 2013, a number of challenges had emerged with the use of the EToN system. These were a significant factor in the decision to create a new system for coordinating the management of street works. Common themes identified with the EToN system during the Discovery phase centred on a lack of consistent working practices, the need for better communication and collaboration, too much time and effort being spent managing inefficient processes and a general lack of visibility and accuracy of limited data. The main challenges identified through the discovery phase are discussed below in the Scoping Phase section.

Scoping phase

The DfT commissioned a Discovery exercise between February and April 2017 to consider whether the EToN system continued to be fit for purpose or whether a new service could provide a more modern solution needed to meet user needs. Leading into the Discovery Phase of the project, the primary aim was to test the hypotheses below:

[25] DfT Street Manager Alpha Business Case

[26] A full list of requirements can be found: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/181675/eton-6-technical-specification.pdf

- A change is needed in the EToN systems being used to manage street works
- A single data hub/exchange will assist in the planning, management and monitoring of street works, and in the visibility of them by those working in the sector
- Open data on planned and live street and road works needs to be provided through one source so that others can use it to provide accurate and up-to-date information to the travelling public and others
- The service should be capable of including (or be interoperable with) additional data sets relating to the management of the street over time
- The service should provide a reporting and performance management tool

The Discovery phase involved a needs assessment with all stakeholder groups and had a significant influence on the project's overall design. User research was carried out that sought to understand whether the current approach met user needs and was cost effective and efficient, or whether it has become too inflexible, inefficient and costly. Consideration was also given to what new or replacement systems might be required to meet the user needs identified.

Users consulted during the scoping phase were identified initially by a small group of representatives from authorities and utility companies, with a snowball approach taken to identify other users as the project progressed. A survey was also developed and distributed to a wider group of individuals from the street works community.

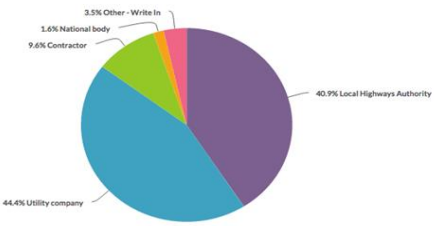
The discovery team had one to one sessions with representatives of key stakeholder groups with experience of the EToN system:

- 9 Local Highways Authorities
- 5 Utilities
- 3 Contractors
- 10 National Organisations
- 4 companies[27]

The Discovery process itself was separated into three parts, as highlighted in Figure 5.2.

[27] Note that these are not detailed further in the available information.

Figure 5.2: Street Manager Discovery phase process summary



Phase 1

- A series of workplace-based **1-1 interviews** to understand the Street works process from different perspectives
- Participants showed us the **systems they use and the processes they go through**, what works well, what doesn't, and why this is

Phase 2

- Following the 1-1 research, a **survey** was devised aimed at getting a wider response from the street works community, and establishing the prevalence and severity of the issues found
- There were **249 completions** with a good split between organisation and role

Phase 3

- Our understanding of role responsibilities, frustrations and needs was **validated** with a cross section of participants from phase 1
- An option for a **single system** was presented to participants along with some hypothetical statutory legislation changes and several 'key interaction moments' to illustrate and prompt discussion

The findings from the Discovery phase supported the hypothesis that a new system was required to meet the modern needs of stakeholders and users of EToN. These findings reflected the views of interviewees consulted with as part of this study.

Stakeholders from both HAs and utilities expressed satisfaction with the implementation of the Discovery phase. The needs assessment was viewed as having been carried out in a thorough and professional manner, with no gaps identified by stakeholders interviewed for this case study in terms of the organisations consulted or the seniority of the individuals engaged with the process.

"There was good coverage in the Discovery phase, I think. Anyone who had an interest in EToN and the management of street works definitely had the opportunity to input and a lot of work seemed to take place with different groups of users" – Utility stakeholder

The combination of approaches used to gather information for the scoping phase was highlighted by stakeholders as a strength of the approach. The use of existing connections with local industry bodies in the street works area such as Highway Authorities and Utilities Committee (HAUC), Joint Advisory Group (JAG) and Street Works UK was also received positively. The use of industry bodies as a method of outreach and the snowball approach implemented to identifying further interested parties were viewed as the most efficient routes to reach those with the requisite knowledge of the sector and were seen as effective in ensuring wide involvement from users of EToN.

The findings which emerged from the scoping phase are described in more detail below. These issues were corroborated by stakeholders consulted for this study as reflecting the most significant issues faced at the time:

- **Lack of consistency and no one version of events:** There was a general view between HAs and utilities that the EToN system lacked consistency when information was exchanged between supplier platforms. This was viewed to have been a result of differing

interpretations of the statutory requirements between major suppliers, an area which had led to disagreements in the past. Examples given included differing views on the day from which a permit application should be considered as having been received and the expected deadline for HA response. Interviews with HA and utilities for this case study identified a clear desire to establish a database that would provide 'one version of the truth'.

- **Lack of confidence in data:** Linked to the above, questions regarding the accuracy of data being provided using EToN fostered a lack of confidence amongst a significant number of users.

- **Ease of use:** Speed and fluidity of the street works operations could be hindered by the high number of transactions taking place, many manual processes and limited mobile working. For LHAs, the many information systems that need manually checking and often limited mobile working slows the process down. For Utilities, there are often many different transactions, mostly manually assessed, as part of the permit process in their effort to increase compliance and reduce charges.

- **Outdated specifications**: The EToN system did not allow for some aspects of modern ways of working to be incorporated, such as the potential for monitoring of performance. In the business case for SM, examples given were monitoring how well promoters and undertakers meet quality targets (right-first-time reinstatements and defect rates), how often they collaborate with other companies, how well they plan in advance and how often they incur fines.

- **Supplier led development**: There was also a perception from interviewees that the development of EToN and the platforms used by utilities and HAs was somewhat led by suppliers, meaning the HAs and utilities as the users were having to adapt their approaches to what suppliers would offer rather than having a system which met their needs.

- **Overhead costs:** A final challenge identified with EToN in the discovery phase was the existence of high overhead costs for using EToN systems. Users, both HAs and utilities, were required to pay subscriptions to EToN suppliers for the use of their platforms which were considered a significant cost. The DfT estimated in the business case for SM that authorities and utility companies spent £30-£40 million each year on running the EToN system, including licence charges, administration overheads associated with making the system work and developing parallel systems and work-arounds to overcome issues.

Rationale

The overriding rationale for the project was therefore to update the way permits and notices were processed and to allow works to be undertaken in a way that is more efficient for all parties involved.

“Existing systems were outdated and in need of modernising, there was a big push to modernise the sector and more effectively manage street works but the major barrier was the legacy systems which any legislative change would need to account for” – DfT staff

A clear difference can be seen between the main benefits expected by different stakeholder groups from the new system. For utilities companies, the main benefit SM was expected to be an increase in efficiency in terms of the administration related to carrying out roadworks. For HAs, the main expected benefit was a potential for better coordination of works in their areas. While supporting both of these views, the DfT also viewed the system as a means to open data on street works to third parties in order to create the opportunity for the data to be incorporated into products (such as traffic planning apps) in a way which could provide additional value to road users. Despite these differences in reasons for supporting the SM project, all stakeholders involved agreed with the principle of a new DfT owned system and recognised the different benefits expected by each stakeholder group.

Project delivery

The SM project was organised into three main parts:

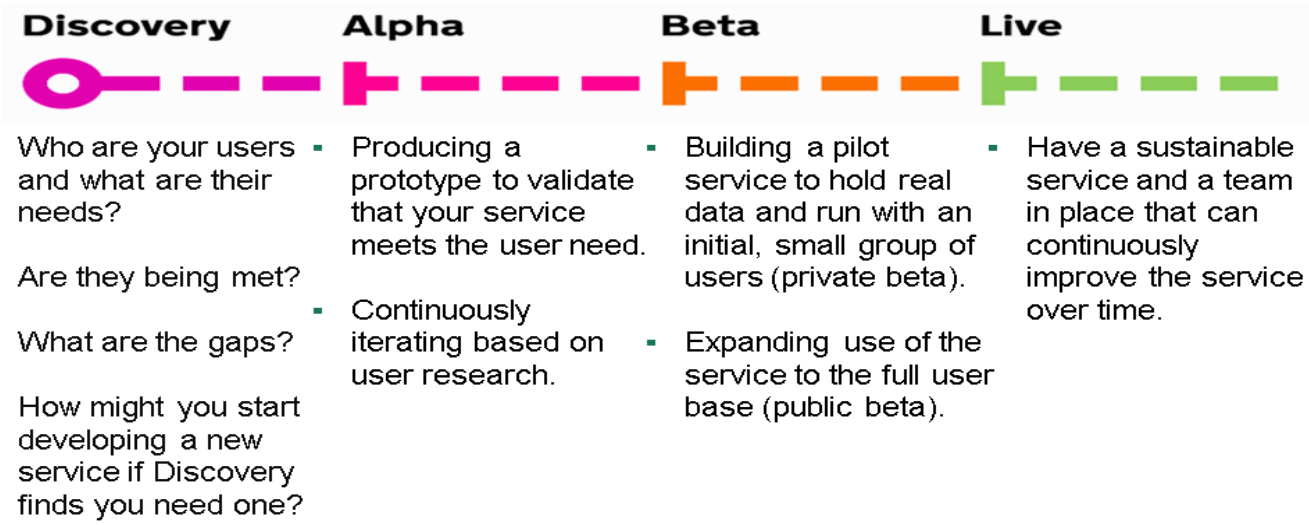
1. **Discovery Phase:** Initial exercise undertaken in early 2017 that aimed to capture the views of key stakeholders in the street works sector on EToN and a potential replacement to it.

2. **Alpha Phase**: Development of a prototype to validate and test with a small number of users with the intention to develop further following feedback.

3. **Beta Phase**: Further development to produce a working pilot to test with a wider pool of users, initially in a private beta to be followed by a wider group of users in a public beta. Development continued in parallel as feedback was received.

A fourth stage involved the management of SM following 'Go Live' and includes maintenance of the platform as well as further development in line with feedback.

Figure 5.3: Summary of project design stages for Street Manager



The Alpha stage began in November 2017 and continued into March 2018 with the Beta following on from May 2018. The latter took a longer development path following use with a small pilot group followed by a small private beta and then a larger public beta. The SM platform went live in July 2020, three months after the original go-live date (foreseen for 1 April 2020). DfT attributed this delay to the impact of the national lockdown imposed in early March 2020 as a result of the COVID-19 outbreak and the fact that users were not able to complete training, transition and testing.

Project resourcing

Table 5.2: Key stakeholders involved in the delivery of Street Manager

Key stakeholder	Role

DfT	• Commissioned the Discovery piece of work and held responsibility for the SM project overall, appointing the contractor, engaging with GDS and undertaking project management and coordination responsibility.
Subject Matter Experts	• Supported the development team, providing feedback in relation to regulatory matters and collecting/funnelling wider stakeholder feedback. • Two representatives of utilities and two representatives from HAs, dedicating 2 days a week toward SM and paid for by their respective employers. Brought on for their knowledge of regulation. DfT paid expenses.
Kainos with cx partners and Clarasys (contractors)	• Contractors contracted by DfT to undertake the Discovery phase and lead the development of the Street Manager platform (Kainos).
Utilities	• Engagement with Discovery phase as well as Alpha and Beta products to provide feedback. Fed back on approach, plus their contractors.
Highways Authorities	• Engagement with Discovery phase as well as Alpha and Beta products to provide feedback. Fed back on approach, plus their contractors
Sector bodies	• HAUC, JAG and Street Works UK provided channels for directed feedback and aggregation of views from stakeholders. Supported identification of stakeholders for Discovery.
EToN suppliers and other technology companies	• Input/feedback on API development and integration.
Strategic transport authorities	• Feedback on SM through development and identification of requirements for relevant areas

Overall, the core SM team within the DfT was small with two colleagues taking on most management responsibilities. This core team was supported by other colleagues in the department for specific aspects. For example, colleagues from IT security and architecture were involved when needed. GDS were also consulted at specific points, primarily prior to GDS gateway reviews – a requirement of all government IT projects. In the case of SM, these reviews were described as less challenging than initial expectations and provided some degree of reassurance on the development approach taken. GDS feedback was taken onboard and acted upon where received.

Significant input was also provided by various external stakeholders including utilities, HAs and sector bodies most notably. Other utility and HA stakeholder's primary means of input was through the provision of feedback during the Alpha and Beta phases in addition to the various events held by the core team.

The total cost for the project was approximately £10+ million in DfT funding with an additional £1.78m funding from two lane rental schemes operated by TfL and Kent County Council.. Whilst for most stakeholders, the amount of resource put into the project was viewed as adequate, some users expressed a desire for more resources to enable further development of some of SM's functionality. As noted in the next section, some HAs reported frustration that they had not been able to transition their management and coordination functions to SM. This was perceived as an element of the platform which was somewhat underdeveloped at the launch of SM in July 2020. The decision not to include management and coordination functions in the initial version of SM was reported as having led to some difficult discussion on scope in workshops, due to the

fact that the resources available were insufficient to provide everything that users requested. In light of the project targeting a minimum viable product at launch, this would indicate differences in opinion as to what that means in practice from different stakeholders. SM development does however plan to include many elements desired from these stakeholders.

In terms of budget however, the fact that this was in effect fixed at the outset of the project did cause some conflicts with the project management style, that being an Agile project. For the central project team, Agile, having a variable scope and flexing based upon needs as new information comes to light and developments are implemented, was not suited to such a fixed budget and contingency or flex in budget would have been useful. For future projects similar in nature, the minimum viable product may require more or less budget than initially allocated and the resourcing allocation process should reflect that.

The role of the Subject Matter Experts (SMEs) also placed pressures on those taking up these roles. The project was described by SMEs as very technical in nature with the role requiring them to be up to speed on the development of SM and alert to the needs of other users throughout. SMEs were only seconded on a part time basis, and whilst SMEs did not mention any implications of this secondment for their organisations, they did mention that they would have benefitted from more time to dedicate to the project (noting the need for them to still be engaged with their organisation). The pace of change was described as rapid, a factor which exacerbated the burden on SMEs.

“There was a lot of detail to get through and to get to grips with through the days we had to spend on SM. It needed someone with the motivation and willingness to spend a lot of time to understand the process, especially balancing that with usual day to day responsibilities” – Subject Matter Expert

Project management

The overall goal for the Street Manager project was to implement a one-stop-shop for the creation, management and processing, and flow of street works data between interested parties that:

- Aligns with emergent DfT and GDS Technology, Architecture and Data Principles.
- Provides a centralised / single Service, one implementation / interpretation of requirements and legislation.
- Provides a single-source-of-truth for all street works data (agnostic to technology used to access).
- Removes existing interoperability challenges.
- Improves impact assessment of future works leading to increased accuracy of applications - with reduced admin costs based on notices/permits more likely to be granted.
- Has the potential to use machine learning to automate approval for some works.
- Improves analysis of the impact of historical works by joining works data with traffic and congestion data.

All through the Discovery phase into Alpha and then into Beta a vision was established that stated:

"Street Manager will be a digital service that will transform the planning, management and communication of roadworks through open data and intelligent services to minimise disruption and improve journeys for the public" – DfT Street Manager Beta Budgetary Estimates

The SM project utilised an Agile approach to project management and software development. The DfT, SMEs and other stakeholders such as HAs and utilities were new to this type of approach and reported having little knowledge of how such a project operates before their involvement with SM. This approach was primarily spearheaded by the contractor responsible for the technical development and implementation of SM. A day to day manager with experience in applying Agile was appointed by the contractor and was viewed by the DfT team as a significant source of support. However, a lack of experience in and familiarity with Agile within the DfT meant that the project team were on a steep learning curve. DfT staff felt that having someone with prior experience of Agile within the Department would have helped them estimate initial resourcing and setting expectations of what could be delivered within the project budget.

Stakeholders contributing to the development of and providing feedback on SM through the Alpha and Beta phases described Agile as "seeming appropriate". For many users, its main advantage was the ability to provide a viable product quickly and allow for the development team to be reactive to needs. The phased nature of the approach and its reliance on continual feedback gave stakeholders a sense of ownership, with all reporting a sincere belief that their feedback had been taken into consideration.

However, the Agile approach was described as susceptible to some issues where decisions made earlier or requirements missed resulted in an increase in work later in the project to rectify this. SMEs provided examples of a small number of cases in which their involvement earlier could have prevented certain regulatory requirements being excluded from the system.

Related to this, the SMEs were viewed by many stakeholders to be key in ensuring the development captured regulatory requirements. The knowledge and experience of the SMEs was deemed vital here, based on many years of experience in the sector and significant responsibilities in their normal roles which were directly impacted by SM. Those filling the roles of SMEs for the SM project were described by other stakeholders as appropriate in terms of experience, knowledge and enthusiasm. Given the demands on their time, significant interest and engagement was required from SMEs as well as a willingness to get involved in the detail of specific elements of the project. The balance of two utility SMEs and 2 HA SMEs was also viewed positively. It was suggested that if a greater number of SMEs had been involved, the scope for miscommunication would have increased, as would the time taken to reach consensus.

SMEs were also seen to offer a way for wider stakeholder feedback and concerns to be addressed quickly, due to their ability to identify key issues from a significant volume of feedback. One of the main feedback channels used was a Slack channel set up by DfT. The added value of SMEs was demonstrated here in their ability to identify useful bits of feedback from a significant volume of information.

Several of those interviewed explained that there had been significant scepticism at the project outset, with stakeholders reportedly not convinced a central Government project such as SM could be pulled off in a relatively short space of time. Such scepticism was thought by some stakeholders to have been founded in a sense that a central Government department would struggle to keep delivery to time and to budget. Applying an Agile approach did lead to the project completing on time (going live was delayed by 3 months for external factors, that being the COVID-19 pandemic), but there were increases to the initial budget foreseen (largely related to increases in SM's overall functionality).

"There was definitely some disbelief that they [DfT] were even embarking on this project, it was almost 'well it will never happen' 'it's too big' 'another Government initiative'"– Utility stakeholder

Communications and stakeholder engagement

The approach to project management incorporated a significant degree of communication and stakeholder engagement. Stakeholders consulted as part of this study were largely involved in some form throughout the process from Discovery phase through to the platform going live. Most interviewees had more direct input in development as part of Beta testing through the provision of feedback but were engaged with DfT dissemination and consultation activities from an early stage.

Stakeholders were in general happy with the degree of engagement from the DfT team and were of the view that every effort was made to keep them informed. Communication activity undertaken by the core team included regular newsletters (approx. 20)[28], weekly webinars at key stages and 29 regional roadshows. In addition, a business change app was developed, 34 use case and training videos were created and a Slack group was setup with over 950 members and more than 9000 messages exchanged. Of these mechanisms, regional workshops and other appearances at sector body events were seen to be the most engaging and allowed for a greater range of depth in conversation and coverage of stakeholders. Sector bodies offered a platform for keeping stakeholders updated that good use was made of. Across the range, HA and utilities overall agreed that all relevant parties had some form of exposure to the project and could access any information they might need if they wanted.

"There was a good mix of activities and we certainly felt like we were kept informed of progress and had the opportunity to feed in where necessary" – HA stakeholder

The more "old-fashioned" communication approach of using newsletters was viewed as being the least engaging overall whilst the use of Slack by so many users posed challenges in sifting

[28] DfT Street Manager Overview presentation

through the exchanges to extract relevant learning to feed into the development process. Some stakeholders suggested that more coordinated curation of such a platform would be required for this to be useful.

Subject Matter Experts also had a role in engagement activities through their ability to channel some forms of feedback from other stakeholders. This alleviated some pressure on the small DfT team and was able to temper some stakeholder views.

Of the utilities and HAs consulted, there were differing view on the engagement with EToN system suppliers however. Where organisations moved away from their supplier and have since begun to use SM using in house APIs or through the UI, there was a general consensus that suppliers did have the opportunity to input into the development process and stay up to date with progress, but chose not to either as a result of seeing SM as a threat to their business or through scepticism that the project would be completed. However, some of those HAs and utilities maintaining the services of their Eton supplier (at least in the short term) felt that engagement with such suppliers could have come sooner. This is important given the continued reliance on EToN systems by some users (see section 4) where APIs are required to link existing EToN systems to the new SM platform. Stakeholders with this view believed that earlier engagement might have led to earlier development of the required APIs which were described as not quite ready by the time of the planned go live data of April 1st 2020 by some stakeholders.

The table below summarises the range of stakeholders engaged through wider industry and cross Government as well as a breakdown of the number and type engaged through Discovery, Alpha and private Beta.

Table 5.3: Breakdown of stakeholders engaged from Discovery through to private Beta

Discovery and Alpha	Beta
• 42 local highway authorities	• 57+ local highway authorities
• 20 utility companies or contractors	• 46+ utility companies or contractors
• 7 API/developers	• Participants in Private Beta
• 2 DfT statisticians/analysts	• 150 search and mapping survey respondents
• 12 national organisations	• 126 participants across API workshops and interviews
• 5 app development companies	• 3 DfT data statistics team members

Source: DfT Street Manager Beta Budgetary Estimates

A final point on communications links to the use of Agile for the project management and software development. Stakeholders were, as stated earlier, not knowledgeable on the method but demonstrated a clear understanding of the rationale for its use. The majority of stakeholders were informed about the Agile approach through workshop engagement and other communications and, whilst most were happy with the depth provided, some stakeholders desired more information on how the approach would work at a more practical level.

Project delivery

The project is divided into four different activity strands, which are analysed here in detail.

Defining user journeys

The end-user group of Street Manager comprises a variety of stakeholders from different organisations involved in requesting, approving, or undertaking street and road works. However, Street Manager is not intended to be used only by LHAs, utility companies, or contractors, but also by a range of other stakeholders including Highways England, Network Rail and HS2 and those who could make use of the data such as DfT analysts or journey planner application developers.

During the Discovery phase, research was conducted into the user journey to understand the issues related to the EToN system. A series of workplace-based one-to-one interviews and participant observation sessions highlighted the benefits of EToN and the aspects that needed to be improved.

Based on the findings from the Discovery phase, further qualitative research in the Alpha phase with utility companies, LHAs, and other organisations identified a series of user needs that Street Manager aimed to address. The Alpha phase identified also a set of 'personas' working for the various end-user organisations to understand their experience with Street Manager. Research with end-users was continued in the Private Beta phase, when the experience of various users using Street Manager was assessed in order to understand how to further develop the system.

Platform development

The new Street Manager platform prototype was based on the need for a one-stop-shop to exchange and provide accurate and up-to-date information on street and road works, whilst ensuring that the new service was capable of including (or being interoperable with) additional datasets relating to the management of streets.

The prototype of the system was built during the Alpha phase. Research with end-users ensured that the feedback obtained from end-user engagement events fed into the development of the platform. The Agile way of working allowed the team to adapt to changing priorities and user needs, although DfT staff and SMEs reported quite significant knock-on effects in terms of resource requirements for the project as a whole.

