National Centre for Social Research

Mobility as a Service Case Study: Wave 1 Report

National Evaluation of Future Transport Zones

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Executive summary

This report presents findings from the first wave of a longitudinal case study conducted as part of the Future Transport Zones (FTZ) National Evaluation. The FTZ programme is a Department for Transport (DfT) funded initiative that involves the Transport for the West Midlands (TfWM), the West of England Combined Authority (WECA), Solent Transport (representing Portsmouth, Southampton, Isle of Wight and Hampshire) and Derby and Nottingham, trialing new transport services and innovations. In each area, the local FTZ programme is made up of distinct 'schemes' all of which contribute to innovation in transport delivery. This case study focuses on the Mobility as a Service (MaaS)[a] and associated data schemes which are being trialled in all areas.

Research conducted for this study consisted of:

1. A non-probability online panel survey with a sample of the general population in each of the FTZ areas (2,004 responses in total and 501 responses per area – see Appendix A for more detail); and

2. Qualitative research with stakeholders[b] involved in the delivery of MaaS and data schemes (16 interviews across the four areas).

As the first wave of this case study, this report seeks to:

- Establish a baseline of public views on public transport and MaaS; and
- Understand areas' progress and learning in the relatively early stages of developing their MaaS and data schemes.

Views on public transport and MaaS in FTZ areas

MaaS is expected to reduce usage of private cars by offering customers greater choice of public and private travel options through one digital interface. Streamlining multi-modal journey-planning and payment, and providing customers with reliable real-time information about their journeys through MaaS, are expected to make travel by public transport easier and more appealing (Alyavina et al., 2020). Across all FTZ areas, the survey findings indicated a heavy reliance on privately owned car travel. Across all FTZ areas, the survey findings indicated a heavy reliance on privately owned car travel. Public transport use was particularly low among those aged 60 or over, rural residents and those in low-income households. Three main barriers to use of public transport were identified:

- Cost;
- Infrequent or unreliable public transport; and
- Public transport does not go where people need.

Satisfaction with public transport was linked to views on affordability, with those who viewed the service as affordable more likely to think public transport was 'very good or excellent'. This suggests that for MaaS to drive greater uptake in

public transport, it *must be seen to be* offering the best value options, so getting the pricing of services available through MaaS right will be critical for FTZ areas. This will, however, need to be balanced with commercial viability to support maintenance of the app and an acceptable financial return for transport operators and mobility providers.

The survey indicated that the use of digital travel and payment services had become commonplace and residents in each of the FTZ areas were generally receptive to the idea of MaaS:

- Over half said they would be likely or very likely to use it;
- Frequent users of public transport were particularly receptive to use of a service like MaaS.

Just over a third of respondents (36%) were resistant to using MaaS (reported being unlikely or very unlikely to use the service) and of this group, a considerable proportion said nothing would encourage them to use it. Others felt that knowing they would always get the best price for their journey would encourage them to use it. However, among those resistant to using MaaS there was a perceived lack of need for a MaaS app, which was the most commonly identified disadvantage. Other concerns related to being reliant on a smart phone; uncertainty about accountability if something went wrong; and not knowing how the service would work. While barriers related to perceived lack of need could be difficult to address, targeted communications addressing the information gap about accountability and how the service works may go some way in encouraging use.

MaaS solutions will include new transport modes like e-scooters, public bike share and Dynamic Responsive Transport (DRT)[c]. Although awareness of rental e-scooters and public bike share schemes was relatively high, their reported likely use among respondents was notably lower. In comparison, awareness of DRT services was lower, but there was a clear interest in using it from those who had heard of the service, with almost half saying they would do so. Factors including a lack of availability of such services could be driving the reported low likelihood of uptake. It is also possible that as these services become more mainstream willingness to use will increase. It will be important for areas to continuously monitor future MaaS schemes to ensure that the mode mix meets area needs, and to prioritise inclusion of services with cross-demographic appeal.

Developing MaaS solutions in FTZ areas

At the time of the research (November 2021), FTZ areas were at different stages of developing their MaaS solutions and associated data infrastructure. Solent and Derby were furthest along with their solutions, with each having built an app with limited functionality available to specific audiences. Both products had limited modes but were due to be further developed with new modes added. WECA and TfWM were about to launch their invitations to tender, while the wider Derby and Nottingham FTZ project was still scoping out approaches and options for providing a solution that would work across both cities. As an innovative new service, drawing on external expertise, learning from previous

trials and market testing had been crucial steps in allowing areas to develop and refine their MaaS product specifications.

Areas were still working out exactly which services would be offered in their final MaaS products but, as a minimum, across the areas, the MaaS offer was expected to include:

- Seamless access to multi-modal journey planning;
- Booking and payment across a variety of public and private modes with some forms of personalisation (such as providing information on accessibility, carbon emissions etc.); and,
- Real-time information across modes (to enable planning).

The delivery of MaaS solutions was dependent on collaborations with commercial enterprises, such as transport operators and data suppliers. Effective engagement with transport operators and mobility service providers was seen as critical to building the trust necessary to achieve the goals of MaaS, as in some cases, transport operators were reportedly wary about the MaaS project due to concerns about losing market share. Two factors were seen as likely to affect the success of this engagement:

- The type of relationship already in place; where areas were building on long-standing, effective relationships with operators this was felt to be more positive for MaaS; and,
- The ability to negotiate commercial agreements which were attractive and viable for external service providers.

At the time of the research, FTZ areas were approaching the back-end design of their MaaS solution in different ways, depending on the level of infrastructure already in place. For example, the TfWM were planning to build on their existing, well-established multi-modal ticketing system, that was already configured to process payments and calculate multi-modal fares. In addition, they already had journey planning with real time data integrated, meaning that the MaaS solution would simply provide the front-end interface for the existing infrastructure. In contrast, Solent, WECA, Derby and Nottingham did not have significant existing journey planning technology to build on and while all had some smart ticketing offer in place, these systems were at different stages of maturity.

As a result, Solent and Derby have already adopted a white-labelled solution[d] and WECA is expecting to go down this route. However, while the underlying code may be available through a white-label product, multiple data inputs were required to enable full functionality. Gaining access to the data, in the format required, was not always straightforward and had proved a challenge in both Solent and Derby. Challenges arose from pre-existing commercial agreements between transport operators and technology suppliers or from the fact that data was simply not available in a standardised format – although national initiatives, such as the Bus Open Data Service[e], was helping in this respect. The fact that data standards and formats are different across transport modes adds to the complexity.

Through the process of scoping, designing and developing their MaaS projects thus far, stakeholders identified some key learnings for taking forward similar projects in other areas.

- **Keeping pace.** The importance of building and maintaining momentum across the project was felt to be key to driving it forward, particularly as MaaS projects involved multiple stakeholders.
- **Collaborative working.** Stakeholders viewed MaaS as challenging, not only due to the technology, but due to the stakeholder management needed. They felt that collaboration both with internal stakeholders and external partners to be key to success and it required time to invest in building trusted relationships as well as engagement to ensure stakeholders shared a common vision at each stage of the project.
- **Customer focus and culture change.** Stakeholders highlighted that putting the customer at the centre of the project rather than the technology as a key learning. In some cases, however, they felt this required a cultural shift within local authorities' transport teams and across the transport sector.
- **Understanding the commercial environment.** Stakeholders highlighted the importance of understanding the commercial environment, including changing conditions faced by operators in light of COVID-19, in order to make MaaS an attractive proposition for all stakeholders.