Technical choices for the prototype – including language and frameworks – were also made based on the feedback received. This approach was maintained during the beta phase, when testing was extended to a larger number of end-users. During the Beta phase, the team built a working version of Street Manager based on the Alpha prototype that was able to handle real transactions and work at scale. At the end of the Beta phase, the team was able to launch a public end-to-end Beta prototype, which was then further amended during the subsequent Live phase.

User testing

User testing took place throughout the development of the platform prototype and of its Live version by constantly engaging a wide array of stakeholders through different channels, including a Slack channel and regional roadshows during the Beta phase.

A survey was also launched to collect feedback from end-users, with a focus on the identification of issues encountered whilst using the service. Almost 250 individuals from a range of stakeholders listed in Table 5.5 replied to the survey.

Moreover, during the Private Beta a feedback system was introduced via Trello and Atlassian Service Desk in order to manage a growing number of organisations and users. User observation continued alongside system analytics and data gathering, which were used to identify and correct glitches.

Table 5.4: Stakeholders engaged from wider industry and cross Government

Wider industry	Cross Government
• Street Works UK • Joint Authorities Group • Current EToN developers • Existing software/systems providers (Elgin) • App developers • Potential data customers • Strategic transport authorities (TfN,TfL,TfGM, TfWM)	• Highways England • HS2 Ltd • Network Rail • Land Registry • Department of Culture, Media & Sport • Ordnance Survey • GOV.UK Notify • Transport Catapult • Colleagues within DfT including intelligent transport services / Future of Mobility

Source: DfT Street Manager Beta Summary

Management of Transition Period

A transition plan for moving stakeholders from EToN to Street Manager was agreed with a large number of organisations based on the findings from user research conducted during the Private Beta. The transition period aimed to provide business change support whilst ensuring that end-users had enough training and guidance materials to adapt to the new system, for example by engaging with existing EToN vendors and by keeping an open channel of communication with end-users.

Feedback from utilities companies, in particular, suggested disappointment with the need to continue using EToN and other systems, thus duplicating the cost of compliance, while some of the functionalities of Street Manager are not yet in place. A view was expressed by some stakeholders that transition to complete usage of Street Manager could have been delayed until some of the additional functions were implemented and working smoothly. A transition period may well be viewed as an inevitable element of this type of project, however, as the shift from one system to another will inevitably require a period of adjustment for all stakeholders.

Therefore, there may be an argument for recognising that there may be a need for a transitional period with associated costs at the outset.

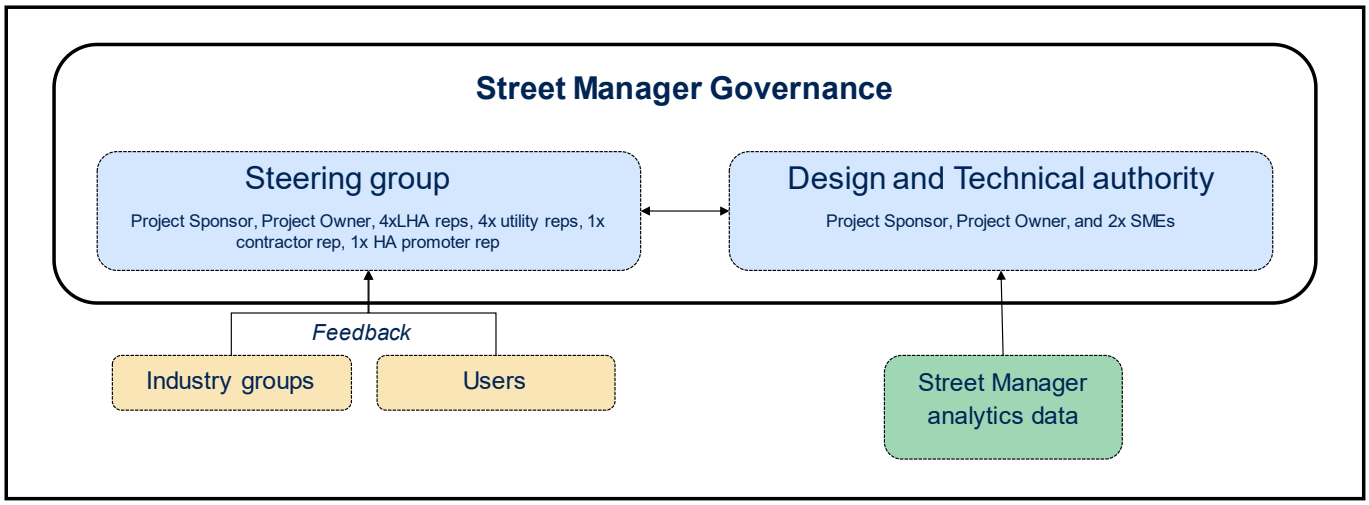
Future development

Moving forward, the DfT will retain responsibility for maintaining and developing SM with a user Governance Group with the costs of such covered by payments from HAs and utilities using the system. Stakeholders interviewed reflected positively on the Governance Group and its makeup, despite highlighting the relatively early stage of its influence. The number of organisations included and frequency of meeting were described as sufficient and users largely had confidence in the direction of travel.

"The next couple of years will be important in terms of users' perceptions of Street Manager. If the promised functionality materialises then I can certainly see more users moving to using SM separate from EToN style products. And I have confidence that the system in place can deliver that" – Utility stakeholder

A benefit of the SM approach and single system means that updates made on a fortnightly basis can be used by anyone and developments would not be vendor or user specific as was the case with EToN.

Figure 5.4: Summary figure of Street Manager governance



Source: DfT Street Manager Newsletter No17: January 2020

Monitoring and evaluation

Significant consideration has gone into monitoring the success of project activities and tracking the platform's longer term impacts. A number of main metrics were used to monitor the private beta and reported to GDS at the service assessment.

Building on this, a performance framework to monitor usage of Street Manager in the longer-term has been developed and agreed with the user governance group. More details about this will be sent to users in April 2021.

It is hoped that, in the longer term, data collected to measure the performance metrics agreed by the user governance group can be visualised via quarterly bulletins that will help to to facilitate the monitoring of the project's outcomes and impacts, as well as industry and service performance.

Project results

Project outputs

The expected outputs of the SM project can be summarised in the five points set out below:

- Replacement of EToN system with ready-to-use Platform
- All users using it in line with legal requirement
- Single set of data regardless of technology required to access it
- Single view of the street network
- Open data published

Table 5.5 illustrates the largely completed nature of the project, with some continued development required to add in additional functionality. At present, the platform has been said to "provide what users need" and development will focus on additional user requirements.

Table 5.5: Summary of SM progress against outputs

Expected output	Progress
• Replacement of EToN system with ready-to-use Platform	• Street Manager replacement live and in use since 1st July 2020
• All users using it in line with legal requirement	• All users required to under legislation using SM
• Single set of data regardless of technology required to access it	• Provides a single source of data
• Single view of the street network	• Achieved to some degree but functionality missing for some management and coordination use of HAs
• Open data published	• Open data available but limited fields at launch with all now available as of September 2020

Source: Ipsos, based on review of DfT documentation

Since the 1 July 2020, all HAs and utilities have been using SM and open data is now available (an initial set from July and now the full set from September 2020). Whilst expectations of stakeholders at the outset were largely met, or even exceeded in the case of those who expressed scepticism, SM still lacks some functionality that was desired by HAs in particular. This primarily pertains to the sort of notifications and alert that are used by many to manage and coordinate roadworks. This can be common for larger HAs and regional authorities covering multiple local authorities.

Legislation

The Street and Road Works (Amendments Relating to Electronic Communications) (England) Regulations 2020 was implemented in July 2020 to mandate the use of SM for transfer of notices and permits. This followed a consultation conducted between July and September 2019 that received a total of 92 responses. Utility companies accounted for 19 of these, HAs 54, industry and representative bodies 15 and 14 responses classified as other. The consultation found in favour of all the proposed changes, most notably mandating the use of SM but also extending charging powers to cover utilities. The regulatory change was deemed important by

all stakeholders and without it there were concerns that not all users of EToN would swap to SM, at least in the short term, primarily because they were used to how EToN worked and a move would come with commercial risk. Inertia was therefore considered a factor that would prevent take-up of SM without regulation. In addition to this, stakeholders highlighted the need for all users to move across to SM in order to benefit from the single version of the truth it promised. Should some users stick with EToN systems only and others move to SM then the same issues as under EToN could reoccur. This motivated the use of regulation and the setting of a go live date.

Project outcomes

Stakeholders highlighted the fact that it was still early days in terms of the use of SM, having gone live the month before the study began. Having said that, stakeholders stated a perceived reduction in ambiguity since using SM and that the aim of providing one version of the truth was achieved. Feedback received on performance since going live was also largely positive, however contribution to outcomes such as the main outcome of reduced congestion were not considered feasible to assess at this stage.

Management and coordination of roadworks and cost savings

As touched on above, some HAs felt that functionality was lacking from the go live date, but this was expected to an extent given the system considered to represent a 'minimum viable product' as of July. These gaps were in some of the reporting and notifications that were used to manage and coordinate works locally and which had been developed largely independently for HAs by their EToN suppliers over time. It was highlighted here that EToN had a long time to develop and hence it was unrealistic to expect SM to provide the same level of functionality at outset. There was, however, confidence amongst stakeholders that the next two years of SM development would begin to implement additional functionality.

Whilst some HAs had moved away from their EToN supplier and were using the UI others had developed their own APIs incorporating their needs around notifications and reporting. However, those which had not done so far were still using EToN suppliers. Combining the cost of maintaining their EToN supplier services and the contribution towards SM development and maintenance meant that cost benefits for many HAs were not visible or expected in the short term. Stakeholders in general did not expect cost savings to be significant in any case given the need to support the development of SM going forward.

Utilities were more likely to have moved away from their EToN supplier and to be using the UI for data entry with a number considering this approach in the future potentially as a result of not needing the additional functionality requested by HAs.

Use of open data

At the time of interviewing, there was limited evidence of open data being used actively by third parties. However, discussions had taken place regarding what data could be made available publicly with many utilities against making some potentially sensitive asset location data available. At present this is not published with the list of fields available for download limited but

with data available. The potential users of open data have been considered to some extent with five groups identified in the overview presentation:

- Automated vehicles
- Traffic routing systems
- Smart cities initiatives
- 3rd party App Developers/journey planners
- Industry collaboration

There was little evidence beyond this consideration regarding how the data may be used with practical use cases. Once SM has become embedded and use normal practice, work in relation to making data public should focus on this aspect and consideration would need to be given to how to raise awareness of the data.

Lessons Learned

This section summarises the main lessons learnt through SM, which could be applied to future open data projects or initiatives and outlines the stakeholder's perceptions of the future role of the DfT in this project and open data.

The role of the DfT in the future

Stakeholders supported the need for the DfT to manage and host SM moving forward, developing the system with the input of the Governance Group. The role of the DfT was explained as that of providing a forum for users/stakeholders to discuss/feedback and oversee what developments are required (the user Governance Group now decides on what is built and in what order) , with the developments then implemented by the DfT.

In addition to this, there was consensus that the DfT had a key role in promoting the use of the open data generated and available through SM. Individual utilities and HAs did not specify direct benefits for themselves from having data available publicly and any potential benefits in terms of the average member of the public were not expected given the need to request data through an API. There was support for the DfT to develop use cases for the data available once the data available had been expanded. These should build from the five groups specified in section 4.2.2. It would then be necessary to advertise the availability of the data to the target groups, with potential target groups operating nationally or across HA borders, this would place the DfT in the best place to engage.

Lessons Learned

The main lessons learned from the SM project which could be applied to future open data projects were:

- There was consensus regarding the vital importance of legislation to ensure compliance, particularly as the main benefits of using SM are dependent upon all parties involved in the process using system. Without legislation mandating the use of SM, there would likely be a longer transition period in which inertia plays a role, and some users do not swap to SM until it provides all the functionality they want moving forward. This would neutralise one of the benefits of SM for HAs and utilities in that the one version of the truth may not hold whilst some users maintain legacy systems and some use SM;

- Where SM provides a minimum viable product at launch (in terms of providing the functionality necessary to fulfil regulatory requirements), consideration needs to be given to the issues of some users with regards to the use of two systems, SM and a legacy system, where SM does not yet provide some existing functionality through a legacy system. For these users a transition period is associated with increased costs in the short term.

- Consideration should be given to the budgeting and resource allocation processes at the outset of Agile projects, taking into account the potential for shifting requirements and scope of the project as it aims to reach a minimum viable product. A certain degree of flex

would give project teams more certainty as to whether a given MVP is viable and certainty that where more funding is needed it can be acquired dependent upon the business case. A central pot of funds could be allocated for Agile or digital projects which could be utilised as a contingency to resolve these issues.

- The SM project highlights the importance of experts in the regulatory environment through the roles of SMEs. Whilst a resource intensive role, the small group of experts constituting representatives of users of the system in design were important in ensuring the system encapsulated all of the regulatory requirements and they also provided a conduit to focus feedback.

- Development of use cases for open data and promotion required to facilitate take-up amongst 3rd parties. A role for the DfT in future would be to develop strategy for promoting the open data and work with potential users to further understand need to ensure what is made available meets these needs.

- There is also a need to retain internal knowledge and experience of similar projects within the DfT to support future projects and set expectations at the outset. Lessons learned documents from this and similar projects could be used to share knowledge and inform future projects.

- The range and depth of communication and engagement activity was well received throughout the course of the SM project. Future projects could consider a similar mix of national, regional, face-to-face and online geographies and mediums. Efficient use of existing relationships and collaborations, e.g. through existing industry bodies should be made with these bodies able to represent multiple stakeholders and signpost relevant individuals in the industry.

Annex 2: BODS

Introduction

This case study provides a detailed analysis of the Bus Open Data Service (BODS), a project implemented by the Department for Transport between 2017 and 2020. The case study was informed by a literature review of project documentation provided by the DfT and broader literature, supplemented by 10 in-depth interviews with members of the Project Team, Local Authorities, Bus Operators and Ticketing Agencies implicated in the development of BODS.

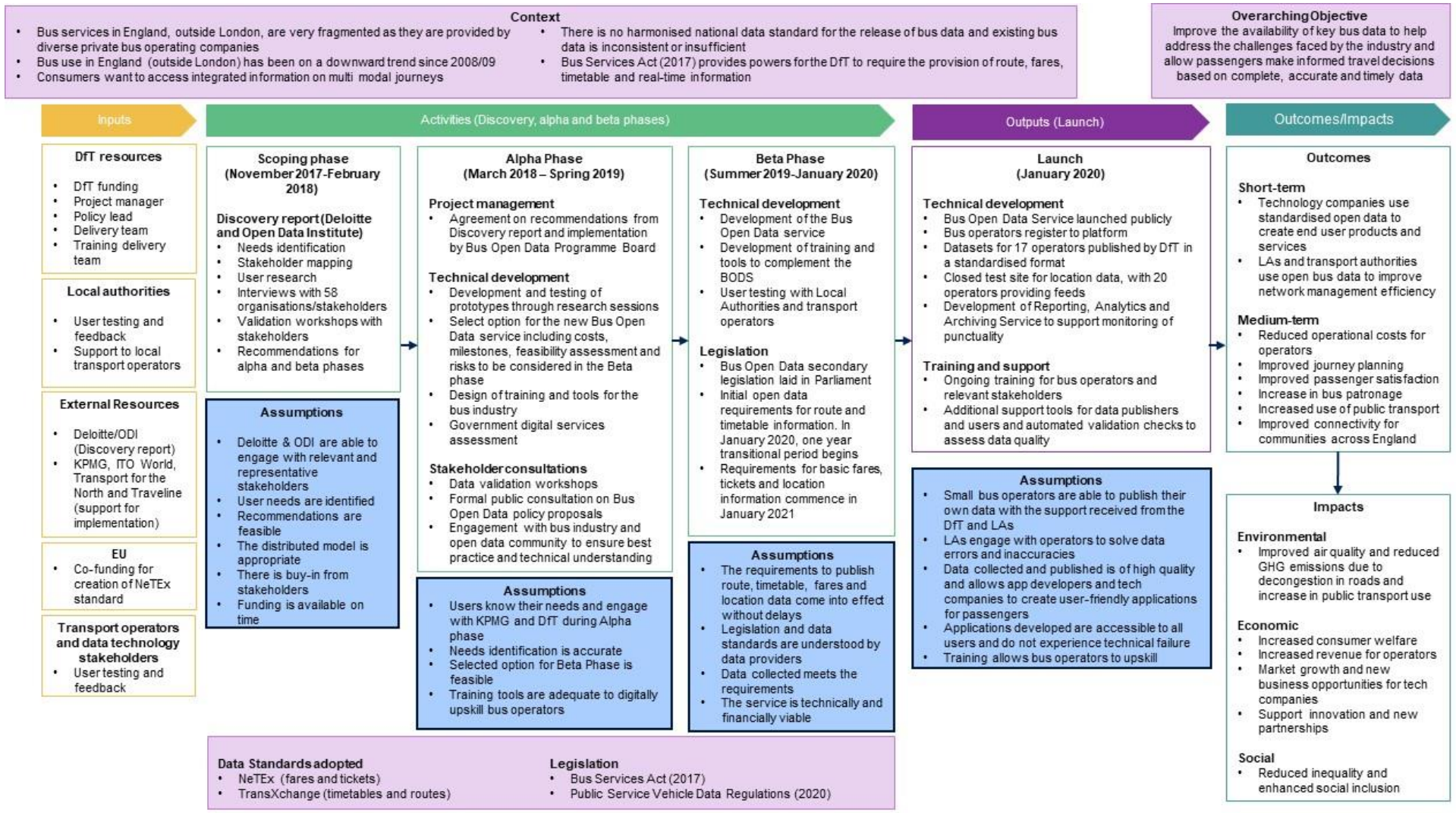
Table 5.6: Bus Open Data Service overview

	Overview
Objective	▪ Improve the availability of key bus data to help address the challenges faced by the industry and allow passengers make informed travel decisions based on complete, accurate and timely data
Total funding	▪ £6 million, increasing to £7.5 million in 2021
Main activities	▪ Introduction of new legislation ▪ Development of a portal for the publication of routes, timetable, location and fares data ▪ Definition and creation of common data standards ▪ Provision of tools and training to support operators when publishing data
Timetable	▪ November 2017 – January 2020 (compliance deadline: January 2021)
Main stakeholders involved in the delivery of the Competition	▪ DfT ▪ Local authorities ▪ Service providers, including bus operators, data brokers, ticketing companies and others ▪ Technology companies
Types of data being shared	▪ Route and timetable data ▪ Real-time location data ▪ Fares and tickets

Logic model

A logic model describing the main inputs (in terms of human and financial resources) and activities associated with BODS, as well as the expected short-term outputs, medium-term outcomes and long-term impacts is provided in Figure 5.5 (overleaf).

Figure 5.5: Bus Open Data Service logic model



Context

The bus sector in England is fragmented and decentralised, with responsibilities divided between central government, local authorities and private sector service providers (including bus operators, data brokers, schedulers and ticketing machine suppliers). Central government provides strategic direction through statutory and legislative instruments and for monitoring compliance. Bus provision is managed regionally by local authorities, who work in partnership with a diverse array of large and small private sector bus operators to deliver a range of services, including school buses, scheduled public buses and on-demand services. Service provision is the responsibility of the private sector, with bus operators supported by a range of ancillary actors.

Most bus routes are serviced by the "Big Five", but there remain a significant minority of smaller operators including technologically advanced companies spun-off from more traditional operators, public-owned service providers and family-run micro-enterprises responsible for one of two specific routes. Local authorities have an interest in ensuring that smaller operators remain viable and ensure competition helps maintain acceptable and affordable levels of service on less lucrative routes. Ticketing services are commissioned by individual bus operators, meaning there may be multiple ticketing companies active in any region at any given time, each providing data in their own chosen format.

Initial research carried out by the DfT found that there are a total of 34,900 buses in England, delivering approximately 4.5 billion journeys (half of which are in London). Bus patronage was more prevalent amongst certain groups, with over 60% of journeys are taken by the old, young and disabled.[29] Since 2008, there has been a decline in bus use nationally. This has been linked to a lack of accurate and accessible information, which can make it difficult for passengers to plan journeys effectively or identify the best value tickets and fares available. Additionally, the lack of a centralised source of information can be an obstacle to travel beyond county borders, as routes, fares and timetable information is only available at local level (if at all). There is significant variation in the data standards used for route, timetable and real time location data, and no existing standard within the UK for fares and tickets data. The situation at the outset of the project with regard to different types of data is provided in Table 5.10:

Table 5.7: Overview of data standards in bus sector prior to Bus Open Data Service[30]

Data type	Situation prior to BODS
Route and Timetable Data	Largely open now through voluntary agreements supported by Traveline and the delivery of the Traveline National Dataset (TNDS). However, significant gaps remain in terms of the quality, consistency and interoperability of data published.

[29] DfT (2019), BODS briefing pack
[30] DfT (2019), BODS briefing pack

Location Data	Whilst 97% of buses across England have an Automated Vehicle Location (AVL) device, outside of London the data is not shared in a co-ordinated and consistent way. Approximately 40 local transport authorities currently publish AVL data through the Traveline Next Buses API.
Fares and Tickets Data:	The lack of an agreed industry standard means that, whilst data is created for electronic ticket machines, information on fares is not consistently published and no national dataset exists.

Project design

Origins and genesis

"I don't get a sense that this was a request that came from the ticketing or bus operators world…for a bus operator, what value is there?…I can see there is value but it's not obvious", Service Provider

The Bus Open Data Service (BODS) is based on the premise that opening bus data can deliver smarter, greener and more efficient journeys that have wider socio-economic benefits. BODS is expected to:

- provide a single source of accurate, up-to-date data on local bus services, reducing duplication and administrative burden for bus operators and LAs, and
- provide opportunities for innovation and product development using the data available, leading to better informed passenger decisions and an improved passenger experience.

The requirement for better access to transport data was formalised into British law with the 2017 Bus Services Act, which allowed the Secretary of State for Transport to require bus operators to open up data for local bus services across England on routes and timetables, fares and tickets, and real time location information from 2021. The origin of BODS, however, dates to 2011, the Competition Commission (now the Competition and Markets Authority) conducted an inquiry into the health of the bus market and concluded that the sector suffered from a lack of competition on individual routes, despite having a significant number of operators, and fares were (and still are) increasing well above the rate of inflation. The Commission recommended that consumers would benefit from the transparency provided by opening bus data.