1 Introduction

This report presents findings from the baseline wave of the longitudinal case study on Mobility as a Service (MaaS) and data schemes being implemented as part of the Future Transport Zones (FTZ) programme. The case study forms part of the national evaluation of the FTZ programme. Research conducted for the baseline report consisted of an online non-probability survey with a sample of the general population in each of the FTZ areas and qualitative research with stakeholders involved in the delivery of MaaS and data schemes in the intervention areas: West Midlands, West of England Combined Authority (WECA), Solent Transport (representing Portsmouth, Southampton, Isle of Wight and Hampshire) and Derby and Nottingham.

1.1 Future Transport Zones programme

The FTZ programme is a Department for Transport (DfT) funded initiative that involves selected areas trialling new transport services and innovations. FTZs are a key element of the Government's Future of Mobility Urban Strategy[f] and part of the wider shift to cleaner transport technology. With a focus on trialling new and innovative modes and approaches, the DfT's core objectives for the programme are to:

- Trial new mobility services, modes and models;
- Improve integration of services;
- Increase the availability of real-time data; and
- Create a digital marketplace for mobility services.

There are four areas participating in the programme. DfT selected Transport for West Midlands (TfWM) to act as a 'pathfinder area' in 2018. WECA, Solent and Derby and Nottingham were subsequently selected in March 2020 following a competitive bidding process. Each area is implementing a set of schemes designed to meet the objectives of the programme detailed above, whilst reflecting local needs and ambitions. Table 1.1 sets out the full range of schemes by area. Mobility as a Service (MaaS) and e-scooter trials[g] are the only schemes that are consistent across areas, but even then, design features and implementation models differ by area.

Table 1.1 Scheme by FTZ area

TfWM	WECA	Solent	Derby and Nottingham
MaaS	MaaS	MaaS	MaaS
Data projects	Data hub		Data hub
E-scooter trials	E-scooter trials	E-scooter trials	E-scooter trials
Mobility Credits	Mobility Credits	[Mobility Credits]	
Demand Dynamic Responsive Transport (DDRT)	DDRT	[DDRT]	

Mobility hubs	Mobility hubs		Mobility hubs
Innovation showcases	Urban freight	Bike share	Depot of the future
Segmentation models		Drone logistics	
Sensor network		Delivery consolidation	
		[Lift sharing]	

[denotes scheme on hold]

1.2 The national evaluation

The core objectives of the national evaluation are to maximise the opportunities for learning, to understand how new digitally enabled mobility modes, services and business models can be delivered successfully, and to assess the extent to which the programme has achieved its intended outcomes. NatCen's role as national evaluator is to provide support to the FTZ local evaluations and to evaluate the FTZ national programme as a whole, bringing together insights from across the areas.

The national evaluation is taking a theory-based approach – this approach to evaluation stipulates that all programmes have an underlying theory or rationale as to how they expect change to occur. The overall programme level Theory of Change (ToC) has been built around a typology that has categorised schemes based on their ultimate aims. Broadly speaking each pathway is aligned with an overarching objective:

- **Customer Offer pathway:** Improve the customer offer and experience to encourage sustainable transport use.
- **Use of Data pathway**: Improve the availability of data to improve transport planning capability within local authorities.
- **Movement of Goods pathway**: Use new technologies to make the movement of goods more efficient.

The MaaS and Data case study contributes to building the evidence base across two of these pathways: customer offer and use of data. It also contributes to understanding the linkages between the two pathways – namely how the availability of data will improve the offer to customers, as well as how the MaaS platform will generate new data enabling Local Authorities to better understand the travelling public.

MaaS, and its offer to the public of 'seamless travel', sits at the heart of the FTZ projects in all areas. Understanding how MaaS users and the general public more widely respond to it will be key to understanding its success. Across areas, the delivery and functionality of MaaS will be closely linked to the availability and integration of data. Furthermore, once MaaS is developed, it is also expected to yield a vast quantity of new data enabling greater understanding of customer behaviour.