The specific concept for BODS emerged from DfT discussions around how best to improve the experience of bus passengers. In 2007, Transport for London (TfL) published data on live arrivals, timetables, air quality, network performance and accessibility across its network. The data was made available through APIs, static data files and feeds using a version of the Open Government Licence. A longitudinal evaluation of the outcomes of this decision found that it had resulted in improved customer experience and an estimated £130 million per annum in benefits, including a 2% uplift in patronage of public transport routes where real time location data was available.[31] However, research by DfT led to the understanding that there was no pre-existing data standard which was uniformly used across the bus industry. Instead, different operators and service providers used several different data standards to process and publish ticketing, location, fares and timetable data – making it challenging to replicate the principles of TfL's approach in other locations.[32]

[31] Deloitte (2017), Assessing the value of TfL's open data and digital partnerships, available at: http://content.tfl.gov.uk/deloitte-report-tfl-open-data.pdf

[32] DfT (2019), BODS Briefing Pack, available at: https://its-uk.org.uk/wp-content/uploads/2019/04/DfT-BOD-Briefing-Pack-Summer-2019-v1.0-002.pptx

Strength of need

There were mixed views on the strength of the rationale for the BODS project. Many stakeholders view BODS as an important accelerator to getting more fares information online and pushing for the integration of fares, timetable and real time information into one coherent data set. While most stakeholders interviewed were generally supportive of the vision underpinning BODS (i.e. creating one single repository of data, drawn directly from source) and view improving customer experience as a very good thing, concerns have been raised around whether this is the correct platform for such a service.

Local authorities and bus operators identified a historic DfT initiative – the Electronic Bus Service Registration (EBSR) - as an important antecedent to BODS. Piloted in 2007, the EBSR was intended to create an electronic bus information system and, importantly, included the piloting of a tool (known as the Hogia tool) which created data in a TransXchange data format.[33] Although the EBSR system was eventually not adopted, the Hogia software has been used for the last decade in certain regions but has not been offered to or adopted by all LAs. Another historic project referenced by some local authority stakeholders was Transport Direct – a journey planner launched in 2004 to provide comprehensive, accurate travel information across England, Scotland and Wales. In 2014, the decision was taken to discontinue the project as several similar services were available from private sector providers.[34]

The EBSR and Transport Direct projects are important reference points because they appear to have framed local authority views with regard to the validity of BODS. In short, stakeholder feedback largely reflected two groups. Those that supported the EBSR project and/or use Hogia or similar applications remain broadly supportive of BODS, viewing it as a logical extension of the value provided by Hogia. However, LAs involved in Transport Direct expressed scepticism around central government's long-term commitment to BODS and an unwillingness to invest time and resources, as they believed it risked being discontinued in the future.

"In theory, the benefit is that the data will be open so anyone can come along and offer something better than Traveline…By giving other developers the data, they can go along and make something totally different and offer that to consumers…instead of a monopoly, we should have competition", Service Provider

A third important antecedent to BODS is the Traveline system, which has been in place since 2000. Maintained at regional level by local authorities and funded by bus operators, this is a centralised system for the publication of timetable information which is collated to create a national timetable dataset as well as offering a telephone hotline for timetabling and other enquiries. Currently, local authorities receive transport data from bus operators, and are responsible for cleaning it and sense checking it before publishing it on Traveline in the correct (TransXchange) format.

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[33] http://naptan.dft.gov.uk/transxchange/training/EBSR/EBSR%20Training%20Toolkit%20v1.0/3%20Resources/Guides/EBSR%20Brochure%20-%20v1.0.pdf

[34] https://www.gov.uk/government/news/transport-direct-website-closes-on-30-september-2014

Many local authorities and bus operators are satisfied with the Traveline system and reported concerns that BODS may not function as smoothly as the system they are used to or might further enhance the digital divide, by no longer providing the option for offline (telephone) enquiries. This has led to concerns best summarised in the feedback from one local authority respondent: “if it isn’t broke, why fix it?” Others, however, describe Traveline as a useful first step towards a standardised open data offering which, while providing a data in a clear format at regional level, ended up siloed into semi-autonomous regional entities who were not providing data and other information services in a standardised way at the national level.

Many providers and local authorities are happy with the current Traveline service and some have suggested it might have been better to adapt this than invest in developing what is viewed as a competing system from scratch. BODS will publish a much wider range of data than Traveline, however. In addition to timetable data, BODS requires the publication of routes, fares and real-time location data in standardised formats. This is expected to significantly increase the opportunities for exploitation of the data by third parties into products which can create added value for passengers. BODS will also centralise the data, publishing it on one platform in one format (for each data type) and thus ensuring one version of the truth.

Shifting responsibilities to bus operators

Discussion of the Traveline system also brings up one of the underlying principles of BODS: in essence, the introduction of BODS represents a fundamental paradigm shift in terms of responsibilities away from local authorities towards bus operators. This was described by DfT staff as being in line with the Government’s Reform Agenda, which focuses on shifting the financial burden for delivery from the public sector to the private sector.

As mentioned above, local authorities have historically shouldered the responsibility for ensuring that good quality bus timetable data is published on Traveline. BODS places this responsibility on bus operators, with the inclusion of data quality tools to allow them to quality check their own data and publish it directly on BODS in a pre-specified data format. While some LAs supported the shift in responsibility for data quality to those responsible for producing the data, many expressed doubts that this would be feasible in practice and some raised concerns about the knock-on effects of this shift on resourcing at LA level.

A market failure identified in the business case for BODS is that the direct benefits foreseen from opening public transport data are expected to accrue to tech companies and the general public, rather than those who will bear the financial and resource burden for its implementation (service providers). This, combined with the shift in responsibility from LAs to service providers, creates a misalignment of incentives which may well influence receptiveness to the project as a whole.

Scoping Phase

“One thing that worked well was initial discovery – that was a great piece of work”, Service Provider

The BODS Discovery Phase was implemented between November 2017 and March 2018. Four early engagement workshops were conducted with a variety of stakeholders, supplemented by interviews, questionnaires and consultations with different groups including passengers, transport operators (and their data brokers), technology providers and local authorities. Additionally, DfT engaged with the British Standards Institute to understand issues around the provision of accurate, high quality data for bus stops using the NaPTAN[35] database and how the passenger experience could be improved using technology.

Most of the stakeholders interviewed for this evaluation were not involved in the initial scoping phase, but those who were described it as an open and constructive process. While expressing some doubts regarding DfT and Deloitte's understanding of the complexities of delivery models, stakeholders viewed the Discovery as a useful "process of education" regarding how specific aspects of the sector work. There was unanimity amongst those interviewed who were involved that the scoping phase had been productive and informative and that the information they provided had been taken on board. One example of how the project responded to stakeholder needs was the introduction of Agent mode, to accommodate the role played by some local authorities (and private sector data brokers) in uploading data on behalf of smaller bus operators.

The findings from the Discovery phase were published in March 2018. One of the main conclusions was that there was significant inconsistency and a lack of standardisation in data published across the industry. Local authorities invested significant resources in cleaning data and there was no possibility of a harmonised dataset. A clear role for central government was identified in terms of providing greater leadership around the specification and implementation of common data standards.

With one or two notable exceptions there was a consensus amongst LAs and service providers that the design of BODS does not appropriately account for the complexity of the bus sector. Two common examples provided to demonstrate this assertion were the vast array of complex fares available and the increase in non-standard routes, particularly in rural areas. In both these areas, stakeholders claimed that data cannot be uploaded to BODS in a way which allows for the particularities of a given fare or timetable (for example, routes which are sometimes school buses and sometimes public service buses, on-demand buses, and fares which change according to the time of day). This may be due to the current stage of implementation, with BODS still in Beta and therefore undergoing further development. Some stakeholders have also reflected that the issues raised, with regard to fares in particular, may reflect a broader need to simplify the way fares are created and calculated.

[35] http://naptan.dft.gov.uk/naptan/overview.htm

Project delivery

"We expect compliance to create extra work, but a small amount. It's not very onerous on us but mainly because of [the ticketing company] Ticketer – if we didn't use them, it would be quite onerous and time consuming. We may have to manually manipulate the data to get it onto BODS." , Service Provider

The overarching objective of BODS is to improve the availability of bus data to help address the challenges faced by the industry and allow passengers make informed travel decisions. Delivery of BODS is focused on four main activities:

- **Introduction of new legislation -** The project is underpinned by two pieces of legislation, namely:

The 2017 Bus Services Act, which gave enabling powers to the Secretary of State for Transport to require bus operators to open up data for local bus services across England on routes and timetables, fares and tickets and real time information from 2020.

The 2019 Public Service Vehicle (Open Data) (England) Regulations, which define the standards to be used for the publication of data for local bus services.

- **Development of a portal for the publication of routes -** BODS is intended as a one stop shop providing a national repository of standardised data on routes and timetables, fares and real time information for buses across England.
- **Definition and creation of common data standards.** To ensure data is published in a compatible format, BODS specified the following standards:
  - TransXchange 2.4 for timetable data
  - NetEx for fares data
  - SIRI for real-time information
- **Provision of tools and training to support operators when publishing data,** including support converting data files into the formats required for upload to the BODS platform and help verifying the quality and completeness of the data being provided.

Project resourcing

The key stakeholders involved in the project delivery and their roles are set out in Table 5.11 below.

Table 5.8: Key stakeholders in implementation of Bus Open Data Service

Key stakeholders	Role

DfT	Defined the initial open data requirements for the bus sector, including opening data on tickets, fares, routes and timetables; member of the Bus Open Data Programme Board; coordination and project management responsibilities, including liaising with other stakeholders
ITO World, KPMG, Transport of the North and Traveline	Delivery partners commissioned by the DfT to develop digital tools to support the creation and opening of TransXChange and NeTEx data files, which are integrated in the BODS offer
LAs	Expected to support bus operators to meet their statutory obligations and, in some instances, support in the creation and hosting of data on behalf of bus operators
EU	Co-funded the creation of NeTEx standard for fares and tickets data
Transport operators	With the support of LAs, they are expected to publish local bus data across England and outside of London

Sources: Bus Open Data Implementation Guide (2019)

The core BODS team within DfT is relatively small and holds responsibility for implementing the project, overseeing the accompanying legislation, and managing stakeholder engagement. Expertise from across the Department was sought as needed. This included, in particular, statisticians and data managers working on NaPTAN, and the DfT's legal team. GDS were also consulted at specific points, particularly at the end of the Alpha and Beta phases when data projects are required to pass a formal GDS assessment in order to proceed to the next phase.

A Digital Service Partner from Government Digital Services (GDS) provided support in the preparation of the formal GDS assessments at Alpha and Beta stage and the Cabinet Office spending review. Additionally, the Digital Service Partner gave team members access to training and certification on the use of Amazon Web Services (AWS) – a cloud-based hosting service, where the BODS platform was hosted to ensure they had the requisite skills and knowledge to implement the platform. Finally, the Digital Service Partner organised a virtual review of the project, including a walkthrough of how the project had been implemented, and provided proactive feedback and suggestions regarding potential improvements. The virtual review, in particular, was viewed by DfT as very helpful in ensuring that specific issues with the project were identified early. The BODS team has also shared learning from the project in a Departmental show and tell.

Input from external stakeholders representing local authorities, bus operators and other service providers during project delivery was provided through two primary mechanisms:

- **Strategic Management Board,** made up of senior stakeholders from LAs and the bus industry, and described by one interviewee as those responsible for "setting the aspiration of the project".
- **Project Implementation Working Group**, made up of experienced operational personnel responsible for ensuring the decisions taken by the Management Board would work in practice.

Representation on the Management Board and Working Group was described as approximately right by those interviewees involved in both groups. A gap was identified with regard to industry participation, however, with one service provider explained that there was only one seat for bus operators on the Management Board, making it difficult to accurately represent the multiplicity of approaches taken by different stakeholders. Additionally, representatives of ticketing companies claimed to have had no representation on either the Strategic Management Board or the Project Implementation Working Group.

However, some on the working group identified a “significant information gap” between themselves and those signing off on the decisions, who were perceived as not understanding the details of certain issues raised and not giving enough credence to the issues raised by the Implementation Group. One example given to illustrate this disconnect was around the choice of data standards, with members of the Management Board not being aware of the differences between different versions of TransXchange. One interviewee also suggested that the Management Board could have been more helpful in supporting DfT with their consultation activities and steering them towards the appropriate contacts. In terms of representation, one criticism raised was that there tended to be a bias towards those LAs and service providers who are already relatively advanced in terms of data, and not enough focus on understanding the obstacles faced in those regions where data is limited or of poor quality.

One of the significant changes which took place between the Discovery and Alpha phase of the project was a change of suppliers. This stemmed from a decoupling of the scoping activities in the Discovery phase from the design and build activities which made up the Alpha and Beta phases.

DfT explained that whilst the Discovery phase was well delivered, the expertise and technical skills required for the design and build were fundamentally different to those needed during the scoping phase. This meant that the two phases were deliberately decoupled in the project design, and delivery partners were procured using two separate processes. DfT staff acknowledged that the change of suppliers had led to some duplication, but explained that the decision to work with a new supplier for the design and build phase was based around the need for an expert with granular knowledge of data standards and international experience. Changing suppliers was described as a very difficult decision which had required much reflection by the DfT project team and was taken in consultation with the internal leadership team and others with experience of managing similar projects. Ultimately, however, it was necessary to award the project to the consortium which had put together the best bid and provided a clear demonstration of the requisite skills and experience required.

This transition led to some disruption in terms of project delivery, as the new contractors required time to get up to speed on the details of the project. While contractors were not engaged as part of this evaluation, bus operators and local authorities who had been involved in the initial scoping phase expressed frustration and disappointment with the transition (who had been impressed by the needs assessment and stakeholder engagement, and expressed dissatisfaction that feedback they had provided during the scoping phase appeared to have been either lost or ignored in the transition to the design and build phase).

Project management

"It's good that they've been doing test servers, early adopters and proof of concept – that would always be a concern that they would go live and fall over on day one.", Service Provider

BODS was delivered in line with Agile principles. The use of Agile when implementing government IT projects is mandated by Government Digital Services. This marks a shift away from Waterfall project management principles which rely on up-front planning towards a more iterative, user-focused approach to software development. The idea underpinning Agile is that by breaking work into smaller increments and incorporating user testing at regular intervals, difficulties can be identified and responded to early, reducing the risk of embedding costly mistakes into a project.

As well as engaging with external stakeholders, the DfT BODS team gathered learning from the Street Manager project. Following a Departmental show and tell session, members of the team engaged with those working on Street Manager in what was described as a "useful and collaborative" relationship to gain insights on the application of Agile principles.

In practice, the use of an Agile approach meant getting inputs from stakeholders at all stages of delivery (development of wireframe, mapping of delivery "story", prototype creation and roll out of Alpha and Beta platforms) Agile was described by DfT staff as enabling a more user-focused and flexible way-of-working, which enabled the team to ensure the final product remained focused on meeting user needs. Difficulties identified included the risk of project creep, as the focus on meeting user needs can make it hard to say no to requested changes. DfT staff explained that they were able to push back against this risk by having a clear idea of what they wanted to deliver and ensuring clear prioritisation.

Stakeholder engagement

A significant element of the Agile approach relates to regular stakeholder engagement. Those interviewed for this evaluation had been involved at different points in the project, with some having been involved since the project design and scoping phase. The majority of those interviewed, however, had primarily been involved in product testing particularly during the Beta phase.

Industry representatives interviewed, with one notable exception, were largely involved later in the process. This led to the impression among a number of the service providers interviewed that BODS had been designed without their input and that by the time they were involved, it was too late to introduce any significant changes.

Several of the LA representatives consulted for this evaluation were involved in the implementation working group. The extent to which working group participants felt their feedback had been heard varied significantly. Whilst some asserted that their comments had been taken on board, others claimed that there was no evidence of any changes in response to

the issues they raised.[36] Working Group meetings were held in London, which was identified as an obstacle to attendance for LAs outside of the south-east of England. This appears to have exacerbated a feeling from some LAs that the project was very London-centric and based on assumptions that do not necessarily hold true outside of the south-east of England[37]. For those who weren't able to attend the in-person meetings, the transition to online meetings during lockdown was welcomed and viewed as a step towards a more inclusive approach.

A number of stakeholders expressed the opinion that those involved in the consultation activities generally represented two-tier authorities and larger service providers. This has been linked to resource constraints within smaller organisations, which may have prevented them from dedicating resource to an initiative like this rather than a lack of outreach on behalf of the DfT. However, if true, this does mean the needs of smaller LAs and bus operators, in particular, may have been under-represented when developing and testing the Platform and support tools. This may impact, for example, on the extent to which support tools developed help address the resource constraints of smaller operators.[38]

Bus operators involved in product testing during the Beta phase described being approached individually, with representatives from KPMG calling them directly and sharing screens to run through different elements of the BODS platform as it was developed. Operators appreciated the opportunity to provide feedback as the Platform was developed, but felt quite isolated during this process and would have welcomed involvement in a broader dialogue with other members of the industry.

In terms of broader communications, DfT provided information directly through a dedicated twitter account (@busopendata), as well as a regular project newsletter and a dedicated email address for stakeholders to contact the team with any queries or concerns. Additionally, there was good coverage of the project in the trade press and dissemination through industry contacts. In particular, many stakeholders mentioned that they had initially heard about the project either through an article in a trade magazine or through Traveline. One gap identified by DFT staff was an over-reliance on digital channels for their direct communications. This may go some way to explaining the feeling of many LAs that only those who were already relatively digitally savvy were engaged in the project, as it may be inferred that those with less interest or competence in the digital sphere may also be less likely to engage with digital channels.

While most stakeholders appreciated DfT and KPMG's responsiveness to direct queries, a number of LAs raised the prospect of nominating a named regional contact point to alleviate pressure from the relatively small DfT team, address queries, coordinate progress within their region and act as a champion of the project locally. One respondent mentioned having been

[36] Examples cited included difficulties which were raised around the implementation of the specific standards chosen – one specific example given on this was that whereas senior management might be aware that a company was using TransXchange, they would not necessarily be aware of the difference between TransXchange 2.1, 2.4 and 2.5 and did not have detailed awareness of the specific additional requirementd DfT was requesting.

[37] Examples given of some assumptions which do not hold up outside of London are that buses will run regularly (i.e. multiple times per hour), buses will run through the night, bus companies use buses for only one purpose (i.e. not mixing coaches, buses, school buses etc) and a lack of consideration for on-demand routes and complex fares.

[38] If the tools available to convert data files into specific standards are difficult to use and take a significant amount , they would not address the resource constraints faced by smaller operator.

nominated as a “regional champion” but explained that in practice this had amounted to little more than providing contact details to the BODS team. The idea of a more significant role to proactively support LAs and smaller bus operators to engage with the different elements of the project appears to have support, particularly amongst LAs.

Project Delivery

As described in the project design section of this case study, project delivery was divided into four main activity strands. Each of these is now considered in turn.

Introduction of new legislation.

“In the bus sector, we don’t have much leverage. It’s not like TfL or the rail industry which have direct contracts with industry, the 2017 Bus Services Act…is the only way to gain leverage in this area...[it] allowed us to create secondary legislation”, DfT staff

The DfT team included a policy lead, whose job was to support the passage of legislation through Parliament with support from the Department’s legal team. Following the passing of the Bus Services Act in 2017, the Public Service Vehicle Regulations – laying out the specific details of how the Act would be implemented – also made it onto the statute books in 2019.

Most interviewees across all stakeholder groups expressed strong support for the legislation. They explained that, in order to guarantee a comprehensive national dataset, it was necessary to ensure compliance from all operators and guarantee data is published in compliance with the same technical standards. Some minor criticisms were raised with regard to content, primarily focused on a lack of detail (particularly with regard to enforcement, how far in advance schedule changes should be communicated and the frequency with which data should be published) and a need for more detailed definitions in certain areas. A small minority of service providers viewed government intervention as unnecessary, describing this as “the sort of data you would expect to provide”. In general, however, even those who stated that they would have complied without the legislation still viewed it as helpful in terms of ensuring that BODS compliance remained a high priority at all levels within their company.

LAs and industry stakeholders agreed, however, that financial and technical support was needed to ease the financial and resource burden placed on smaller bus operators by the legislation. For some smaller operators (particularly those with very small fleets or operational on only one or two routes), the costs of aligning their systems with BODS requirements were reported as putting them at risk of going out of business. The COVID-19 outbreak, which had a particularly deleterious effect on the bus industry, was viewed as increasing the urgency of the need for financial support.

Development of a portal for the publication of routes.

“All we have to do is click a few buttons in Ticketer to generate something, this creates a link, we log into BODS and upload it and its done – if not, we might have to spend hours creating fare charts in the same format”, Service Provider

BODS is intended as a one stop shop providing a national repository of standardised data on routes and timetables, fares and real time information for buses across England. The BODS portal was officially launched in Beta in January 2020. While not all functions have been introduced, users are able to register and upload data. DfT staff described 2020 as a "transition year", to allow time for registration to and testing of the portal by bus operators before the data publication requirement comes into force in 2021.

Publication of data to the portal is being introduced in phases, starting with the most straightforward and moving on to those viewed as more complex. In practice, this meant starting with the publication of timetable data, before moving onto fares and tickets and real-time data. The original BODS timetable foresaw timetable data being uploaded by January 2020 and fares uploaded by January 2021 and real time data by 2022. However, some technical delays – exacerbated by the COVID-19 outbreak in early 2020 - led to the deadline for timetable data publication being pushed back and rolled into the January 2021 deadline for fares and real time data.

Concerns raised regarding the BODS Platform

DfT staff described "pushback and nervousness from LAs" throughout the development process, and this sentiment was clearly reflected in the interviews carried out both with LAs and service operators as part of this evaluation. LAs, in particular, expressed concern around the quality of the data being published to BODS[39] and explained that not enough attention had been played to their current role both in cleaning and sense-checking the data before disseminating it. Additional concerns were raised from both LAs and bus operators around the capacity of smaller operators to comply with BODS requirements.

While many acknowledged that the theory of uploading data direct from source was sensible, LAs pointed to the data files they had received historically, which included significant duplication, formatting issues and large chunks of incorrect or missing data. BODS includes quality assurance tools to automate this role, but LAs expressed doubt that these tools would be able to pick up on some of the nuances which rely on familiarity with the local context (for example, incorrect timetables, bus stops missing or included in error, and routes which change depending on the school year). The introduction of Agent mode, in particular, is expected to address this problem by allowing LAs to continue to provide a "bureau" service for some smaller operators.

DfT staff acknowledged that digital literacy and inclusion are a real challenge for some operators and pointed to their business change programme to increase digital literacy and skills for operators. However, given the move towards a data-driven society, it was pointed out that "if buses want to continue to have a role, operators and staff need to be digitally literate."

There was consensus amongst those consulted from all stakeholder groups around the importance of delivering the project in stages, with appreciation from LAs and service providers of the importance of being able to test the process for uploading and publishing data prior to

[39] LAs described the data as arriving in a variety of formats (including "written on scrappy pieces of paper"), with significant gaps and mistakes with regard to items such as misnaming bus stops or forgetting stops on certain routes

roll-out. As the BODS platform is currently in Beta, there are still some outstanding issues which are causing concern. A number of these issues relate to niggles around certain data files not uploading, error messages when no errors had occurred, or the lack of certain technical capacities – such as the ability to rename files after upload – which limited the platform's user friendliness.

"We had a genuine issue with the test server not being able to cope with the volume of data from early adopters, signing up as many as possible as quickly as possible, but [DfT] kept on with process. Yes, they have an objective to meet but it's not a great experience for the bus operators themselves – I don't feel like KPMG understand bus operators or the transport sector that much", Service Provider

These niggles were exacerbated by a significant increase in the incidence of timetable changes as a result of COVID-19. One service provider explained that in a normal year, timetables might change once every 6 or 12 months. During 2020, however, timetable changes were being introduced in some cases every 7 days. This meant that any technical glitches or errors being faced when uploading files had to be navigated on a regular basis which, combined with a perceived lack of communication regarding how these reported errors were being addressed and a sense of being blamed for errors which had not originated with them, created an aggravating factor for service providers publishing data during the Beta.

Agent mode

One of the most significant concerns, raised by a majority of LAs and some service operators, relates to a facility known as "Agent mode". Agent mode was introduced in an attempt to accommodate the role played by some local authorities (and private sector data brokers) in uploading data on behalf of bus operators. It is intended to allow bus operators to nominate third parties to log in on and upload data on their behalf. Many local authorities expressed their intention to use this facility when it becomes available in order to help their smaller operators. Agent mode has been subject to internal delays, however, creating a level of nervousness with regard to the timeframe available to upload data once it has gone live – particularly, if there are any teething errors which affect its ability to function. Some local authorities claimed to have most or all of the required data ready to upload but stated they had been prevented from doing so until Agent mode goes live. This is currently scheduled for November 2019, which would allow two months for any third parties to upload data before the January 2021 deadline.

BODS transition period

Finally, LAs and bus operators reported significant duplication related to the transition from Traveline to BODS, with some explaining that the data being uploaded to BODS was currently being distributed in multiple formats to 7 or 8 different contacts. This duplication can be expected to reduce once the BODS platform is up and running, however this could be expected to take up to 12 months. DfT staff voiced the hope that LAs and service providers would continue to publish data on Traveline, in particular, until December 2021. Feedback from LAs and bus providers around their intentions in this regard was mixed, with some stating the intention to continue publishing until they felt the platform was reliable and others sketching out a plan to "switch off" Traveline in January.

Definition and creation of common data standards

The choice of TransXchange and SIRI were largely supported by LAs and service operators alike, who view these as commonly used industry standards. While stakeholders declared themselves content with the use of SIRI (and the timetables involved), some concerns were raised regarding the detailed requirements specified by the DfT for the TransXchange standard being used by BODS. Although DfT chose to use TransXChange 2.4, they specified compliance with a particular interpretation of this standard. This was viewed by many LAs and bus operators as a deviation from the standard, which would require additional information and would oblige them to change their systems in a way which would not be expected by other consumers of the data in the same format. This has the potential to be costly, as well as introducing unnecessary complexity as it implies producing TransXchange files in different formats for different purposes. DfT staff explained, however, that this was more a case of clarifying the specific interpretation of BODS which was to be implemented. Other stakeholders also questioned whether the information included in the SIRI feed would be enough to allow this data to be integrated with the TransXchange data.[40]

The use of NetEx was a major cause for concern amongst service providers, largely because this is a new standard which is not familiar to many in the industry. Ticketer, the largest ticketing company in the UK, has developed the capacity to create NetEx files but this is not the case for all ticketing companies. While DfT's role in standardising fares data was welcomed, many service providers expressed doubts that they would be able to comply with NetEx requirements by the January 2021 deadline. The TFN tool for uploading fares data, discussed in more detail below, seems to have gone some way to allaying these fears.

Concerns regarding compliance were exacerbated by perceived delays to the publication of data specifications. The TransXchange and NetEx requirements were published late in the summer, leaving stakeholders with a fear that they would not be able to adapt their systems in time to comply with the requirements in time for the January 2021 deadline.

Finally, one stakeholder pointed to potential for improved coherence within DfT, explaining that a different team within DfT was investigating issues related to accessibility on buses in parallel to the roll-out of BODS. They suggested that if the BODS standards included accessibility elements (for example, whether a bus stop has a shelter or raised kerb) this could help facilitate accessibility needs in future.

Provision of tools and training to support operators when publishing data

Tools have been created or are under development to facilitate compliance with BODS data requirements. The two main tools mentioned by interviewees are:

- **A TransXchange tool,** created by KPMG to help convert timetable data into a TransXchange file

[40] One specific example given was that while SIRI provides the service number of a given bus, it does not provide information on the specific route that the bus is following.

- **A fare data build tool,** created by Transport for the North (TfN) to help convert fares data into a NetEx file

Of these, the fare data build tool particularly won praise from some for its timeliness ("it's there nice and early") and for ease of use, despite one or two teething problems around data validation. The TransXchange tool, however, was described as providing little added value, due to its perceived inaccessibility and the length of time taken to convert files, particularly as data has to be entered line by line. DfT also published a BODS Implementation Guide in January 2020 and a number of quality assurance tools are under development, although none of those interviewed had yet used these tools.

Monitoring and evaluation

Since the BODS platform was launched, DfT has been able to monitor the number of operators registered on the Platform and the number of datasets published. Open data principles were viewed as an obstacle to understanding the projects longer term impacts, however, as it is not possible to track who is accessing the data and the purposes for which they are using it. Nonetheless, consideration is being given for methods to assess this – potentially in the form of user surveys or feedback requests.

The approach to be used for longer-term monitoring and evaluation of BODS was still under discussion at the time this case study was developed. DfT staff explained that one significant challenge they are facing is the lack of a blueprint for evaluating the opening of data. The current approach to monitoring and evaluation is expected to be in the form of a scorecard, looking at the completeness of the data available, regularity of data updates, the quality of the data published etc.

Additionally, DfT has been communicating with DVSA and the Office of the Transport Commissioner (OTC) to understand how BODS might facilitate compliance monitoring and enforcement. One area identified is punctuality data, with a new Reporting, Analytics and Archiving Service module introduced to help operators meet statutory punctuality reporting and support compliance monitoring by DVSA. At the time of data collection, news of this module was relatively recent for stakeholders and was being met with concern by some, particularly bus operators. The use of BODS to support compliance nonetheless appears a sensible approach to leveraging the dataset to: encourage bus operators to ensure the data published is up to date and of high quality; facilitate the DVSA and OTC in their oversight role; and reduce duplication by ensuring reference is made to one common source of data.

One area for improvement identified by DfT staff was the need to integrate planning around evaluation much earlier. DfT staff acknowledged that specifying goals upfront and developing clear accompanying KPIs would have helped significantly in terms of designing a clear monitoring framework and evaluation methodology.

Project results

This section presents an overview of the project's main outputs and progress to date against the outcomes foreseen in the logic model.

Project outputs

The table below provides an overview of the specific outputs foreseen at the beginning of the project, and the extent to which these have been achieved.

Table 5.9: Progress against anticipated outputs[41]

Outputs foreseen	Outputs achieved
Bus Services Act and supporting legislation passed	Bus Services Act and Implementing Act passed
Bus Open Data Service launched publicly by January 2020	BODS portal developed and registrations open – phased introduction of functionalities
All bus operators registered to platform	333 registered bus operators (out of an estimated total of 600), including "Big 5"
Datasets for 17 operators published by DfT in a standardised format	782 datasets on BODS of which 405 are published **Location data:** 106 feeds for 66 operators Feeds for approximately 10444 vehicles (of 32,500) – will rise to 16500 when Vix publish **Fares data:** Currently 114 datasets for 11 operators. Number of services to be confirmed of 16000
Training and support tools for data publishers	TransXchange tool, NetEx tool and implementation guide published.
Automated validation checks to assess data quality	Data validation checks under development

A closed test site for location data has also been launched, with 20 operators providing feeds to the service.

As mentioned previously, 2020 has been treated as a transition year with a focus on registration rather than publication of data. So far, the main project milestones have been met, but it is still unclear whether BODS will function appropriately once operators are required to publish data in January 2021. As discussed in the project management and delivery sections, LAs and service

[41] Data provided by DfT 07/12/2020

providers have raised concerns around technical glitches, the lack of certain functionalities (such as Agent mode), and data quality (particularly with regard to omissions).

DfT are currently in discussion with the OTC and regulators to develop an enforcement strategy for.2021, as well as engaging with ticket machine suppliers (for NetEx) and other intermediaries to ensure their systems can publish the data required for BODS in the correct formats.

Project outcomes

The main expected short and medium-term outcomes of BODS are described below.

Short-term outcomes

- Technology companies use standardised open data to create end user products and services
- LAs and transport authorities use open bus data to improve network management efficiency

Medium-term

- Reduced operational costs for operators
- Improved journey planning
- Improved passenger satisfaction
- Increase in bus patronage
- Increased use of public transport
- Improved connectivity for communities across England

As BODS is still under development, it is hard to point to any concrete evidence of longer-term project outcomes. Nonetheless, the Dft has recorded a total of 570 unique visitors to the BODS platform so far, including data consumers such as google, moovit and citymapper. DfT staff also report having engaged with software developers and data consumers across the industry and are looking to organise virtual workshops in the future. As described in the monitoring and evaluation section, it will be difficult to directly trace the extent to which data provided on the BODS platform is being used to drive specific apps as, in response to industry concerns and in line with open data principles, the BODS portal does not track who is accessing the data or how they are using it.

DfT staff believe that the Portal has already demonstrated its value. They report that operators who were registered on BODS at the start of the COVID-19 outbreak were able to provide real-time data to google and others regarding timetable changes during the national lockdown which

followed. This enabled up-to-date information on timetables to be provided directly to passengers, despite multiple changes at short notice.

Unintended impacts of the project reported by stakeholders range from the opportunity to meet and exchange experiences with their peers across the country to the development of the Reporting, Analytics and Archiving Service module, which was not foreseen in the original BODS specification but was described by one LA as “absolutely brilliant” and a real money-saver compared to their current method for tracking scheduling adherence.

Lessons Learned

"If they get the opportunity to do what's right with BODS and make the process simpler for operators, is absolutely right [to do it]…[but] if there is a single source of truth, there has to be an incentive or something to keep it up to date.", Service Provider

The role of the DfT in the future

There was broad support for DfT to play a leading role in developing and implementing national data standards, particularly with regard to fares and ticketing. Additionally, a number of stakeholders underlined the importance of DfT's continuing involvement beyond the "completion" of BODS, in order to maintain momentum, ensure future compliance and continue to support with improving data quality.

There was consensus around the need for further financial and technical support to ensure compliance, particularly for smaller operators, one tier authorities and those working in rural areas, where limited footfall can lead to very slim operating margins. The administrative and financial burden associated with compliance were felt to be significant in these circumstances, and stakeholders were in agreement that additional financial or technical support (beyond the tools already created) would be needed to ensure smaller operators could comply without risking insolvency.

There is a clear appetite amongst local authorities for DfT to continue playing a role in coordinating exchange between different LAs at national level. While options do exist through specific membership associations, these are beyond the reach of many LA budgets. A forum for sharing learning and expertise was suggested, as well as ongoing troubleshooting sessions for to allow different stakeholder to offer and benefit from peer support.

Stakeholders identified a variety of areas where further intervention from central government would help ease the burden on local authorities and service providers, including the creation of framework contracts which could used by local authorities to support with procurement; and suggestions for a centralised DfT-managed ticketing app using the data uploaded to BODS.

Lessons learned

A number of important lessons can be drawn from the implementation of BODS. These are:

- Stakeholders were in agreement regarding the vital importance of legislation to ensure compliance, particularly as the bus sector is an area which is not under the direct influence of central government. Some concerns were raised around the clarity of the legislation, however, particularly with regard to definitions and specific details, such as how far in advance of a timetable change data would need to be provided;

- Significant concerns have been raised around the shift in responsibility for data publication from LAs to operators, and the potential implications this might have for the quality and completeness of data. While automated tools introduced to check the quality of data are likely to be able to identify issues with data completeness, they are unlikely to

address the ongoing need for a “sense-checking” function in order to identify and correct human errors, such as misnaming of bus-stops or accidental omissions/additions to certain routes. Further thinking may be needed regarding how these errors can be identified and addressed effectively and efficiently, and the level of local knowledge required to perform this function.

- The tools provided to support data preparation and upload were perceived as insufficient by a majority of stakeholders, particularly the TransXchange tool. One suggestion put forward would be to develop or procure a scheduling system to be made available to all bus operators. Some local authorities reported having implemented schemes such as this at regional level, with one making a data broker available to smaller operators to collect, clean and validate their data; and another leasing ticket machines to smaller operators which could guarantee a BODS-compliant SIRI feed.

- While there was general support for the underlying rationale of BODS, stakeholders expressed dissatisfaction with the level of stakeholder engagement – particularly with regard to smaller operators and tier one local authorities who could not spare the resource to participate in workshops and user testing. It was feared that this gap might limit understanding regarding the needs of less digitally savvy or well resourced stakeholders. DfT also acknowledged a gap in their communications, which focused primarily on digital channels and may have therefore missed those who still rely primarily on traditional, paper based communications.

- While acknowledging their significant expertise in IT and systems, stakeholders also expressed doubts regarding DfT and their consultants’ understanding of transport-specific issues or knowledge of the market. Including at least one subject matter expert in the core delivery team would have helped to allay the impression that the BODS team were uninformed and that knowledge was not being shared with new consultants and/or members of the DfT team.

- Additionally, while reporting that both KPMG and DfT were responsive to direct communications or support requests, stakeholders identified a need for more coordinated support across stakeholder groups to facilitate information and share learning between parties. A number of LAs suggested including named regional contact points, either from DfT, KPMG or at LA level to support in this regard

- The timetable for BODS was perceived as too ambitious, especially given the exacerbating factor of COVID-19. While acknowledging the need for sustained pressure to drive compliance, service providers and LAs were of the opinion that a longer timeframe would allow for the standards to become embedded and any errors (related to the data and/or the BODS system itself) to be ironed out.

Annex 3: Opening LA Transport Data

Introduction

This case study aims to analyse the performance of the Funding for Innovation – Opening Local Authority Transport Data project ('the Competition'). It describes how the Competition is being delivered, identifies the different factors that have hindered or enabled its delivery, and the extent to which it has achieved its intended outcomes. The case study was based on desk research, analysis of application and monitoring data provided by the Department for Transport (DfT) and Local Authorities (LAs), and 13 in-depth interviews with relevant stakeholders including members of the DfT's Traffic and Technology and Analytics and Data Divisions, LA staff, technology providers, end user organisations and other strategic stakeholders.

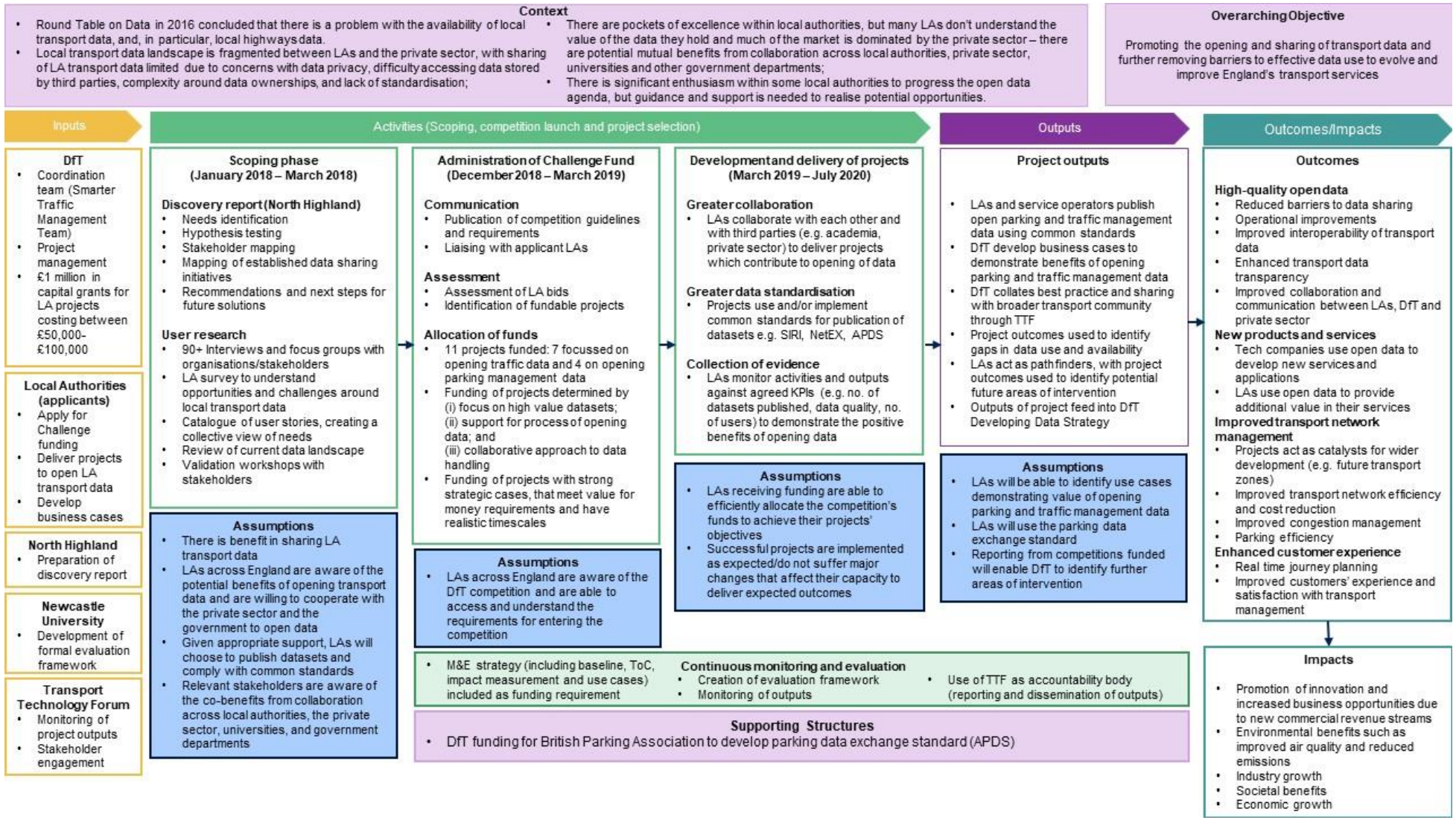
A brief overview of the Competition has been provided in the table below.

Table 5.10: Overview of the Competition

	Overview
Objective	▪ Promote the opening and sharing of transport data; and further remove barriers to effective data use across England's public transport services.
Total funding	▪ £955,360
Funding awarded	▪ Between £50,000 - £100,000
Number of pilots supported	11
Main Activities	▪ Launch of Funding for Innovation Competition ▪ Evaluation of bids and allocation of project funding ▪ Delivery of pilots and ongoing stakeholder engagement ▪ Collation of learning and dissemination of project results
Timetable	▪ April 2019 - March 2020
Main stakeholders involved in the delivery of the Competition	▪ LAs; ▪ DfT; ▪ Technology providers / data suppliers; and ▪ End user organisations.
Types of data being shared	▪ Real-time traffic management information ▪ Parking data

A logic model describing the main inputs (in terms of human and financial resources) and activities associated with the competition, as well as the expected short-term outputs, medium-term outcomes and long-term impacts is provided in Figure 5.6 (overleaf).

Figure 5.6: Opening Local Authority Transport Data - Funding for Innovation project logic model



Context

The DfT's involvement in Opening LA Transport Data can be traced to a 2016 round table chaired by the Department's Secretary of State, which concluded that local highway transport data is often inaccessible, of poor quality and siloed within LAs, with no single owner for transport data[42]. In response, the DfT commissioned the North Highland (NH) report in 2018 to scope out the potential benefits of improved access to local transport data for local transport network planners, operators and users and to further identify which datasets would be of most value to them. The report highlighted several barriers inhibiting the opening of transport data and addressing those barriers could improve transport network efficiency and promote economic, social and environmental benefits[43] (as highlighted in the following table).

Table 5.11: Barriers and potential benefits of opening LA transport data

Barriers to opening and sharing transport data	Potential benefits of opening and sharing LA transport data	Description of benefits
There are significant amounts of LA transport datasets that are currently closed, and the market is primarily dominated by the private sector	Improved transport network efficiency	Opening up transport data can support better transport network management planning, including congestion management, and improve the visibility of transport services within LAs.
There are concerns around data privacy and data ownership; and LAs face difficulties accessing transport data stored or maintained by third parties	Improved air quality and reduced emissions	Improvements in transport data collection can help assess the impact of environmental policies in transport behaviour, such as changes in preferred modes of transport, and help support multimodal journey planning and the implementation of sustainable transport models.
There is a lack of data standardisation and consistency across key transport datasets	Improved user experience	The increased accessibility to transport data promotes more efficient journey planning, allowing customers to travel more easily and have a connected experience across multi transport modes. It also reduces congestion and reduces journey times, increased customers' satisfaction.
There is a lack of awareness and understanding across LAs on the potential benefits of opening data; and there is a lack of skills and expertise within LAs	Support transport growth and innovation agenda	Open transport data promotes innovation within the transport sector through the development of apps and services to improve journey planning. It also allows the use of transport data to improve urban planning or the introduction of new technologies, such as electric vehicles.

Source: North Highland, Local Transport Data Discovery (2018)[44]

[42] Department for Transport. Traffic & Technology Division. Local Transport Data – Discovery. Award notice. Available online at: https://www.digitalmarketplace.service.gov.uk/digital-outcomes-and-specialists/opportunities/5570
[43] Department for Transport. Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf
[44] Department for Transport. Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf

Improving access to and availability of local transport data is a key priority of the Government's Future of Mobility: Urban Strategy (2019)[45], which seeks to maximise the opportunities from the changes in the transport urban setting and emphasises the importance of opening up transport data to improve choice and operation of the transport system. This strategy fits into the wider Future of Mobility Grand Challenge, which aims to position the UK at the forefront of mobility innovation.

Project design

Origins and genesis

The Opening Transport LA Data Competition was one of five competitions organised by the DfT between 2016 to 2019 as part of its strategic approach to the Future of Mobility. The competitions were intended to establish and showcase real-world benefits of transport connectivity at local level.

The Opening Transport LA Data Competition was launched by DfT in December 2018, with the following objectives:

- Encourage LAs to open, clean and standardise their existing high value transport datasets in an open format, with a focus on real-time traffic management information and parking data;
- Help support the business case for more widespread open data and data sharing;
- Improve transport operations and highlight potential efficiencies;
- Identify opportunities for further exploitation of potential benefits such as improved safety, efficiency and reduced transport emissions;
- Fund projects that adopted a collaborative approach across LAs and third parties, such as the private sector and academia;
- Demonstrate the value of cross-boundary data collaboration;
- Unleash the potential benefits of sharing data, strengthening partnerships between different stakeholders;
- Encourage innovation in the private sector supply chain. [46].