The evidence from this study aims to:

- shed greater insight into the whole process of developing and delivering a successful MaaS intervention;
- examine the development and design of the 'back-end' as well as the user experience of the 'front-end'; and,
- enable more joined-up learning to inform future local authorities seeking to develop MaaS.

In doing so, it will also contribute towards the broader understanding of the extent to which MaaS has achieved the outcomes articulated in the national ToC. An Implementation longitudinal case study is being delivered in parallel to this study.

1.2.1 MaaS and data case study

The MaaS and data case study's two overarching learning objectives and the associated key research questions are set out below.

- What cross learning can be adopted by other FTZ areas to refine their interventions? How has the design of the data architecture affected the implementation of MaaS?
  - What weaknesses have been identified and what mitigation measures have been put in place to minimise risks?
  - What key factors encourage or are likely to encourage user engagement?
  - What are the key facilitators for customer behaviour change?
- What are the learnings that should be documented to inform clear decision making for other local authorities?
  - What MaaS and Data models have each of the areas adopted?
  - What are the key strengths/weakness of the models?
  - What contextual features have affected selection of these models?
  - Which specific models provide best customer experience? Why?

As the first wave of research, this report seeks to partially address some of the questions set out above. Further research waves will build on this evidence base.

1.2.2 Defining MaaS

MaaS is a term used to describe "digital transport service platforms that enable users to access, pay for, and get real-time information on a range of public and private transport options" (Enoch, 2018). MaaS aims to change the way in which users perceive transport, shifting away from a focus on the means of transport (such as having a bus pass or train ticket) to the purchase of transport

services as multi-modal packages which can be used flexibly to meet individual needs (Karamargianni & Matyas, 2017).

At its most developed, MaaS consists of a single digital interface which allows frictionless and integrated access to a complex range of travels services. To varying degrees, MaaS solutions may also provide information or other features designed to nudge behaviour in certain ways, such as to reduce congestion (Goodall et al., 2017). As an innovative new service, examples of MaaS around the world remain limited, although this is a rapidly growing field[h]. While MaaS is conceptualised as a step-change from traditional mapping and journey-planning services, there is no consensus on exactly which functionality is required in order for a service to be defined as a MaaS product (Goodall et al., 2017).

1.2.3 Overview of FTZ MaaS projects

This section provides a brief overview of the MaaS projects being undertaken in each of the FTZ areas. Each MaaS solution is being developed iteratively, as is described in more detail in chapter 3. As MaaS is a concept of mobility that could take different formats, throughout the report we refer to 'MaaS solutions' in order to recognise that this could be delivered in different ways (e.g. web browser interface and/or app). All of the FTZ areas were planning to have an app but were also considering web browser interfaces (see 3.2 for details).

Transport for West Midlands (TfWM)

The objective of the West Midlands MaaS solution is to get people out of single occupancy cars and on to sustainable modes of travel. It intends to achieve this by putting all mobility services in a single app, including public transport, taxi and micro-mobility. In so doing, TfWM hope to improve the customer experience by simplifying the local travel app landscape. Key features will include route planning, booking and paying for journeys across modes. TfWM also plan to build in personalised incentives for different types of customer. As of November 2021, when the research was conducted, TfWM had been iteratively developing their existing travel planning app and Swift, their local multi-modal ticketing offer. TfWM were in the process of commissioning a MaaS solution provider who will be expected to build on Swift infrastructure, with a view to having a final product available in April 2023.

WECA

Similarly to TfWM, the aim of the WECA MaaS solution is to grow the market for sustainable modes of transport, by making it as easy as possible for people to choose public and active transport over private cars. This is part of WECA's wider commitment to net zero and sustainability. WECA's vision for their MaaS solution is that it will be highly personalised around each customer's concerns and preferences, and thereby able to offer the most appropriate journey options. WECA anticipates that the app will enable seamless multi-modal planning, booking and payment as well as offer incentives such as mobility credits. At the time of the research in November 2021, WECA were preparing to launch their tender for suppliers and were looking to appoint a MaaS provider in Spring 2022 with a full product launch expected in Spring 2023.