One of the broader aims of the Opening LA Data competition was to create a test bed to demonstrate that the Alliance for Parking Data Standards (APDS) standard was workable.

[45] DfT, Future of Mobility: Urban Strategy (2019). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/846593/future-of-mobility-strategy.pdf
[46] Department for Transport. Funding for Innovation: Opening Local Authority Transport Data: Moving Britain Ahead. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/767441/open-data-guidance-local-authority.pdf

Over £6 million was invested in 44 separate Cooperative Intelligent Transport Systems (C-ITS) pilot projects, and a further £1.5 million in supporting further development of the most promising results identified across the competitions. From the Opening LA Transport Data Competition, two of the eleven projects have so far been given funding for further development. The Opening Transport LA Data Competition funded projects which focused primarily on traffic management and parking data, both of which were identified as potentially high value datasets which were not being exploited to their full potential.

Table 5.15 describes some of the potential benefits which were identified regarding these specific datasets in the NH report, rendering these datasets highly valuable[47].

Table 5.12: Benefits of traffic management and parking data

Dataset	Benefits identified
Real-time traffic management information	• Improving journey planning; • Stimulating the private sector to develop new solutions to improve congestion; and • Allowing LAs to better manage incidents and disruptions.
Parking data	• Promoting parking efficiency to reduce congestion; • Facilitating the optimisation of parking revenue; and • Supporting better decision making for users around price, availability and location of parking.

Source: North Highland, Local Transport Data Discovery (2018)[48]

Rationale

"It's about gaining enough momentum in the LA community, so that late adopters can be convinced of the merits and benefits of doing projects like these" – Strategic Stakeholder

The NH Report outlined a number of recommendations which served as a rationale for the launch of the competition. The recommendations most pertinent to this competition are described below:

- LAs should be supported to focus on developing more high-quality open data, which could be achieved by working with LAs to scale proven data initiatives or developing open data guidance;
- The DfT should sponsor identified data projects which encourage and foster better LA transport services, which could be done by creating standards for LAs to support services and developing a private and public national data catalogue;
- There is a need to promote training and skills development within LAs; and
- There is a need to improve collaboration between LAs, Highways England and the private sector.

[47] North Highland, Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf
[48] North Highland, Local Transport Data Discovery (2018). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730787/local-transport-data-summary.pdf

Additionally, the NH report recommended addressing the lack of a UK standard for parking data. In response to this recommendation, the DfT funded the development of an international standard for parking data exchange by the British Parking Association

Local Authorities and opening transport data

There was consensus amongst stakeholders interviewed for this case study that the findings of the NH report were valid. They acknowledged that whilst there were several significant high-value transport datasets, LAs tend to be poor at opening them and that much of the data collection remained siloed and closed to third parties. Additionally, all stakeholders highlighted issues with the quality and completeness of data captured and held by LAs, describing a lack of standardisation and consistency in key transport datasets.

The needs of LA stakeholders were broadly aligned with and they tended to support the DfT's rationale for the competition, highlighting that it was intended to demonstrate use cases or proof of concepts and open previously closed datasets, including across LA borders, to act as a catalyst and lay the groundwork for further development.

Motivation for LAs to apply

The main motivations reported by LAs applying for funding were the development of proof of concept and use cases and to open previously closed datasets which did not hold significant immediate commercial value. LAs highlighted both the need to undertake testing work to enable further development in opening transport data as well as the challenges associated with finding available funding sources. In a survey of English LAs conducted as part of the NH report, 30% of respondents cited the cost involved in making open data possible as their biggest obstacle to sharing data openly. LA and DfT stakeholders supported the findings of the NH report and highlighted that due to LAs resource constraints, internal funding for discovery pilots is often deprioritised in lieu of other more urgent spending. LAs are often depend on external funding to carry out more experimental projects of this type. Furthermore, all stakeholders agreed that there was limited available financing or appetite to invest in pilots at the local level from the private sector, as the immediate benefits were felt to accrue predominately to the LAs in terms of improvements to transport operations.

"The funding allowed us to develop this area of work at a time when we could not have expected our normal revenue budgets to support such work." – LA Stakeholder

LAs reported being aware of a significant number of assets gathering potentially valuable transport data, such as Automatic Number Plate Recognition (ANPR) cameras, Variable Message Signs (VMS), car parks and traffic signals. It was acknowledged that there were not being effectively utilised, and that the competition offered an opportunity to make greater use of those existing assets. DfT, LA and private sector stakeholders also highlighted the need to develop a collaborative approach to data handling through working across local authority boundaries.

Furthermore, the objectives of the competition supported or enabled a number of local strategies and existing work being undertaken by LAs. For instance, the competition financed

the development of a piece of work required for the City of York to deliver its wider Smart Travel Evolution Programme (STEP) programme.

Project design

This section will provide an analysis of the overall design of the competition, including the eligibility requirements, the application process and the datasets and standards requirements utilised for the competition.

Overall design of the Competition

The NH report recommended stimulating LA development in opening data. Acknowledging the difficulties faced by LAs in accessing internal funding for such projects, the DfT chose to use the competition as a vehicle both to distribute funding for the opening of potentially high value datasets and (as the funding was awarded with specific requirements attached) to ensure the funding helped to prioritise this activity at LA level. As outlined above, the competition allocated between £50,000 to £100,000 in capital grants directly to LAs, funding a total of eleven pilot projects to open, clean and standardise their selected datasets.

All stakeholders agreed that the competition represented an appropriate vehicle for encouraging and realising the development of use cases, because they gave LAs the opportunity to pursue opportunities for innovation which might otherwise be deemed too high-risk and helped to identify areas and approaches which might merit further uptake – at local, regional and national level. Additionally, the requirements for demonstrating collaboration were thought to be helpful in aligning LAs and fostering the development of new and existing relationships between LAs, private sector data suppliers and other stakeholders.

"It (the competition) captured the potential of using data at the local level very well"- Strategic Stakeholder

LA, DfT and strategic stakeholders considered that the design of the competition successfully addressed the needs of the transport data sector as it was targeted at activities (including digitalisation) which will help future-proof the work of LAs and their providers and was targeted at addressing identified gaps in service provision within transport sector. Including the Opening LA Transport Data Competition, over £6m had been invested by the DfT in 44 separate Cooperative Intelligent Transport Systems (C-ITS) pilot projects and therefore LAs and suppliers reported a well-developed understanding of the process as a way to encourage innovation in the private sector supply chain.

Eligibility requirements and application process

The competition was felt by LA and DfT stakeholders to be highly visible to LAs, generating a total of 25 applications. LAs reported no difficulties in accessing and understanding the requirements for entering the competition.

LA stakeholders reported no significant challenges in the application process or meeting the eligibility requirements. Additionally, the guidance issued by the DfT was considered to be clear and easily understood without being overburdensome. One issue reported by LAs was the

requirement to have a senior financial officer sign off on the bid, which was more onerous than similar DfT projects where the process could be delegated. This caused concerns regarding their ability to meet the application timelines, although ultimately this did not come to pass.

Additionally, there was considerable investment of resources required to complete the application, with one LA reporting having spent up to £10,000 on the bid for a £100,000 funding request. However, this was considered to be in line with the investment required for similar DfT funds.

"It appeared to get the balance right between detail that would allow DfT the opportunity to critically evaluate but not too much that would have created a significant cost pressure and taken officers away from their 'day job'." – LA Stakeholder

Previous DfT funding opportunities have focussed on supporting preferred private sector vendors in pilots which LAs were not permitted to lead. LA stakeholders felt that this distorted the market, as it tied them to working with vendors who had essentially been chosen by central government. In contrast, LA stakeholders felt that the competition's awarding of direct capital grants to LAs reduced their reliance on particular vendors or services and provided them with greater choice.

LAs reported that the requirements of the funding were broadly in line with their own areas of focus and did not require them to significantly alter the design of their project to match the funding requirements.

"I think we always knew we had a strong case and the criteria merely confirmed this and gave us the green light to submit." – LA Stakeholder

Selected datasets and data standards

The competition aimed to promote the opening of datasets in selected data exchange standards or formats in order to facilitate the open exchange of data and realise the value of opening real time traffic management and parking datasets.

In terms of sharing real-time traffic management information, the DfT encouraged the opening of Urban Traffic Control (UTC) and Urban Traffic Management Control (UTMC) systems, as they were considered to be valuable datasets that could be shared across LAs to improve network efficiency. Other datasets the competition focussed on opening included journey times, highway works and traffic count data. It can therefore be concluded that the way the competition was designed allowed for a broad diversity in terms of the types of projects funded, despite these projects only covering two sectors: parking data and traffic management.

The competition also encouraged LAs to share parking data to provide them with additional capabilities to analyse parking occupancy, investigate new methods for ensuring compliance with parking requirements (e.g. identifying and issuing fines to those who overstayed their timeslot) and optimise the use of parking spaces. While existing national legislation already mandates the publishing of transport data, including Regulation 25 of the Civil Enforcement of Parking Contraventions (England) General Regulations 2007 which requires LAs to publish their

parking account (e.g. all income from off street parking and enforcement activities), LAs also manage data not covered by legislation such as parking spaces, real-time availability and tariffs, which could also be opened up.

The competition required projects to ensure data is published in human and computer readable formats, as well as in a standardised format to ensure data is comparable across different organisations. The competition guidelines indicated that LA should utilise CEN DATEX II standards for traffic information and CEN Transmodel implementations such as SIRI or NetEX for public transport data. Parking data was also required to align with the Alliance for Parking Data Standards (APDS) to facilitate integration and compatibility of data.

LA and strategic stakeholders highlighted the importance of having DfT guidance and leadership around the adoption of standards and the role of the competition in supporting that. The CEN DATEX II standard is widely used and whilst LA, technology providers and end user organisation stakeholders felt that there was no serious competing standard, it was also considered not to have kept pace with technological developments. Additionally, all stakeholders supported the NH report findings that the parking sector has been held back by the lack of standards and agreed in principle that the adoption of the APDS for opening their parking data would contribute to its broader adoption and increase the value of their open datasets.

DfT, LA and wider stakeholders agreed that datasets in real time traffic management and parking data had limited immediate commercial value but significant value in terms of efficiency, decarbonisation, generating savings and improving LA services for road traffic. Similarly, the same stakeholders felt that opening parking data was suitable because it was largely closed and represented an opportunity to improve service provision with a stronger link to commercial and revenue raising activities. In contrast to the more limited demand from private sector, there was strong demand from LAs service providers and planners for the datasets targeted in the competition. Specific examples given of how these datasets could provide additional value included reducing city centre congestion and enabling more efficient use of parking spaces, due to the provision of increased real-time information to motorists regarding which carparks have spaces available or where street works are being carried out in the city centre.

Technology providers, end user organisations and other strategic stakeholders highlighted the importance of adopting national standards to ensure interoperability as a precondition to realising the value of the open data. Without standardisation, it would be very difficult for the full dataset to be accessed and used by individual developers to develop apps and other high-level products.

One issue LAs reported with the selection of datasets and formats were the constraints of long-term agreements with vendors, where LAs were already locked into contracts and were not easily able to change the terms and conditions of those contracts in order to request additional data or oblige vendors to comply with new standards (such as the APDS parking standard). In a number of cases, this meant that the ability to oblige vendors to comply with such requirements

would inevitably require LAs to await their next procurement, when they could include the new terms and conditions in tendering documents.

Project delivery

This section presents an overview of the competition and pilot resourcing, its coordination and management, and the approach taken to monitoring and evaluation of the pilots.

Project resourcing

"For us, the project fit it quite well, but we obviously were tailoring to what we could do in the budget." – LA Stakeholder

The competition was coordinated and managed by members of the DfT's Traffic and Technology Division with additional input from the Analytics and Data Division at the evaluation stage. In total, £955,360 was awarded by the DfT to eleven projects. LAs co-funding amounted to £238,738 and additional third-party contributions were provided in three projects, amounting to a total of £270,000. The most significant of these was provided by a local enterprise partnership. Additionally, several LAs utilised in-kind contributions of time or database access from suppliers. LAs, DfT and wider stakeholders considered the size of the grant funding available to each LA to be the minimum investment level required to make the pilot projects viable and the limited budgets were described as "significant constraints" on the scope of individual pilots. Whilst the allocated funds were seen as sufficient given the limited objectives of the competition, it was explained, however, that significant additional funding would be required to further develop the use cases into business cases.

Project management and delivery

"Genuinely a well-run process" – LA Stakeholder

"(There was) a lot of support to stop LAs trying to reinvent the wheel" – LA Stakeholder

Launch of funding for innovation competition

The design and launch of the competition were the responsibility of members of the traffic and technology division at the DfT. Publicity for the competition came from dissemination of the competition guidelines, which were published online and distributed through the DfT's networks. The competition opened for applications in November 2018 and a total of 25 bids were received. Evaluation of the proposals was carried out in March 2019, with allocation of project funding timed to coincide with the end of the financial year in order to top up the overall funding pot using any leftover money available in the team's budget. This allowed for competition funding to nearly double, and enabled the DfT to award funding to eleven pilot projects in place of the five projects originally foreseen. Pilot projects were expected to run from April 2019 to March 2020.

Evaluation of bids and allocation of project funding

Funding was awarded to bids which best met the following criteria:

- focussing on the high value datasets identified by North Highland (including real-time traffic information and parking data);
- supporting the process of opening data (for example, cataloguing data within their control, cleaning data to ensure quality, and standardising datasets); and
- developing a collaborative approach to data handling (for example, working across local authority boundaries; developing or exploiting existing data platforms).

To ensure that data was not restricted by local authority boundaries, bidders were required to demonstrate a collaborative approach to opening their data. Only six of the eleven projects allocated funding included collaboration between LAs. Feedback from stakeholders suggests a level of reluctance between some LAs to work together on cross-border projects, perhaps due in part due to the added complexity of integrating systems and providers which are managed separately and may be at different stages of development, with different ways of working.

"The DfT said: If you fail, that's ok, as long as you report back…we are impressed by the fact that we [succeeded and] did what we said we would", LA beneficiary

Decisions were based on factors including how well applicants made the strategic case for wider benefits, the expected return on investment in terms of value for money, the likelihood that the project would result in a deliverable and the quality of applicants' proposals for monitoring and evaluation of project implementation and outputs. DfT staff responsible for evaluating the bids reported a range of LAS, in terms of their level of development and experience in the field of open data as well as their previous experience of interacting with DfT.

The mixture of proposals received was viewed as an indicator of the success of the promotion activities, and the Department were keen to support both those who were already well advanced and those who were at an earlier stage. For those in the latter category, DfT staff reported providing some additional support in the form of site visits to see demonstrations of the work being carried out and the provision of practical advice with regard to project implementation. The specific LA identified by DfT as being less advanced in terms of opening data successfully completed their pilot and has delivered against the projected, albeit relatively modest outputs. Participants from LAs which had not yet opened their data appreciated the supportive approach taken by the DfT and their view that failure is not necessarily bad, as long as there is transparency so lessons can be learned. This was viewed as a significant element in encouraging less advanced LAs to apply for competition funding.

An overview of the successful projects including their key expected benefits and anticipated added value has been provided in Table 5.16.

Table 5.13: Summary overview of pilot data projects

Lead Local Authority and project title	Project summary	Collaborators	DfT funding awarded (£)	Key benefits and anticipated added value for LA
Bedford Borough Council: UTMC Data Warehouse Bedford	The project was expected to develop access to the Council's developing Common Database through an abstraction layer for third parties to use the data for commercial or research purposes.	South East Midlands Local Enterprise Partnership	92,000	• Reduced journey times and improved network management • Opportunity to build a digital platform to accommodate future technology developments • Commercial research opportunities for third parties to produce digital products • Improved accessibility and connectivity and encouragement of modal choice
Cambridgeshire County Council: DfT open transport data for Cambridgeshire project	The project aimed to establish Datex2 feeds from the suppliers into the UTMC common database platform for real time traffic.	Siemens; Drakewell; University of Cambridge; Geospock; Idox; Vivacity Labs Ltd	94,000	• Community and environment benefits • Operational benefits; improved network management • Improved user experience and encouragement of modal shift to promote sustainable transport models • Improved safety and adherence to regulations • Promotion of economic growth
City of York Council: Opening Local Authority Transport Data	The project aimed to automate the publishing of currently closed traffic datasets owned by the CYC.	CYC Transport Department; CYC IT Department; CYC Parking Department; University of York	100,000	• Development of automated and efficient data formatting and publishing process, promoting increased access and use of data • Improve reliability of journey times, road safety and air pollution • Development of applications and insights by developers and academics
Essex: Real-time information for connected vehicles	The project aimed to develop an open data feed to provide incident, road closures and diversion information; set up a template for a national standard source of open data; identify and test the feed data for potential end users.	Hertfordshire Country Council; Elgin (developer); Ringway;Ringway Jacobs JV	79,500	• Development of a template for a national standard source of open data to cover incidents, as well as road closures, and to cover all disruptions to the network • Smarter road network • Improve public's journey and reduce times of disruption • Enhanced bus partnership leading to improved bus services and more accurate real-time information
Hull City Council: Hull City Canonical API	The project was expected to develop a template for sharing information held by Local Government based upon the approach pursued by TfL. Information was expected to be brought together into a canonical API and shared through an innovation platform.	HCC; TransPix Ltd; Citi Logik; University of Hull	55,000	• Enable new digital initiatives and business to develop • Increased visibility of data across transport network, supporting better transport planning, network efficiency and operations within LAs and private sector • Improved air quality and reduced emissions • Improved transport data leading to impact on travel behaviour
Manchester City Council: APDS Pilot: Off Street	The project aimed to open data owned by car operators and LA in an APDS format. The data	Salford City Council; Liverpool City Council; Parking Matters (Project Manager); Buchanan Computing;	100,000	• Improved accessibility of services and customer experience • Improvement of cost efficiencies

Lead Local Authority and project title	Project summary	Collaborators	DfT funding awarded (£)	Key benefits and anticipated added value for LA
Car Park and Kerbside Availability Project	was expected to be available to the general public via third party publishers.	NCP; Q-Park; Parkopedia; JustPark		• Reduction in circulating traffic, reductions in congestion and noise, and improved air quality and road safety • To demonstrate an approach to a publicly-owned parking data and payment platform • Promotion of innovation and development of new services driven by data availability
Nottingham City: Nottingham Live Transport Data	The project aimed to create an application and data hub to share different datasets including traffic and parking data, roadworks information, electric vehicles charging points availability and air quality.	University of Nottingham; Vivacity Labs Ltd	50,000	• Improvement in air quality • Improved access to employment and services • Improved transport network efficiency and reduced congestion • Promotion of economic growth • Improvement in public health
Oxfordshire County Council: HeartPark	The project aimed to develop a consolidated EEH Parking data server and to present parking data via APDS format under OGL, with additional enhancements such as predictive availability.	Buckinghamshire County Council; Northamptonshire County Council; Cambridgeshire County Council; Hertfordshire County Council	91,860	• Better more efficient journey planning • Increased availability of granular information regarding utilisation of data • Increase number of end users accessing parking data; • Facilitate future mobility
Southend-on-Sea Borough Council: ASELA Open Transport Data Initiative	The project aimed to join up UTC, UTMC and Parking Data across the South Essex Corridor and link to key collaborators to maximise the opportunities from transport data.	Basildon Borough Council; Brentwood Borough Council; Castle Point Borough Council; Essex County Council; Rochford District Council; Thurrock Council	98,000	• Enhance real-time information, insight and network management • Enhance Journey planning • Active network management, maximising existing capacity • 'Real-time' monitoring and predictive analytics, actively managing the network to improve air quality • Linking data across multiple modes, providing travellers with high quality information to promote optimal mode choices
Transport for West Midlands: Transport Data Unification (traffic data)	The project was expected to consolidate West Midlands traffic data into one repository, provide open data access through standard interfaces and create a unified API layer for developers to access this data.	Birmingham City Council; CityScience; Conduent; APCOA	100,000	• Improved traffic management and air quality • Encouragement of mode shift and active travel • Stimulation of economic activity and innovation • Improved citizen experience
Transport for Greater Manchester: GMDataHive Project	The project was expected to extract UTC-SCOOT data making it available in a more enhanced format than currently available through the open data service within the TfGM common database (CDB). It aimed to engage with data users to establish use cases for the datasets opened up.	Chordant; Birmingham City Council; Coventry City Council; Dudley Council; Sandwell Council; Solihull Council; Walsall Council; City of Wolverhampton Council; Inrix; Dynniq; Siemens; RTEM;	95,000	• Creation of innovative services through open data • Development of incident management tools, increase value in terms of financial/economic contribution to customers and organisations

Lead Local Authority and project title	Project summary	Collaborators	DfT funding awarded (£)	Key benefits and anticipated added value for LA
		Adaptorlogic; Amey; CA Traffic; Swarco; Now Wireless		

Source: Internal document review of successful LA bids

There was agreement amongst stakeholders that the competition was well managed and coordinated by the DfT. LAs, in particular, felt supported throughout the process from application to project delivery. In addition to providing positive feedback regarding the clarity of the guidance provided, competition applicants reported that the DfT was quick to respond to queries from LAs and provide support as required.

Delivery of pilots and ongoing stakeholder engagement

Following the announcement of the competition winners, the DfT organised three introductory workshops. These included competition winners from all five competitions being run by the DfT, beneficiaries of previous competitions and members of the Technology Transport Forum (TTF), a broader forum run by the DfT. The aim of the workshops was to share feedback and identify similarities between projects at the outset of the competition.

Beneficiaries were also expected to join the TTF's Connected Technologies and Data user group, which acted as a continuous point of contact and an arena for ad-hoc support and peer to peer knowledge sharing throughout the competition. LA stakeholders welcomed the opportunity to share knowledge and learning across pilots and appreciated the substantial effort made by DfT to promote exchange of experiences, shared learning and to develop synergies between projects (and LAs more broadly). This was felt to be particularly valuable in identifying potential opportunities for follow-on projects and further collaboration.

"It was a brilliant initiative for DfT to arrange for all the bidders to meet and be in contact with each other, a very refreshing change and hopefully something that can be applied to other programmes, particularly now as we don't have to travel to meet" – LA Stakeholder

The transition to virtual meetings resulting from the COVID-19 outbreak and ensuing social distancing restrictions in March 2020 led to a tangible decline in the perceived value of the TTF user group. Despite conducting a number of virtual meetings, LA stakeholders noted a significant decrease in interaction and engagement between LAs since shifting to online delivery which in some projects led to an increased feeling of stasis in further development of their projects.

Collation of learning and dissemination of project results

On completion of their projects, competition beneficiaries were required to submit a closing report detailing project activities and expected outputs. At the time of writing this case study, seven of the eleven projects had officially completed their projects. Five of the completed projects were presented to the broader TTF Forum and three were included in the DfT's State of the Connection Nation Report.