Solent

The aim of Solent's MaaS solution is to enable and encourage more informed decision-making about travel choices, allowing customers to take into account many different factors contributing to cost and convenience of travel. Solent's project also includes a strong research component which will explore factors around customer behaviour change. At the time of the research in November 2021, Solent had already procured a MaaS supplier who had built the Alpha version of the app. A Beta product consisting of journey planning was launched in early 2022 (after the research was completed) with a limited number of mobility providers. Additional operators and providers are due to be integrated during the Beta phase. The main product is expected to be launched to the public in Spring 2022. The product will continue to be developed with a final product expected to include journey planning across all modes (bus, rail, ferry), micro-mobility (e-scooters and bike share), active travel, car share and payment through a Pay-as-You-Go model.

Derby and Nottingham

The aim of the Derby and Nottingham MaaS solution is to produce a single platform with aggregated information across a range of mobility services, to share knowledge on what is going on in the transport network, reduce congestion and improve air quality. At the time of the interviews in November 2021, Derby and Nottingham had commissioned an options appraisal to establish the exact scope of the MaaS solution. However, it was expected that it will provide a single point of booking and payment, and the ability to plan entire journeys across multiple modes with seamless ticketing. Alongside the options appraisal, Derby was running a restricted MaaS trial, called Derby Go, in partnership with Toyota Kinto. The app launched to staff and students of Derby University and Derby College with limited features in September 2021 (see chapter 3 for more details on the trial).

1.3 Methods

In order to address the research questions set out in section 1.2, a mixed-methods approach, consisting of an online survey with the general public and in-depth interviews with key stakeholders, was adopted.

1.3.1 Quantitative survey with the general public

An online survey exploring the attitudes and awareness of the general public (aged 18 and over) to local public transport and new transport services was conducted in the four FTZ areas. This serves as a baseline for the case study, with the survey due to be repeated in 2023.

Sampling

In total, 2,004 respondents took part in the online survey, with 501 people from each of the four FTZ areas. The survey was conducted between 29th November and 15th December 2021 using an online panel. A non-probability

sampling approach was used with quotas set by age, gender, economic activity and car ownership to ensure representativeness of each of the FTZ area populations.

Questionnaire design

A single questionnaire was used across all four areas. The questionnaire drew on existing and well-tested surveys including the National Travel Survey, Transport and Technology Tracker, National Travel Attitudes Survey and Understanding Society. The survey questions were centred around the two key themes: 1) current travel behaviour and attitudes to public transport; and 2) attitudes and use of new transport technologies (including digital tools for journey planning and new services and modes).

The survey was run on Dynata's online panel and took an average of 10 minutes to complete. The survey was checked by independent consultants to ensure it met W3C Web Content Accessibility Guidelines (WCAG) 2.1 AA.

Interpreting the findings

A non-probability survey was deemed the most suitable approach for this case study, as it is a less time consuming and more cost-effective method compared to traditional random probability sampling. Non-probability panel surveys are useful in providing broad-brush picture of attitudes and behaviours (Brown et al., 2017). However, they do have some limitations.

Chief amongst these, is the fact that it's not possible to quantify our degree of confidence that the views and experiences of the respondents represent the views and experiences of the wider population as a whole. We are also unable to calculate response rates, and so cannot estimate the non-response bias. As a result, generalisations should be treated with caution. Non-interlocking quotas[i] were set for each area based on characteristics expected to influence transport behaviour, namely age, gender, economic activity and car ownership. Small corrective weights were applied to the final sample to ensure alignment with the local population profile (see appendix A for area demographic profiles).

A full set of tables with cross tabulations across key subgroups were produced. Area level tables were also produced to explore whether trends varied across areas. Significance testing was conducted across key sub-groups and only significant differences between groups are reported in the findings.