Although delivery of the pilot projects was due to be completed by the end of April 2020, four projects had yet to deliver their closing report by August. The timeframe for project delivery was identified as a significant challenge for LAs, with a number of projects reporting delays due to issues in relation to the procurement of datasets. LAs identified two major challenges: the first related to delays in acquiring data, with knock-on effects for its publication the second related to the integration of the data once it had been acquired, with a number of datasets described as

incomplete or poorly organised and in need of significant additional data cleaning. One LA reported significant issues related to the consistency of data between datasets supplied by different vendors, while others reported a reluctance from LAs to release certain datasets.

LAs also reported encountering technical challenges which required them to seek alternative solutions and amend the initial project specifications, causing delays or failure to achieve some outputs. One LA discovered through the course of implementing their pilot that the increasingly demanding nature of the datasets to be published would require an upgrade of their open data platform to host such datasets.

COVID-19 presented a challenge to a number of beneficiaries because of resource availability and changing organisational priorities. A number of project elements were put on hold, creating delays and bottlenecks in the delivery of pilot projects.

Monitoring and evaluation

LAs applying to the competition were required to provide a logic model to demonstrate how their data proposal would achieve the intended benefits and to commit to monitor and evaluate the impacts of datasets being opened. The competition guidance supported LAs' utilisation of the NH approach to measuring the value of transport data, focusing on:

- Community and environment - contributing towards wider societal and behavioural change, such as improving air quality and accessibility of services;
- Operational/efficiency - streamlining ways of working and processes for individuals or organisations, which improves overall cost efficiencies;
- User experience - residents or customers receiving an enhanced or improved service through enriched information;
- Safety/regulation - ensuring that information is transparent, and that any legislation is fully adhered to; and
- Economic growth - helping the flow and movement of people and businesses contributing to wider economic activity.

Furthermore, the DfT engaged an academic institution to develop a new agile evaluation framework that was to be utilised by LAs to evaluate pilot projects, identifying common outputs and specific local objectives. The framework was not adopted, however, due to concerns from DfT that it was not fit for purpose. However, in line with the original objectives the DfT conducted three regionalised roadshow presentations bringing together all the beneficiaries to gather data and outline their requirements for monitoring and evaluation. Additionally, the TTF was intended to facilitate monitoring of the pilots, with the pilots reporting into their State of the Connected Nation report. The DfT planned to gather feedback on pilot outcomes a year after completion to feed into the development of successful business cases and discover how the opened datasets have been utilised but, at the time of reporting, data collection had not taken place.

At the pilot level, given the variety in the project objectives, there was a wide range of KPIs that LAs planned to work with academic partners to track. These mainly focussed around the following:

- Number of datasets opened;
- Usage of those data including the number of users, downloads, typology of data users and interactions with the data;
- Demonstration of an ability to feed into use cases or future business cases; and
- Identification of additional datasets.

The monitoring of pilot outcomes was thought to have been a significant challenge for the DfT and data collection on the current status of a number of pilots remained incomplete. Overall, the competition suffered from the lack of an overarching evaluation framework, limited engagement of some LAs in providing monitoring data, limited resources available to the DfT to monitor each individual pilot and a lack of dedicated focus from LAs in incorporating evaluation into their pilots from the outset.

Project results

This section presents an overview of the results of the competition, including pilot outputs, evidence supporting the demonstration of use cases, enabling LA to open, clean and publish transport data, demonstrating the value of cross-boundary data collaboration and encouraging innovation in the private sector supply chain and discussion of emerging evidence of competition outcomes being realised.

DfT underlined the limits of the ambition of the competition, which was intended to fund small projects over a very short period of time. The expected results did not relate to monetisation of project outcomes, but rather related on the successful opening of new datasets by LAs or the use of data in a novel way (i.e. the projects were not intended to be a continuation of something that was already in place.

Outputs

Table 5.17 outlines the key outputs of the projects at the time of reporting. As can be seen, seven of the 11 pilot projects supported through the competition (representing 64% of all projects) were completed with four ongoing (representing 36% of all projects). All completed projects had achieved their expected outputs, with the four projects not yet completed subject to delays related primarily to issues around procurement and publication of the datasets in the required formats.

DfT stakeholders felt that whilst some of the projects that demonstrated significant successful outcomes, the level of success across the pilot projects varied significantly. This related in part to how advanced different LAs had been at the outset of the competition (with some described as “leaders” in terms of digitisation, whereas others were very much beginners in terms of opening data).

Examples of particularly successful pilot projects include the development of the parking data platform for Manchester City Council; contribution to the development of Nottingham and Derby’s Future Transport Zone utilising the open data platform developed through the pilot; and the Transport for West Midlands (TfWM) pilot opening several databases across the West Midlands that feed into their regional control centre. Some of the most successful projects were building on pre-existing systems, suggesting that their knowledge gave them the technical capacity needed to appropriately scope their projects and to identify what was needed from an early stage in order to guarantee success.

As can be seen below, there have been delays in the delivery of projects by Bedford Borough Council, Nottingham Council, Oxfordshire County Council and Southend on Sea.

Table 5.14: Overview of data competition outputs

Local Authority	Project status	Outputs	Intended outputs achieved to date?
Bedford Borough Council	**Ongoing**	• The project was still in the process of procuring data from the supplier and service provider	N/A
Cambridgeshire County Council	**Complete**	• Data was made available to 3rd party developers to support innovation and app development. • UTC, Bluetooth Journey Time, off-street parking and traffic count data feeds were set up and integrated into Idox platform and available on a Datex2 feed • Bluetooth Journey Time, off-street parking and traffic count data were integrated into iCP platform and data was made available to download • Visualisation of off-street parking & Bluetooth Journey Time data was made available on iCP platform • Traffic count and Bluetooth Journey Time data was integrated into Geospock data platform • There was on-going work to provide further visualisations of datasets on iCP platform, open up on-street parking data and integrate more data into the Geospock platform	Outputs achieved
City of York Council	**Complete**	• Full investigation of the chosen data feeds. • Data was made available through an upgraded version of York Open Data. (www.yorkopendata.org) • Development of processes to transform and process the data stored in the data warehouse so it is suitable for publication. • Development of automatic processes to stream data from the private data warehouse to the public platform York Open Data. • Development of processes to ensure the live stream and maintenance of the published data on York Open Data. • Engaging with the open data and transport community ranging from data publishers to data consumers to promote the newly published data. • Upgraded Open Data platform to host datasets of a more demanding nature created through this project	Outputs achieved
Essex	**Complete**	• Provision of live road closure, incident and diversion information • Creation of a freely accessible CAV data feed that can be scaled nationally • Method for third parties to subscribe to pass input data into this feed from non-Elgin systems • Several potential end users had been identified and discussions were ongoing with Ocado, TRL, Bus companies (including Arriva, Centre Bus, and Uno) over integration of the data into their systems	Outputs achieved
Hull City Council	**Complete**	• Initial datasets have been opened up and additional datasets have been identified	Outputs achieved
Manchester City Council: APDS Pilot	**Complete**	• The platform had been developed and was now live	
Nottingham City	**Ongoing**	• The website and datahub were nearing completion	Outputs not yet achieved (data hub not complete)
Oxfordshire County Council	**Ongoing**		Not yet completed

Local Authority	Project status	Outputs	Intended outputs achieved to date?
		• LA had commissioned a service provider to develop a parking specific UTMC Server that brings together all parking data from EEH UTMCs. This had been connected via Datex II to the Zipabout platform, there the data was to be parleyed into the APDS format	(APDS format not yet achieved) -
Southend-on-Sea Borough Council	**Ongoing**	• Scoping of final components of phase 1 was agreed with CityScience • Conversations around development of API for one of the existing parking systems had been initiated with vendor • Analysed data formats and possibilities for extracting data from existing systems • Technical meeting was held with the internal data team and City Science to discuss requirements of implementation of mechanism for data extraction	Outputs not achieved – scoping activities carried out but "South Essex Corridor" not implemented
Transport for West Midlands	**Complete**	• 100% of available data for Birmingham, Coventry & Solihull had been procured and integrated into OneTransport • The project had engaged the vendor to obtain Warwickshire data and it was to be progressed to a published state • 31 Datasets had been published as opensource data onto OneTransport and mirrored to the MFM Datahub • All published data had been transformed into DATEX II format, allowing developers to access unified data	Outputs achieved
Transport for Greater Manchester	**Complete**	• *The TRL SCOOT* UTC was operational and gathering data and a number of data users had signed up to get the data feed	Outputs achieved – issues around costs of some datasets

Enabling local authorities to open, clean and standardise their selected data

The ambition of the competition was relatively limited in scope, with the threshold for successful completion described as publication of a closing report providing evidence of having successfully opened new datasets. Additionally, projects were required to publish the data in compliance with the standards identified (CEN Datex II for traffic management and APDS for parking).

Opening datasets

The competition was successful in opening a significant number of previously closed real time traffic management and parking data, with ten of the eleven projects publishing new datasets. As part of opening that data, LAs identified and catalogued relevant datasets, extracted the data from internal systems, cleaned and checked the data for any inconsistencies, applied standards, developed data feeds, developed automating processes and published datasets. For example, 31 datasets were published as open source data through the TfWM pilot, opening up datasets from across a number of local authorities and consolidating them into a single externally available repository. Furthermore, a number of pilots reported having identified and opened additional datasets during the project.

"(The competition) has enabled the sharing of data on which services can be built" – Strategic Stakeholder

An overview of the datasets that will have been opened by project completion has been provided in the table below.

Table 5.15: Overview of datasets opened

Local Authority	Datasets opened	
Bedford Borough Council	• UTC data • UTMC traffic counts • Journey times • Air quality data	• Parking availability • Vehicle management signs (VMS) • Message setting • Traffic disruption and system faults
Cambridgeshire County Council	• TC data • Parking (both on-street & off-street parking) • Bluetooth journey times • Traffic counts	
City of York Council	• Automatic Traffic Counters • Live Car Park Occupancy Data (5 car parks)	• Further 2 Car Park Occupancy Data (uses a different technology to capture the data) • Air Monitoring Stations Data (9 sites) • SPaT Data • CPNs and Permits data
Essex County Council	• Live road closure data • Incident and diversion information	
Hull City Council	• UTC data including real time parking availability • Vehicle management signs (VMS) • Real-time disruption information	• Road occupancy and flow rates data • Real-time traffic counts • Congestion and accident detection • Pedestrian and cyclist counts

Local Authority	Datasets opened	
Manchester City Council: APDS Pilot	• Real time off street dynamic parking • Parking availability data and static data	• Traffic Regulator Order data on kerbside designation including specific types of kerbside space (e.g. disabled, EV charging)
Nottingham City	• Parking data • Live traffic data • Roadworks data	• EV charge points • Air quality monitored via AURN sites
Oxfordshire County Council	• UTMC data including parking information and real-time space availability	
Southend-on-Sea Borough Council	• UTC data • UTMC • Parking Data	
Transport for West Midlands	• Traffic flow data • Traffic road congestion data • Journey times and signal timings	

A number of obstacles were identified by LAs as preventing the full realisation of their potential. The main issues identified included a lack of systematic data capture at source, the difficulty of integrating data from multiple IT systems and platforms, the cost of further development which would be required to enable third parties to integrate real time data into their systems, and the need for additional contextual information (for example bus location data, school arrival and departure times, and timetable information for other modes of transport such as buses and ferries) to allow for the value of the datasets currently being opened to be fully realised.

Data sharing platforms and other efforts to facilitate data publication

All projects were required to publish the data using an existing data sharing platform or create a new one for the project. There was a relatively equal split between projects using new platforms and those for which a new data sharing platform was developed. In one case, it became apparent during the project that further updates would be required to the existing platform to allow the new datasets to be shared in an accessible format.

The competition contributed to the development of approximately five new data hubs, with the remaining projects choosing to publish data on pre-existing platforms. Of these, three have not yet been launched – with one in soft-live, one in beta phase and the third expected to be developed in Q4 2020. There is limited information available on the cause of these delays, but it is believed to be due in part to the procurement issues highlighted in the previous section.

One particularly successful example of a data platform developed due to project funding was the Manchester City Council pilot, which brought together open parking data owned by car operators and the LA into a publicly owned platform through which parking availability data was published in APDS format as source data. Following the success of the pilot, DfT disbursed additional funds to the LA to further develop the platform, expanding the scope to include the development of a national platform. The competition also supported the development of the Hull Smart City Platform, opening several key transport datasets to bring into the platform.

Data Standards developed and/or promoted

The competition was limited in its contribution to greater standardisation. Particularly with regard to parking data. As outlined above, bidders were required to ensure that the datasets that they opened up were provided in a standardised format that would enable data exchange. This was largely successful with regard to road traffic data, where the standards promoted by DfT were aligned with existing norms. It was less successful, however, in the area parking data with the different pilot projects adopting heterogenous standards.

With regard to real-time traffic information, CEN DATEX II was considered by all stakeholders to be a widely established standard before the competition but the pilots were credited with having contributed to assisting end users in integrating the newly opened data in to their products or platforms utilising that format.

As discussed above, the competition was utilised by DfT to support the adoption of the APDS standard for parking data, requiring LAs opening parking data to adopt this standard. Several LAs have not opened their parking datasets in line with the requirements specified by APDS or experienced significant challenges in doing so, with stakeholders citing a lack of understanding by LAs and technical challenges encountered in formatting datasets.

To date, only two LAs have successfully adopted the APDS standard of the four projects dedicated to the publication of parking data. This was linked to a lack of technical knowhow and difficulties adapting pre-existing systems to meet the requirements of the APDS standard. One LA reported being unable to provide the parking data in the APDS format as it was not in the remit of their UTMC system. They explained that they had encountered substantial difficulty identifying a method to convert data to the standard until engaging an external supplier at additional cost.

"(The pilot) demonstrated that the APDS technical standard was fit for purpose" – Strategic Stakeholder

DfT, LA and wider stakeholders felt that greater support from DfT to LAs was required in order to develop their understanding of the APDS requirements and its potential value. Whilst the DfT utilised the TTF Smart Parking user group to promote the use of the standard and sharing of expertise between LAs, the limited available resources of DfT and the substantial number of pilots hampered the provision of additional support to LAs. In future, more focus could perhaps be included on the inclusion of technical expertise and the need for adaptation of pre-existing systems when projects include the introduction of a novel standard.

Demonstrating the value of cross-boundary data collaboration and encouraging innovation in the private sector supply chain.

In line with the recommendations of the NH report, the competition required bidders to demonstrate a collaborative approach to opening their data. The competition intended to foster collaboration not just across LAs but also between private sector organisations and LAs. All projects were felt by DfT, LA and wider stakeholders to have strengthened collaboration

between LAs, the central government and the private sector, through developing new and existing relationships.

"(the competition) forced people to think about our data without boundaries" – LA Stakeholder

All projects included some form of collaboration, with the focus mainly on collaboration between LAs and private sector stakeholders. Six of the eleven projects (representing just more than half) also included an element of cross border collaboration.

One particularly successful example of cross-border collaboration between LAs was the pilot was led by Oxfordshire County Council on behalf of England's Economic Heartland (EEH) to develop a consolidated EEH parking data server, opening pan-regional parking data.

A less successful example is the pilot for Southend-on-Sea Borough Council, which sought to join UTC, UTMC and Parking data across the South Essex Corridor. This project had not yet been completed at the time of reporting. However, LA and wider stakeholders reported that there remains significant reluctance from within LAs to collaborate across borders. This may be due in part to historic organisation of transport at regional level, with the use of different systems creating difficulties in integrating data between councils.

Seven of the pilots (approximately 63%) were supported by private sector organisations, from suppliers of datasets and technology providers to project managers. This included the Hull City Council and TfGM pilots, which involved significant input from local SMEs in the discovery of the datasets to focus on and the development of use cases to further develop.

Furthermore, LA and DfT stakeholders felt that the competition provided a substantial opportunity to develop their relationship, especially for those LAs who had not previously participated in similar DfT funded pilot projects.

Project outcomes

"What phase 1 did was really show the potential benefits of enabling phase 2" – LA Stakeholder

Given the scope of the competition, longer-term outcomes can be defined as the extent to which the funding enabled projects to reach a certain level of maturity before being progressed into more viable products; and the extent to which those products might be potentially commercialised in future. Results from the pilot projects do provide some data on the potential for the realisation of longer-term outcomes, but this is somewhat limited.

Progression

Despite the significant number of datasets opened and made available to private sector organisations and within LAs, at the time of reporting, with several projects awaiting completion, there was limited evidence of added value products and services created utilising the data (in three of the pilots to date). Moreover, in line with the original objectives of the competition, the pathfinder pilots were intended to support the development of business cases and identify

where the potential benefits lay, with immediate benefits focussed on opening datasets and improving data quality and standardisation for operational and future commercial exploitation.

Project reporting suggested that, in a number of cases, it was still relatively early to demonstrate use cases for the future development of pilot outputs into more complete products. This is because – as mentioned above – some of the platforms are not yet fully accessible, meaning there is no data regarding potential interest. In other cases, more work needs to be done in order to publicise the datasets available.

Nonetheless, three of the eleven pilots have so far been granted additional funding to further develop use cases demonstrated through the competition:

- Hull City Council developed a template for sharing information held by local government and an innovation platform to facilitate that.
- Essex City Council developed a data feed for connected autonomous vehicles, developing a template for a national standard source of open data, tailored to Connected and Autonomous vehicles. Furthermore,
- TfGM created an open data framework for Split Cycle Offset Optimisation Technique (SCOOT) data for traffic management that can be adopted by other cities.

Through the TTF open data groups and the wider forum these use cases have been demonstrated and disseminated to LAs within the network. They have also been included in the State of the Connected Nation report, which was published and disseminated more broadly by the DfT.

Reasons given for the limited success in developing use cases to date were linked primarily to the projects' timeframes, which were perceived as too ambitious in some cases to implement the supporting infrastructure needed to fully realise the potential of the data being published. Additionally, a few of the projects identified issues in the quality and completeness of the data received from vendors, which made it difficult to use in order to achieve additional value. Finally, one or two participants pointed to unforeseen expenses in adapting their systems either to publish the data in line with the expected standards or to enable third parties to access the data, which limited the potential for further exploitation – at least in the short term.

Commercialisation

The competition was designed to encourage the opening of datasets with high potential for adding value either to the work of LAs themselves or in terms of future commercialisation in the form of new products and services which could be developed.

All stakeholders felt that the main benefit of the competition was highlighting that there is value in opening up LA transport data and a number of LAs reported developing additional projects that stemmed from outputs of the pilots. At the time of reporting, three of the eleven pilots had provided data to support evidence of potential commercialisation:

- The pilot for Manchester City Council aimed to make it easier for customers searching for a city centre parking space to find a space available. Private sector organisations utilising the publishing data feeds reported that those benefits were being realised.
- The pilot for Cambridgeshire County Council aimed to develop automated and efficient data formatting and publishing processes, which would enable sustainable and continual data availability through lower cost to the LA, as well as increased access and use of the data. LA stakeholders reported that evidence of these benefits was beginning to emerge.
- The Hull City Council pilot outcomes revolved around the utilisation of opened datasets and those successfully opened as part of the pilot had been viewed over 9,000 times by 725 users by the time of reporting.

As can be seen from the cases described above, in total approximately half of the projects funded have either been granted funding to further develop the potential value of the data being opened or have been able to demonstrate some early glimmers of potential commercial interest.

Of the six remaining projects, four have not yet been completed and the others have reported issues with the availability of data and with adapting their existing platform to ensure the data being published is accessible.

Lessons Learned

This section presents an overview of stakeholder's perceptions of the future role of the DfT in supporting the pilots and the lessons learned, which could be applied to future open data projects or initiatives.

The role of the DfT in the future

All stakeholders felt that the DfT had a crucial role to play in the future by supporting LAs to build on the momentum of the successful pilots with additional capital grants and in sharing the knowledge and best practice developed from the competition across the wider LA landscape.

"The competition should be used to demonstrate to other LAs that they can deliver tangible results even with limited funds, to create an impetus for other LAs to try to find the funding to do it" – Strategic Stakeholder

All stakeholders felt that the successful pilots should be provided with additional support to move to the next stage of development with a greater weighting placed on achieving defined outcomes through the development of concrete products. Additionally, it was felt that the DfT should utilise the outputs of the competition to engage with LAs and help them develop further along the journey of interoperability and standardisation, demonstrating good practice and widely sharing this to promote shared learning. Furthermore, stakeholders felt that the DfT should utilise the pilots to improve their understanding of the current standards being utilised by LAs, gather stakeholder responses on those standards and then further promote those with the most added value.

"There is huge value in DfT setting out that leadership position because it demonstrates to industry and other stakeholders their appetite for investing in the regions" – LA Stakeholder

DfT, LA and wider stakeholders highlighted the additional key role of the DfT's active promotion of the successful pilots to LAs, in encouraging other investments from industry or regions investing in their own development.

Lessons learned

The main lessons learned which could be applied to future open data projects were:

- Existing supplier agreements can be a significant obstacle to the opening of data, as these can prevent local authorities from mandating the publications of additional data or the use of specific standards within a specific timeframe. Consideration of timelines regarding procurement of data services may be needed when considering requirements which will have implications for third party suppliers.
- The ambition of the competition was relatively limited in scope and this may have led to a lack of consideration from some participants around the long-term use of the data being opened. In order to ensure more consideration is given to this aspect, there is a case for including exploitation plans in the application form, so they form part of the resource allocation process;
- Additional support and guidance from the DfT is required to develop LAs understanding of the APDS standards requirements in order to facilitate the adoption of APDS as a national standard for parking data exchange;
- A major obstacle identified by competition beneficiaries was the cost of further development required in order to enable third parties to integrate real-time data into their systems. This can be expected to be a major obstacle across the board and may merit consideration for future DfT support;
- The competition lacked an overall evaluation framework for LAs to utilise as well as limited available resources within DfT to actively monitor the substantial number of pilots. Despite the successful utilisation of the TTF for monitoring and sharing learning, the integration of evaluation measures varied significantly across pilots. Greater support by the DfT for the monitoring and evaluation of project outputs is required, including implementation of an evaluation framework across the pilot projects;
- There is a need to facilitate greater online delivery of information sharing between LAs through the TTF in lieu of physical meet ups, which were significantly impacted by COVID-19; and
- There is a need to outline a clear development pathway for how beneficiaries will be supported by the DfT to take successful use cases to the next stage of development.

Annex 4: Overarching Theory of Change narrative

This annexe sets out a narrative of the overarching theory of change underlying the three open data projects being examined in this evaluation. A theory of change acts as a visual guide explaining the logic behind a given intervention. It shows the steps required to achieve its aims or objectives and the interlinkages between those steps in terms of cause and effect. The theory of change also includes information on the context and rationale for the intervention, as well as any underlying assumptions and risk factors which can be expected to act as facilitators or obstacles to the intervention's eventual success.

The Theory of Change has been constructed based on three individual logic models, developed to describe each of the individual interventions being evaluated. The three evaluations share a number of similarities but also have some distinct differences. The theory of change focuses on the commonalities of the three projects and how they fit together, but the specificities of each project will be explored in detail as part of the case study approach being used for this evaluation.

The following sections provide a detailed narrative of the inputs and activities which took place, and how these were expected to be translated into immediate outputs, short-term and medium-term outcomes, which in turn are expected to contribute to longer-term impacts.

Overarching objective

The overarching objective which links together the three open data projects is a vision of a mobility ecosystem that delivers seamless intermodal transportation which is faster, cheaper, cleaner, more responsive and safer than today. This will be enabled by open data that is available to everyone to access, use and share on fares and journeys across all modes.

Inputs

The financial inputs for the projects take the form of funding provided by the Department for Transport. The Street Manager and Bus Open Data services are being developed within the Department, while most funding for the Opening LA Transport Data project has been distributed directly to Local Authorities through the mechanism of a Challenge Fund. This funding supports:

- the personnel and other resources required for project management and administration, as well as to develop the relevant standards and legislation which underpin the projects, development of the technical infrastructure, in the form of online platforms and APIs required to publish relevant datasets.
- dissemination and publication of the standard, including capacity building activities to help technical compliance with the standard amongst local authorities and other users.

- EU co-financing was also used within the Bus Open Data Service to support the development of the NetEx standard, which is a harmonised EU-wide standard for exchanging public transport information.

The division of labour between different organisations can be described as follows:

- **Project management and delivery:** Department for Transport (all)/LAs (Opening LA Transport Data)
- **Technical infrastructure (BODS/Street Manager):** Department for Transport
- **Training delivery (BODS/Street Manager):** Department for Transport
- **Administration of competition (Opening LA Transport Data):** Department for Transport
- **Content development:** Department for Transport with support of product owners and subject matter experts from local authorities and service providers
- **Promotion activities:** Department for Transport with support of product owners from local authorities, service providers and stakeholder communities such as the Transport Technology Forum.

Activities

While the projects being evaluated differ in terms of their approach and specified outputs, several common activities can be identified across the different projects. These can be categorised into the following broad groupings:

1. Publication of data standards and guidance

All three projects involve the selection, development and/or creation of common data standards, with the aim of ensuring data is published in a consistent format so it can be accessed and processed by any organisation with an interest in using it (for example, to develop a new product). Table 5.19, below, provides an overview of the data standards created or updated as part of each project.

Table 5.16: Overview of data standards

Project	Data standard(s) used	Application	Use of existing standard or creation of new standard
Bus Open Data Service	TransXchange	Route and timetable information	Ensure compliance with existing standard
	NetEx	Ticketing information	Creation of new standard

Street Manager	GDS API technical and data standards (name TBC with DfT)	Exchange and publication or roadworks information	Ensure compliance with existing standards
Opening LA Transport Data	Alliance for Parking Data Standard (APDS)	Exchange of parking data	Creation of new standard

Government Digital Services provide a formal review at the end of each project management phase, in the form of a service assessment to ensure the projects are compliant with the government's Service Standard.

2. Support for opening data

The three projects provide direct support to local authorities and service providers in the publication of open data. For Bus Open Data and Street Manager, this support is takes the form of the development of centralised data sharing platforms where transport datasets can be published, accessed and shared. The approach taken by Opening LA Transport Data is less centralised, with financial support provided to local authorities, in the form of small amounts of seed funding (£50-100,000 per successful applicant) to fund the publication of open datasets.

3. Communications and capacity building

For Street Manager and the Bus Open Data Service, communications and capacity building were used to ensure that relevant stakeholders (LAs, bus operators, utilities companies etc) were able to register to the Platforms under development and publish data in the required format. This involved the development and delivery of training materials for operators to digitally upskill and learn to use relevant standards and services as well as a range of outreach materials including project-specific social media accounts, presentations and other information sharing.[49] Ongoing two-way communication was also a vital component of the Agile project management approach, allowing user feedback to be incorporated at all stages to ensure the final product is relevant to user needs and fit for purpose.

With regarding to the Opening LA Data project, communications in the first instance related to publicising the competition and encouraging LAs to apply for funding. Following the allocation of funding, communication activities have focused on the dissemination of outputs from the different projects being funded and the development of potential follow-on projects.

4. Development of legislation to underpin project requirements (BODS/Street Manager)

The Bus Open Data Service and Street Manager projects necessitated creation of new or updates to existing legislation in order to mandate compliance with the new standards and platforms being developed. The Bus Open Data Service is rooted in the 2017 Bus Services Act.

[49] For example, Street Manager has a dedicated YouTube channel with short information videos and walk-through demonstrations for different aspects of the Platform

In order to ensure compliance – in terms of the type of data required and timelines for delivery – the Public Service Vehicle Data Regulations were introduced in 2020.

The management and communication of street works is governed by various sets of regulations and guidance documents, which were updated to mandate use of the new platform and to introduced charges for local authorities and utilities to cover the platform's running costs. The main Regulations affected were:

- the Street Works (Registers, Notices, Directions and Designations) (England) Regulations 2007 (the 2007 Noticing Regulations);
- the Street Works (Charges for Unreasonably Prolonged Occupation of the Highway) (England) Regulations 2009 (the 2009 Charges Regulations);
- the Traffic Management Permit Scheme (England) Regulations 2007 (the 2007 Permit Regulations); and
- the Street Works (Fixed Penalty) (England) Regulations 2007 (the 2007 FPN Regulations).

No legislative changes were required for the implementation of the Opening LA Transport Data project.

Key assumptions underlying the activities are:

- There is benefit in sharing LA transport data
- DfT is well placed to intervene in order to help LAs and service operators publish open data
- LAs and private sector service providers are aware of the potential benefits of opening transport data and willing to cooperate
- Legislation is the appropriate method for ensuring compliance with standards by actors in the private sector and is not required for public sector stakeholders
- One of the main obstacles to opening data at local authority level is financial constraints (Opening LA Data)

Outputs

The outputs represent the immediate results of the activities and typically act as a measure of successful implementation of the intervention. Common outputs identified from the open data projects are:

- Accessible platforms available for publication of transport data (BODS/Street Manager);
- Updated legislation, where applicable, to mandate the use of the relevant platforms and standards (BODS/Street Manager);

- LAs, service providers and utilities companies who are capable and confident to share open data related to local transport using common standards and publish data using these standards;
- Increased data sharing and aggregation as a result of the availability of standardised datasets and centralised platforms for publication of and access to data;
- Continuous updates by operators allow for more up-to date provision of high-quality data related to roadworks, bus services, parking and traffic management;
- The publication of open datasets in standard formats from a range of transport modes which can be accessed and used by local authorities, central government and third parties to create products and services which provide additional value to the current offering.

Key assumptions underlying the outputs are:

- DfT has identified and engaged with the correct stakeholders to ensure that funding, standards, legislation and/or products developed and offered are fit for purpose;
- The project management approach will allow for the identification of user needs and preferences;
- The projects can deliver products which meet the differing needs of different user groups;
- Local authorities and service providers will engage with DfT and each other;
- Relevant stakeholders will comply with legislation (where applicable) and publish their data on the relevant platform(s) in accordance with the relevant standard(s).

Outcomes

Outcomes represent interim indicators of the extent to which the outputs developed have been successful in delivering against the overarching objective in the medium and longer term. With regard to the open data projects, this means the tangible benefits that the projects are expected to deliver to a range of stakeholders including technology companies, transport users and local authorities themselves.

The primary outcome of the projects is the creation of added value from transport data in the form of increased knowledge and efficiency gains for local authorities as well as the development of new applications and products by third party technology companies.

The main outcomes identified across the open data projects are:

- Creation of new applications and digital products or services to share and/or monetise transport data by app developers and technology companies;
- Use of open data by DfT and LAs to improve the provision of existing transport services and overall transport/traffic management;

- Improved journey planning;
- Provision of up-to-date information on congestion, roadworks and bus routes leading to improved passenger satisfaction and increased confidence in using public transport;
- Reduced operational costs and increased for operators related to increased efficiencies from better planning associated with provision of up-to-date and easy-to use information;
- Improved connectivity for communities across England.

Key assumptions underlying the outcomes are:

- Data has been promoted to the right groups and is discoverable by potential users;
- Data has been published in ways that meet user needs and there are no restrictions that inhibit use of the data;
- LAs and service providers will use the standards and services developed;
- End users have the skills and ideas to make innovative use of the data;
- There are no negative 'lock-in' effects – i.e. standards defined etc are future proof and to do not inhibit or constrain opening of other transport datasets or potential applications;
- Benefits of application development can be internalised by the developer – i.e. there is sufficient incentive to develop applications using the data made available;
- Relevant stakeholders are aware of the co-benefits from collaboration across local authorities, the private sector, universities, and government departments;
- LAs will be able to identify use cases demonstrating the value of opening data;
- Project findings will enable DfT to identify further areas of intervention.

Impacts

The projects described in this theory of change pre-dated the development of the DfT's Transport Data Strategy and can be viewed as pathfinders that have helped feed into the development of this strategy, which aims to maximise the value being extracted from LA transport data across the country.

As defined in project documentation, the long-term impacts which the open data projects expected to contribute are threefold:

1. Environmental impacts

- Decongestion in roads and increase in public transport use will lead to improved air quality and reduced GHG emissions.

2. Economic impacts

- Increased revenue for operators related to efficiency gains from better planning and higher customer satisfaction leading to more use of transport services;
- Tech companies will use the data to develop new and innovative products, which lead in turn to to employment opportunities and economic growth;
- Expanded access to data will help to demonstrate the value of transport datasets, increasing support for innovation and promoting new partnerships (for example, between local authorities, research institutes and private sector operators and utility companies).

3. Social impacts

- Greater information transparency and increased public knowledge regarding parking, congestion, roadworks, and bus timetables, routing and ticket prices will result in reduced inequality and enhanced social inclusion.

Key assumptions underlying the impacts are:

- Data being published will be used by LAs and other third parties to improve current services and create new services;
- It is possible to monetise any applications and services being developed (i.e. people are willing to pay);
- Publishing data will lead to gains in efficiency and improved customer experience when travelling
- Greater transparency will allow passengers to make more informed choices and will lead to increased social cohesion;
- Sharing of data and use of common data standards will provide added social, environmental and/or economic value.

Annex 5: Topic Guides

Street Manager: Local Authorities

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including Street Manager. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

The feedback you provide will be used in anonymised and aggregated research findings in the evaluation report. This will report common themes from the interviews and attribute them to the roles played by stakeholders (for example, DfT staff, local authorities, service providers, technology companies, end users, civil society). Despite this anonymisation, it is possible that some feedback may be recognisable in the report because of what DfT knows about stakeholders' experiences and views. If you are concerned about this, then please tell us if there is anything you share with us that you would not like reported back to the DfT. Please do feel free to tell me this during the interview or at the end, as you prefer.

The discussion is completely voluntary and you are free to decline to answer any question or to stop the interview at any time. You will be at no advantage or disadvantage as a result of your decision about taking part.

Would you be happy for me to record this interview? All recordings are securely stored in accordance with the General Data Protection Regulation, and the research team are the only people who will listen back to the recording. It will not be shared with anyone outside of the evaluation team. The recording will be destroyed after the evaluation has been completed.

Introduction

1. **Could you please describe your role within [name of the organisation] and in what capacity you have been involved in the development of Street Manager?**
    - *Which of the Street Manager development phases did you participate in (Discovery, Alpha, Beta)?*
    - *Why did [name of the organisation] decide to take part in the development of Street Manager?*
    - *Have you used Street Manager since it was released in July 2020?*

Project scoping and design

2. **To what extent were the issues faced by Local Authorities correctly identified and fully taken into account in the project design phase? Probe for:**
    - *Effectiveness of stakeholder consultation approach;*
    - *Extent to which feedback collected through these consultations fed into later decisions;*

- *Representativeness of stakeholders involved in the consultation;*
- *Issues with previous EToN system and appropriateness of SM to meet these;*
- *Identification and consideration of delivery risks at project design stage.*

3. **To what extent do you feel the project responded to a clearly identified need?** *Probe for:*

   - *Clarity of the business case (if they had sight of this)*
   - *Demands for data availability;*
   - *Potential uses of data collected;*
   - *Legal challenges;*
   - *Practical implementation challenges;*
   - *Funding requirements.*

Project management and delivery

4. **How well suited was the project management approach to delivering a suitable product in the case of Street Manager?** *Probe for:*

   - *Vision and communication of the approach;*
   - *Extent to which they are content with the Agile approach (i.e. iterative approach with constant development based on user feedback)*
   - *Involvement of stakeholders;*
   - *Clarity of roles and responsibilities;*
   - *Staff and resource requirements*;
   - *Organisation and planning;*
   - *Feedback and application of learning;*
   - *Flexibility in responding to obstacles;*
   - *Changes to scope of project (positive and negative implications);*
   - *Risk of project creep.*
   - *Extent to which the flexibility of the Agile approach led to a better or worse outcome.*

5. **How satisfied were you with DfT's overall management and delivery of the project?** *Probe for:*

   - *Issues around choice and sequencing of the different project elements;*
   - *Flexibility and effectiveness of DfT project team in responding to issues and feedback raised;*
   - *Key obstacles or drivers to project management and delivery and how these were overcome.*

6. **To what extent were legislative instruments used effectively to promote engagement?**

   - *Was legislation necessary?*
   - *Is the legislation developed fit for purpose?*

- *Do you foresee any need for further amendments to the legislation?*

7. **To what extent were the standards chosen appropriate to the needs of the different sectors involved (utilities, transport, roadworks etc)?**
   - *[If not]: What obstacles have been identified with regard to the adoption and application of these standards?*
   - *[If not]: What obstacles have been identified with regard to interoperability and data sharing among [utility companies/transport operators/other] and other stakeholders involved in the operation of bus routes?*

8. **To what extent is the project contributing to achieving greater data standardisation?**
   - *How clear do you think the data standards are?*
   - *To what extent is the data available provided in a standard format?*
   - *To what extent was interoperability considered?*
   - *How could data standardisation be improved?*
   - *Are there any gaps in the data gathered to date that need to be addressed?*
   - *To what extent do you think local authorities and private companies are familiar with the adoption and use of common data standards?*

Outputs, outcomes, and impacts

9. **To what extent do you think that, overall, Street Manager has delivered its expected outputs?**
   - *How easy to use is the Platform?*
   - *How well has the availability of the data outputs been promoted?*
   - *Are you aware of interest in and/or take-up of the data outputs of the project to date?*
   - *Is there any evidence that the project is successful?*
   - *Have there been any delays in the achievement of objectives? [If yes] Please explain the factors that have caused delays.*
   - *Has roadworks data been used to provide added value in other areas? [If yes] Please specify how.*
   - *What, if anything, could be improved to make the data outputs more useful?*

10. **Are there any factors driving or hindering use of Street Manager?** *Probe for:*
    - *Conflicting technologies;*
    - *Skillset of workforce;*
    - *Legislative requirements;*
    - *Budget;*
    - *Technical issues.*

11. **What are the benefits (if any) of Street Manager?** *Probe for:*

- *Sharing of real-time data;*
- *Improvement of transport management;*
- *Cost savings;*
- *Coordination among multiple stakeholders;*
- *Other unexpected impacts (positive or negative).*

12. **To what extent is the project likely to contribute to any of the DfT's broader strategic priorities:**

- *Achieving social benefits including safer streets, inclusive transport system, smoother journeys, active travel and use of public transport;*
- *Achieving environmental benefits such as reduced emissions, tacking noise pollution, unlocking spatial opportunities, tackling congestion;*
- *Achieving economic benefits such as improved productivity and job creation.*

13. **Are there any other lessons to be learned from your experience of this project?**

- *What has worked well?*
- *What has worked less well?*
- *What learning could other open data projects take from Street Manager?*
- *What could be done differently?*

14. **What role do you think DfT should play in the further promotion of open data?**

Street Manager: Private sector stakeholders

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including Street Manager. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

The feedback you provide will be used in anonymised and aggregated research findings in the evaluation report. This will report common themes from the interviews and attribute them to the roles played by stakeholders (for example, DfT staff, local authorities, service providers, technology companies, end users, civil society). Despite this anonymisation, it is possible that some feedback may be recognisable in the report because of what DfT knows about stakeholders' experiences and views. If you are concerned about this, then please tell us if there is anything you share with us that you would not like reported back to the DfT. Please do feel free to tell me this during the interview or at the end, as you prefer.

The discussion is completely voluntary and you are free to decline to answer any question or to stop the interview at any time. You will be at no advantage or disadvantage as a result of your decision about taking part.

Would you be happy for me to record this interview? All recordings are securely stored in accordance with the General Data Protection Regulation, and the research team are the only people who will listen back to the recording. It will not be shared with anyone outside of the evaluation team. The recording will be destroyed after the evaluation has been completed.

Introduction

1. **Could you please describe your role within [name of the organisation] and in what capacity you have been involved in the development of Street Manager?**

    - *Which if any of the Street Manager development phases did you participate in (Discovery, Alpha, Beta)?*
    - *Why did [name of the organisation] decide to take part in the development of Street Manager?*
    - *Have you used Street Manager since it was released in July 2020?*

    [If engaged in Discovery/Alpha phase]

    - *What were your expectations at the start of the project?*
    - *Did you envisage any specific applications for the data once published?*

Project scoping and design

2. **Were the issues faced by [utility/transport sector/specify sector] companies correctly identified and fully taken into account in the project design phase? *Probe for:***

    - *Effectiveness of stakeholder consultation approach;*
    - *Extent to which feedback collected through these consultations fed into later decisions;*
    - *Representativeness of stakeholders involved in the consultation;*
    - *Extent to which delivery risks were appropriately considered and factored in.*

3. **To what extent do you think that the problems with the previous system (EToN) were correctly identified at the start of the development of Street Manager?**

    - *Extent of interaction with EToN;*
    - *Level of satisfaction with EToN;*
    - *Issues identified and extent to which initial SM concept addressed these.*

Project management and delivery

4. **How well suited was the project management approach to delivering a suitable product in the case of Street Manager? *Probe for:***

    - *Vision and communication of the approach;*
    - *Extent to which they are content with the Agile approach (i.e. iterative approach with constant development based on user feedback)*
    - *Involvement of stakeholders;*
    - *Clarity of roles and responsibilities;*
    - *Staff and resource requirements;*
    - *Organisation and planning;*
    - *Feedback and application of learning;*
    - *Flexibility in responding to obstacles;*
    - *Changes to scope of project (positive and negative implications);*
    - *Risk of project creep.*
    - *Extent to which the flexibility of the Agile approach led to a better or worse outcome.*

5. **How satisfied were you with DfT's management and delivery of the project?** *Probe for:*

    - *Issues around choice and sequencing of the different project elements;*
    - *Communication with DfT project team;*

- *Perceptions around the strength of relationship management by DfT project team;*
- *Flexibility and effectiveness of DfT project team in responding to issues and feedback raised;*
- *Key obstacles or drivers to project management and delivery and how these were overcome.*

6. **To what extent was the use of Government Digital Services standards for data publication appropriate to the needs of your sector?**

    - *If not: What obstacles have been identified with regard to the adoption and application of these standards?*
    - *If not: What obstacles have been identified with regard to interoperability and data sharing among [utility companies/transport companies/other] and other stakeholders involved in street work planning and management?*

Outputs, outcomes, and impacts

7. **To what extent do you think that Street Manager meets the expectations and needs of [utility companies/transport companies/other] and of other primary users?**

    - *Ability to publish datasets;*
    - *Promotion of datasets to end users;*
    - *Ease of access to data published on Platform;*
    - *Relevance of data published;*
    - *Data quality and useability;*
    - *Evidence of data usage/take-up to date;*
    - *Standardisation and interoperability of different datasets;*
    - *Added value of SM versus EToN;*

8. **Are there any factors driving or hindering the use of Street Manager? *Probe for:***

    - *Conflicting technologies;*
    - *Skillset of workforce;*
    - *Legislative requirements;*
    - *Budget;*
    - *Technical issues.*

9. ***What are the benefits (if any) of Street Manager? Probe for:***
    - *Sharing of real-time data;*
    - *Improvement of transport management;*
    - *Cost savings;*
    - *Coordination among multiple stakeholders;*
    - *Other unexpected impacts (positive or negative).*

10. **To what extent are data outputs accessible to primary users? *Probe for:***

    - *Promotion of data outputs*
    - *Useability of datasets published*
    - *Areas for improvement*

11. **Are there any other lessons to be learned from your experience of this project?**

    - *What has worked well?*
    - *What has worked less well?*
    - *What learning could other open data projects take from Street Manager?*
    - *What could be done differently?*

12. **What do you think the role of the DfT should be in future open data projects? How could the DfT further support the opening of transport data?**

Street Manager: Tech providers/data organisations

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including Street Manager. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

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Introduction

1. **Could you please describe your role within [name of the organisation] and in what capacity you have been involved in the development of Street Manager?**

    - *Did you participate in the Alpha or Beta phases of Street Manager's development?*
    - *Have you already made use of data generated by Street Manager after its launch in July 2020?*

      If so: What have you used it for?