1.3.2 Qualitative research with stakeholders

Sixteen in-depth interviews with stakeholders who had a key role in the scoping, design and/or implementation of MaaS in each FTZ area were conducted. Interviews explored aspects such as the design of MaaS solutions and key factors around the development of technology and deployment of data. Interviews lasted approximately 1 hour, were conducted using Microsoft Teams and took place between October and early December 2021.

Sampling and recruitment

A purposive sampling approach was used to capture a diverse range of insights from internal and external stakeholders with varying expertise and involvement in the design and implementation of the MaaS and data schemes. Stakeholders were identified by FTZ area leads. Internal stakeholders included project officers directly involved in delivering MaaS projects, as well as those working on ticketing or data elements. External stakeholder included technology suppliers and transport consultants providing expertise in the design and development of the schemes. The types of stakeholder varied by area depending on progress made against design or delivery in the specific FTZ. Table 1.2 sets out the number of interviews achieved across the FTZ areas.

Table 1.2 Number of stakeholder interviews conducted by FTZ area

Stakeholder type	TfWM[j]	WECA	Solent	Derby & Nottingham	Total
Internal	4	1	2	3	10
External		2	3	1	6
Total	4	3	5	4	16

Stakeholders were invited to participate by FTZ area contacts using a NatCen invitation template. The invitation included clear information about the study, what participation entailed and explanations of limitations around confidentiality and anonymity[k]. Stakeholders were asked to opt-in if they were interested in participation before contact details were shared with NatCen.

Fieldwork and analysis

A topic guide, designed in collaboration with the DfT, was used to guide the interviews. The guide was designed to be used with different types of stakeholders and was thus organised into modules. The main themes covered included:

- Background and context;
- MaaS scheme module: planning and set-up; designing the MaaS solution; working with stakeholders; funding and implementation;
- Data infrastructure module: existing data infrastructure; access to data; issues with data; and,
- Key successes and challenges and lessons learnt.

All interviews were audio recorded with participants' permission and then transcribed verbatim. The transcripts were then managed and analysed using NatCen's Framework approach which allows in-depth exploration of the data by case and by theme. Coded data was reviewed to draw out the range of views across participants to identify any similarities and differences within and across FTZ areas.

Interpreting the findings

When reporting on the qualitative phase of the research, the report avoids giving numerical findings, since qualitative research cannot support numerical analysis. This is because purposive sampling seeks to achieve range and diversity among sample members rather than to build a statistically representative sample. Instead the research provides depth insight into the range of experiences, views and recommendations.

In order to protect participants' anonymity, quote labels only include the FTZ area. Due to the small qualitative sample size, any other detail regarding a participant's characteristics would potentially lead to identification.

1.4 Report structure

The report begins with a discussion of the quantitative findings before moving on to discuss the qualitative insights about the specific MaaS and data projects in each area. The report is structured as follows.

- **Chapter 2** presents the findings from the **online survey with the general public**, looking at findings from across the whole survey as well as views on topics by FTZ area.
- **Chapter 3** focuses on the **set up and design of MaaS products**. Findings are reported thematically by area. Key challenges and how these have been overcome are drawn out where relevant throughout the chapter.
- **Chapter 4** focuses on the **data and technological infrastructure that underpins MaaS.** Findings are reported thematically by area. Key challenges and how these have been overcome are drawn out where relevant throughout the chapter.
- **Chapter 5** concludes the report with an overview of the **key lessons learnt**.

2 Public attitudes and views on MaaS

This chapter focuses on the findings from the general public survey conducted in the four FTZ areas. It begins by exploring current transport usage and views on public transport. before looking at the use of tools for journey planning, views on MaaS[l] and, finally, awareness of other sustainable transport modes. For each theme, we first report findings from across the total survey sample before commenting on differences between demographic subgroups where interesting or relevant. Findings by FTZ area are also addressed, again where these are most relevant.