2. **Were you engaged in the design of the service?** *[If yes]*
    - *Please describe your role and the extent to which you were consulted during the design phase?*
    - *What were your expectations at the start of the project?*
    - *What did you hope to use the data for? Did you envisage any specific applications?*

State of play prior to Street Manager

3. **To what extent was the quality and accessibility of existing roadworks data sufficient to develop products/services?**

    - *How could the quality and useability of data be improved?*
    - *Are there any gaps in the data gathered to date that need to be addressed?*
    - *Were there any issues with the current use of data standards that hinder the publication and use of open data on roadworks?*
    - *Were problems with the previous system (EToN) correctly identified at the start of the development of Street Manager?*

Using open transport data

4. **Have you already made use of Street Manager? *[If yes]* Please explain:**

    - *How is data published*
    - *How have you used the data?*
    - *Did you have any difficulties in accessing and/or using the data?*
    - *What type of technology and skills are needed in order to effectively use open data?*
    - *What type of products and services have been designed using open roadworks data?*
    - *Has your product/service been commercialised?*

5. **To what extent were the standards chosen appropriate to the needs of different actors in the bus sector?**

    - *[If not]: What obstacles have been identified with regard to the adoption and application of these standards?*
    - *[If not]: What obstacles have been identified with regard to interoperability and data sharing among [transport operators/ ticketing companies/ display board providers/other] and other stakeholders involved in delivering bus services?*

6. **To what extent is the project contributing to achieving greater data standardisation?**

    - *To what extent is the data available provided in a standard format?*
    - *To what extent was interoperability considered?*
    - *How could data standardisation be improved?*
    - *Are there any gaps in the data gathered to date that need to be addressed?*
    - *What key features should open datasets have in order to develop high-quality products/services? To what extent are these features present in the datasets resulting from the project?*
    - *To what extent do you think local authorities and private companies are familiar with the adoption and use of common data standards?*
    - *How clear do you think the data standards are?*

Outcomes and impacts

7. **What are the potential benefits of making roadworks data available? Do you believe Street Manager will help in realising these benefits? *(If so, how?)*** *Probe for:*

    - *Increased accessibility and transparency regarding roadworks information;*
    - *Standardisation of datasets;*
    - *Ability to integrate data into new products and services;*
    - *Interoperability with data sets from other areas (e.g. bus data).*

8. **Have you developed any products or services using the published datasets?**

    - *[if no] Do you have any plans to develop to develop products and services in future? Is anything further needed to facilitate this*
    - *[if yes] Could you please describe the product? What added value have the datasets provided?*

    [If the product/service is already being commercialised]

    - *To what extent are the services and products meeting users' expectations and needs?*
    - *Have you collected feedback from end users? [If yes] Could you please share it with us?*

9. **What are the anticipated benefits of your product/service.** *Probe for:*
    - *Sharing real-time information for improved journey planning;*
    - *Other environmental, economic and social benefits.*

10. **To what extent, if at all, has this open data project – and therefore DfT's competition for funding - contributed to:**
    - *Strengthening collaboration between LAs, the central government and the private sector?*
    - *Improve the transport network management?*

11. **Are there any other lessons to be learned from your experience of this project?**

    - *What has worked well?*
    - *What has worked less well?*
    - *What learning could other open data projects take from Street Manager?*
    - *What could be done differently?*

12. **What do you think the role of the DfT should be in future open data projects? How could the DfT further support opening of roadworks and other transport data?**

Bus Open Data Service: Local Authorities

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including the Bus Open Data Service. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

The feedback you provide will be used in anonymised and aggregated research findings in the evaluation report. This will report common themes from the interviews and attribute them to the roles played by stakeholders (for example, DfT staff, local authorities, service providers, technology companies, end users, civil society). Despite this anonymisation, it is possible that some feedback may be recognisable in the report because of what DfT knows about stakeholders' experiences and views. If you are concerned about this, then please tell us if there is anything you share with us that you would not like reported back to the DfT. Please do feel free to tell me this during the interview or at the end, as you prefer.

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Introduction

1. **Could you please describe your role within Lincolnshire Country Council and in what capacity you have been involved in the development of the Bus Open Data Service?**

    - *Which of the development phases did you participate in (Discovery, Alpha, Beta)?*
    - *Why did Lincolnshire County Council decide to take part in the development of the Bus Open Data Service?*
    - *Have you registered with or published data on the BODS platform since it was launched?*

Project scoping and design

2. **To what extent do you think that the problems which led to the creation of the Bus Open Data Services were correctly identified? Were the issues faced by Local Authorities fully taken into account in the project design phase?** *Probe for:*

- *Effectiveness of stakeholder consultation approach;*
- *Extent to which feedback collected through these consultations fed into later decisions;*
- *Representativeness of stakeholders involved in the consultation;*
- *Correct identification of problems faced by stakeholders and appropriateness of solution selected;*
- *Identification and consideration of delivery risks at project design stage.*

3. **Do you think that the project's business case was set out in a sufficiently clear manner?** *Probe for:*

   - *Demands for data availability;*
   - *Potential uses of data collected;*
   - *Legal challenges;*
   - *Practical implementation challenges;*
   - *Funding requirements.*

Project management and delivery

4. **How well suited was the project management approach to delivering a suitable product in the case of the Bus Open Data Service?** *Probe for:*

   - *Vision and communication of the approach;*
   - *Involvement of stakeholders;*
   - *Clarity of roles and responsibilities;*
   - *Staff and resource requirements*;
   - *Organisation and planning;*
   - *Feedback and application of learning;*
   - *Flexibility in responding to obstacles;*
   - *Risk of project creep.*

5. **How satisfied were you with DfT's overall management and delivery of the project?** *Probe for:*

   - *Issues around choice and sequencing of the different project elements;*
   - *Flexibility and effectiveness of DfT project team in responding to issues and feedback raised;*
   - *Key obstacles or drivers to project management and delivery and how these were overcome.*

6. **Were legislative instruments used effectively to promote engagement?**

   - *Was legislation necessary?*
   - *Is the legislation developed fit for purpose?*
   - *Do you foresee any need for further amendments to the legislation?*

7. **To what extent were the standards chosen appropriate to the needs of the bus sector?**

   - *[If not]: What obstacles have been identified with regard to the adoption and application of these standards?*
   - *[If not]: What obstacles have been identified with regard to interoperability and data sharing among [ticketing companies/transport companies/other] and other stakeholders involved in the operation of bus routes?*

Outputs, outcomes, and impacts

8. **To what extent do you think that, overall, the Bus Open Data Service has delivered its expected outputs so far?**

   - *How well has the availability of the data outputs been promoted?*
   - *Are you aware of interest in and/or take-up of the data outputs of the project to date?*
   - *Is there any evidence that the project is successful?*
   - *Have there been any delays in the achievement of objectives? [If yes] Please explain the factors that have caused delays.*
   - *Has open transport data been used to improve local transport networks? [If yes] Please specify how.*
   - *What, if anything, could be improved to make the data outputs more useful?*

9. **Are there any factors driving or hindering use of the Bus Open Data Service?** *Probe for:*

   - *Conflicting technologies;*
   - *Skills and knowhow within LAs;*
   - *Skillset of broader workforce;*
   - *Legislative requirements;*
   - *Budget;*
   - *Technical issues.*

10. **What are the benefits (if any) of the Bus Open Data Service?** *Probe for:*

    - *Sharing of real-time data;*
    - *Improvement of transport management;*
    - *Cost savings;*
    - *Coordination among multiple stakeholders;*
    - *benefits to the user, e.g. better experience, reduced journey times due to better journey planning.*
    - *Other unexpected impacts (positive or negative).*

11. **To what extent is the project likely to contribute to any of the DfT's broader strategic priorities and local priorities:**

- *Achieving social benefits including safer streets, inclusive transport system, smoother journeys, active travel and use of public transport;*
- *Achieving environmental benefits such as reduced emissions, tacking noise pollution, unlocking spatial opportunities, tackling congestion;*
- *Achieving economic benefits such as improved productivity and job creation;*
- *Role of open bus data when thinking about the future of transport;*
- *How about local strategies?*

12. What role do you think DfT should play in the further promotion of open data?

- *If not, who should be driving this?*

13. What lessons can be learnt for future projects?

BODS: Service Providers

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including the Bus Open Data Service. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

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Introduction

1. **Could you please describe your role within [name of the organisation] and in what capacity you have been involved in the development of the Bus Open Data Service?**

    - *Which, if any, of the development phases did you participate in (Discovery, Alpha, Beta)?*
    - *Why did [name of the organisation] decide to take part in the development of the Bus Open Data Service?*
    - *Have you used BODS since it was released?*

    [If engaged in Discovery/Alpha phase]
    - *What were your expectations at the start of the project?*
    - *What did you hope the data would be used for? Did you envisage any specific applications?*

Project scoping and design

2. **Were the issues faced by [specify sector] companies correctly identified and fully taken into account in the project design phase? *Probe for:***

- *Effectiveness of stakeholder consultation approach;*
- *Extent to which feedback collected through these consultations fed into later decisions;*
- *Representativeness of stakeholders involved in the consultation;*
- *Extent to which issues around data availability, standardisation and interoperability were considered;*
- *Consideration of delivery risks during the design phase.*

3. **Do you think that the project's business case was set out in a sufficiently clear manner? Probe for:**
   - *Demands for data availability;*
   - *Potential uses of data collected;*
   - *Legal challenges*;
   - *Practical implementation challenges;*
   - *Funding requirements.*

Project management and delivery

4. **How well suited was the project management approach to delivering a suitable product in the case of BODS? *Probe for:***

   - *Vision and communication of the approach;*
   - *Involvement of stakeholders;*
   - *Staff and resource requirements;*
   - *Organisation and planning;*
   - *Feedback and application of learning;*
   - *Flexibility in responding to obstacles;*
   - *Risk of project creep. If yes, probe for how this affected project outcome.*

5. **How satisfied were you with DfT's management and delivery of the project?** *Probe for:*

   - *Issues around choice and sequencing of the different project elements;*
   - *Flexibility and effectiveness of DfT project team in responding to issues and feedback raised;*
   - *Key obstacles or drivers to project management and delivery.*

6. **To what extent were the standards chosen appropriate to the needs of your sector?**

   - *[If not]: What obstacles have been identified with regard to the adoption and application of these standards?*
   - *[If not]: What obstacles have been identified with regard to interoperability and data sharing among [ticketing companies/transport companies/other] and other stakeholders involved in the operation of bus routes?*
   - *Are there any gaps in the data gathered to date that need to be addressed?*

- *What key features should open datasets have in order to develop high-quality products/services? To what extent are these features present in the datasets resulting from the project?*
- *To what extent do you think local authorities and private companies are familiar with the adoption and use of common data standards?*
- *How clear do you think the data standards are?*

Outputs, outcomes, and impacts

7. **To what extent do you think that the Bus Open Data Service meets the expectations and needs of [transport companies/ticketing companies/other] and of other primary users? Probe for:**

    - *Ability to publish datasets;*
    - *Promotion of datasets to end users;*
    - *Ease of access to data published on Platform;*
    - *Relevance of data published;*
    - *Data quality and useability;*
    - *Evidence of data usage/take-up to date;*
    - *Standardisation and interoperability of different datasets;*
    - *Added value of BODS versus BAU approach;*
    - *Areas for improvement.*

8. **Are there any factors driving or hindering the publication of data on the BODS platform? *Probe for:***

    - *Conflicting technologies;*
    - *Skillset of workforce;*
    - *Legislative requirements;*
    - *Budget;*
    - *Technical issues.*

9. **What are the benefits (if any) of the Bus Open Data Service? Probe for:**
    - *Sharing of real-time data;*
    - *Improvement of transport management, ticketing and timetable information;*
    - *Cost savings;*
    - *Coordination among multiple stakeholders;*
    - *User benefits e.g. improved predictability, reduced travel time etc*
    - *Other unexpected impacts (positive or negative).*

10. **What do you think the role of the DfT should be in future open data projects in the bus sector?**
11. **How could the DfT further support the opening of transport data more generally?**

Opening LA Transport Data: Local Authorities

Note to interviewer: some end users will not know the name of the DfT competition so please substitute with the name of the project as applicable

Thank you for taking part in this interview. The interview should last about an hour.

I am conducting this interview to inform an evaluation of three open data projects implemented by the Department for Transport, including the Funding for Innovation (Opening LA Transport Data) competition. I appreciate that you may not be involved in or aware of all aspects of the project(s) but we would still be keen to hear your views where you feel able to give them.

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Introduction

1. **Could you please introduce yourself and explain your involvement in the DfT's Funding for Innovation: Opening LA Transport Data competition?**
    - *What is your involvement in the [Name of the Open Data Project] in [Local Authority]?*
    - *Please describe your role and key responsibilities within the project?*
    - *What were your responsibilities in the bidding process of the "Funding for Innovation: Opening LA Transport Data" competition launched by the DfT?* ***Probe for:*** *involvement in developing specific sections of the application form, overall coordination of the application, quality assurance, submission.*

Context of the project

2. **Could you please provide some more information on the local situation prior to your involvement with the competition.**

    - *What type of transport data was collected in [Local Authority] prior to the launch of this project?*
    - *Who was responsible for collecting and holding the information?*
    - *Since the project was launched, have there been any changes in the type of data being collected in [Local Authority] or the data collection method used?*
        - *[If yes] Please explain*
    - *What are the key challenges and enablers for opening transport data in [Local Authority]?*

Project Scoping and Design

3. **What was the rationale for your project?**

    - *How did the original idea develop?*
    - *What need was the project aiming to address?*
    - *Who was involved in developing the original project specification?*
    - *How does it fit within [Local Authority] strategy and the UK Government's broader Transport Strategy?*
    - *Why was public funding needed to meet these objectives?*

4. **Can you briefly describe the project?** *Probe on:*
    - *Internal resources used and skills needed to develop the project;*
    - *Organisations and partners involved in either design or delivery;*
    - *Funding received from the competition.*

The Funding for Innovation competition

5. **How did you first hear about the DfT's Funding for Innovation competition?**

    - *Where was it advertised?*
    - *Were the aims and objectives of the competition clear?*

6. **What motivated your Local Authority to apply for funding?** *Probe for:*

    - *Financial motivations;*
    - *Environmental motivations;*
    - *Social motivations;*
    - *Other motivations.*

7. **How well does the project contribute to local strategic priorities?**

8. **How clear were the application guidelines provided by the Department for Transport?** *Probe for:*
    - *Elements which worked particularly well;*
    - *Areas which could be improved.*

9. **Did the eligibility and assessment criteria of the application process influence the design of the project in any way?** *[If yes]* **Please explain.** *Probe for:*
    - *Elements which helped in shaping project design;*
    - *Elements which could be improved and/or removed;*
    - *Gaps in the eligibility and assessment criteria.*

10. **What is your overall view of the application process?**
    - *Did you find the application form easy or difficult to complete and submit?*
    - *Did the process of developing or submitting the application form create any costs for you or your partners?*
    - *Was the funding available sufficient?*

11. **Did you receive any type of support from the Department for Transport during the completion or submission of the application form or feedback to help shape the next phase of planning/delivery?**
    - *[If yes] Please specify what type of support/feedback you received and how useful it was.*
    - *[If no] Would feedback have been useful?*

Project Management and Delivery

12. **Overall, how effective do you think the coordination of the competition was?** *Probe on:*
    - *The role of the DfT in the management and coordination of the competition;*
    - *What worked well and what didn't in terms of how the competition was managed.*

13. **What is the current status of your project?**
    - *Were you able to implement the project activities as expected?*
    - *Were appropriate levels of resources dedicated to the projects at the outset and how was the resourcing requirement calculated?*
    - *How flexible were the project team in responding to internal and external challenges?*
    - *What factors influenced (both positively and negatively) project management?*

14. **Working collaboratively was a key requirement of the competition. Please describe the collaborative approach adopted in the delivery of this project.**
    - *Did you work with other LAs, the private sector, academia or other institutions?*
    - *Did DfT help facilitate collaboration with other LAs?*
    - *What were the key challenges and enablers of collaborating in this way?*

15. **How well did communication with different partners and the Department for Transport work?**
    - *How well were partners' roles and responsibilities defined?*
    - *Were there any engagement issues with partners that impacted project delivery?*
    - *How effective was the DfT project team in responding to issues raised by the team during the delivery of the project?*

16. **Did you attend the Transport Technology Forum?**
    - *[if yes] Did the TTF help increase knowledge, collaboration or exchange of lessons learned?*
    - *Can you provide any specific examples?*

17. **Were any issues encountered during the delivery of the project?**
    - *What obstacles, if any, arose as the project was being delivered?*
    - *How did they affect project delivery?*
    - *Did you receive support from partners and/or DfT to address these challenges?*

18. **Bidders were required to specify their approach to data standardisation. Could you please explain the approach you chose?**
    - *What data standards were adopted and why?*
    - *What obstacles, if any, have been identified with regard to the adoption and use of common data standards, and how have these been overcome?*
    - *What support is needed in order to adopt data standards in a more efficient way?*

19. **To what extent is the project contributing to achieving greater data standardisation?**
    - *To what extent is the data available provided in a standard format?*
    - *To what extent was interoperability considered?*
    - *How could data standardisation be improved?*
    - *Are there any gaps in the data gathered to date that need to be addressed?*
    - *What key features should open datasets have in order to develop high-quality products/services? To what extent are these features present in the datasets resulting from the project?*
    - *To what extent do you think local authorities and private companies are familiar with the adoption and use of common data standards?*

- *How clear do you think the data standards are?*

Outputs, outcomes and impacts

20. Please describe how the progress and results of the project are monitored and evaluated

- *Who is responsible for the M&E of the project?*
- *What are the KPIs used to assess the progress? How were these KPIs determined?*
- *What are the key challenges or enablers for assessing the progress of the project?*
- *Are the progress and results of the project shared with stakeholders? [If yes] Please specify how and with who are the results shared.*
- *Are lessons learnt identified and disseminated?*

21. To what extent is the project meeting its intended objectives?

- *What results have been achieved to date?*
- *What evidence is there that the project is successful?*
- *Have there been any delays in the achievement of objectives? [If yes] Please explain the factors that have caused delays.*
- *Has open transport data been used to improve local transport networks? [If yes] Please specify how.*

22. What, if any, added value has the project has provided to [Local Authority] and service providers (e.g. carpark operators, bus operators, ticketing companies) and what are the expected impacts for end users?

- *How is the project expected to affect local transport?*
- *To what extent has the project affected relationships between LAs, central governments and the private sector to date?*
- *How satisfied are you with the results achieved to date?*
- *Has the project delivered any unintended impacts? [If yes] Please explain.*

23. Were any business cases developed as a result of the project? *[If yes], probe for:*

- *Stakeholders involved;*
- *Product or service developed;*
- *Obstacles encountered and how these were overcome.*

[if no], probe for:

- *Obstacles to developing a business case;*
- *What else is needed in order to develop a business case.*

24. Are there any gaps in the data gathered to date that need to be addressed?

- *What further data needs to be further collected?*
- *Are the data collection methods efficient?*
- *How could data collection be improved?*

25. To what extent is the project likely to contribute to any of the DfT's broader strategic priorities:

- *Achieving social benefits including safer streets, inclusive transport system, smoother journeys, active travel and use of public transport;*
- *Achieving environmental benefits such as reduced emissions, tacking noise pollution, unlocking spatial opportunities, tackling congestion;*
- *Achieving economic benefits such as improved productivity and job creation.*

26. Are there any other lessons to be learned from your experience of this project?

- *What has worked well?*
- *What has worked less well?*
- *What learning could be applied to other open data projects?*
- *What could be done differently?*

27. What do you think the role of the DfT should be in future open data projects? How could the DfT further support opening of data?

Opening LA Transport Data: End users/Tech companies

Note to interviewer: some end users will not know the name of the DfT competition so please substitute with the name of the project as applicable

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Introduction

1. **Could you please describe your role within [Name of organisation] and in what capacity you have been involved in the project for opening transport data in [Local Authority]?**

2. **Are you familiar with the DfT's Funding for Innovation competition that provided funds for this project?**
    - *Are you aware of the competition's aims and objectives? [If yes] To what extent were the objectives of the competition clear and aligned with the project's objectives?*
    - *Were you involved in the application for funding process? [If yes] Please explain how*

3. **Were you engaged in the design of the project? [If yes]**

- *Please describe your role and the extent to which you were consulted;*
- *What were your expectations at the start of the project?*
- *What did you hope to use the data for? Did you envisage any specific applications?*

Quality of project outputs

4. **Have you made use of any of the data published as part of the project?** *[If yes]*

    - *How is data accessed?*
    - *How have you used the data?*
    - *Did you have any difficulties in accessing and/or using the data?*
    - *What type of technology and skills are needed in order to effectively use open data?*
    - *What type of products and services have been designed using open transport data?*
    - *Has your product/service been commercialised?*

5. **To what extent is the quality of the datasets published as a result of the project sufficient to develop products/services?**

    - *How could the quality and useability of data be improved?*
    - *Are there any gaps in the data gathered to date that need to be addressed?*
    - *What key features should open datasets have in order to develop high-quality products/services? To what extent are these features present in the datasets resulting from the project?*

6. **To what extent were the standards chosen appropriate to the needs of your sector?**

    - *[If not]: What obstacles have been identified with regard to the adoption and application of these standards?*
    - *[If not]: What obstacles have been identified with regard to interoperability and data sharing among [carpark operators/bus operators/ticketing companies/other] and other stakeholders involved in street work planning and management?*

7. **To what extent is the project contributing to achieving greater data standardisation?**

    - *To what extent was the data available provided in a standard format?*
    - *To what extent was interoperability considered?*
    - *How could data standardisation be improved?*
    - *To what extent do you think local authorities and private companies are familiar with the adoption and use of common data standards?*
    - *How clear do you think the data standards are?*

- *Are there any issues with the current data standards that hinder the use of open transport data to create new products/services?*
- *What else is needed from the government/DfT?*

Outcomes and impacts

8. **Have you developed any products or services using the published datasets?**
   - *[if no] Do you have any plans to develop to develop products and services in future? Is anything further needed to facilitate this*
   - *[if yes] Could you please describe the product? What added value have the datasets provided?*

   [If the product/service is already being commercialised]
   - *To what extent are the services and products meeting/expected to meet users' expectations and needs?*
   - *Have you collected feedback from end users? [If yes] Could you please share it with us?*

9. **What are the anticipated benefits of your product/service? Probe for:**
   - *Sharing real-time information for improved journey planning*
   - *Contributing to improved transport management*

10. **To what extent, if at all, has this open data project – and therefore DfT's competition for funding - contributed to:**
    - *Strengthening collaboration between LAs, the central government and the private sector?*
    - *Improve the transport network management?*

11. **Are there any other lessons to be learned from your experience of this project?**
    - *What has worked well?*
    - *What has worked less well?*
    - *What learning could be applied to other open data projects?*
    - *What could be done differently?*

12. **What do you think the role of the DfT should be in future open data projects? How could the DfT further support open data projects?**

Ipsos MORI's standards and accreditations

Ipsos MORI's standards and accreditations provide our clients with the peace of mind that they can always depend on us to deliver reliable, sustainable findings. Our focus on quality and continuous improvement means we have embedded a 'right first time' approach throughout our organisation.

ISO 20252

This is the international market research specific standard that supersedes BS 7911/MRQSA and incorporates IQCS (Interviewer Quality Control Scheme). It covers the five stages of a Market Research project. Ipsos MORI was the first company in the world to gain this accreditation.

ISO 27001

This is the international standard for information security designed to ensure the selection of adequate and proportionate security controls. Ipsos MORI was the first research company in the UK to be awarded this in August 2008.

ISO 9001

This is the international general company standard with a focus on continual improvement through quality management systems. In 1994, we became one of the early adopters of the ISO 9001 business standard.

Market Research Society (MRS) Company Partnership

By being an MRS Company Partner, Ipsos MORI endorses and supports the core MRS brand values of professionalism, research excellence and business effectiveness, and commits to comply with the MRS Code of Conduct throughout the organisation.

Data Protection Act 2018

Ipsos MORI is required to comply with the Data Protection Act 2018. It covers the processing of personal data and the protection of privacy.

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About Ipsos MORI Public Affairs

Ipsos MORI Public Affairs works closely with national governments, local public services and the not-for-profit sector. Its c.200 research staff focus on public service and policy issues. Each has expertise in a particular part of the public sector, ensuring we have a detailed understanding of specific sectors and policy challenges. Combined with our methods and communications expertise, this helps ensure that our research makes a difference for decision makers and communities.

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