Targeting of residents within the specific trial areas was achieved by using an online non-probability panel. Therefore, as with any survey which does not follow a random probability sampling methodology, we cannot quantify our degree of confidence that the views and experiences of the residents represent the views and experiences of the FTZ area population as a whole.

2.1 Transport usage and views on public transport

Across all areas, car was the most dominant transport mode. Usage of other modes was shaped by age, income level, geography and whether or not someone was disabled[m].

2.1.1 Modes of transport used in past 12 months

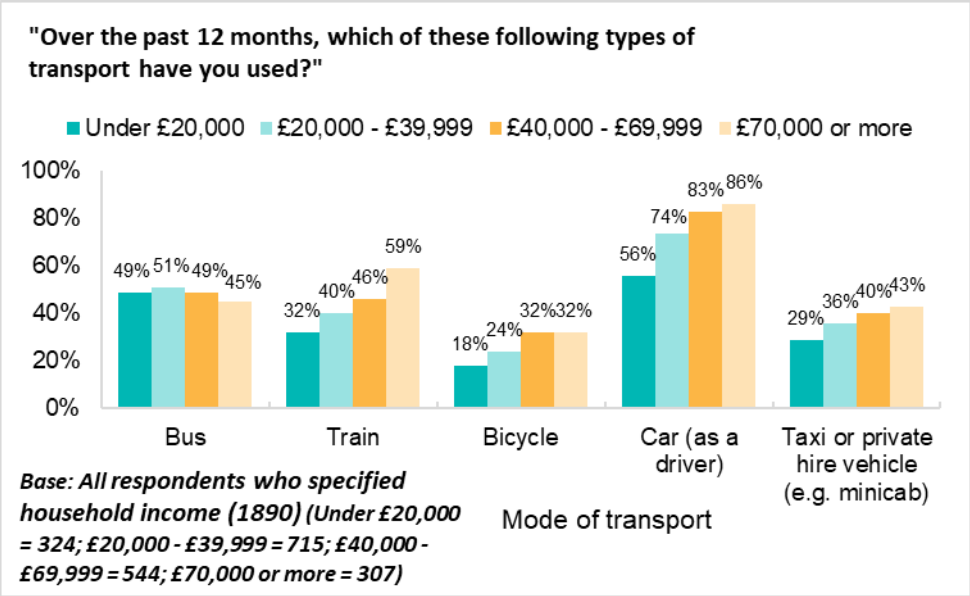
Respondents were asked about which types of transport they had used in the past 12 months. Most had travelled by car as a driver (75%) followed by walking (72%) and by car as a passenger (68%). Just under half had used a bus (49%) while 43% had used a train and 37% had used a taxi or private hire vehicle. Just over a quarter (27%) had travelled by bicycle.

Transport use varied by age, with those in the youngest age bracket (18 to 39) more likely to have used the bus (54%), train (53%), bicycle (32%) or taxi (47%) than those in the older age categories (40 to 59 and 60 plus). The opposite was true of car travel as a driver, with 82% of those aged 60 or over having used this mode, falling to 70% among the 18 to 39 age group. Looking at transport mode by household income levels, while use of the bus was consistent across bands, the proportion of respondents having travelled by train increased as income rose. Almost three in five (59%) of those with a household income of £70,000 or more[n] had used the train in the past 12 months, but this fell to just 32% in households earning £20,000 or less. A similar pattern is observed for use of bicycle, taxi, car as driver and car as passenger **[Figure 2.1].** This disparity in use of transport modes echoes previous research on access to transport that shows that those on lower incomes are less likely to travel across all modes apart from bus[o].

While a similar proportion of disabled and non-disabled respondents used the bus and taxis, non-disabled respondents were more likely to use the train (45% compared to 39%) and to travel by car as a driver (79% compared to 62%)[p].

There were also some key disparities between those living in urban, suburban or rural locations. Those in urban centres were most likely to have travelled by bus (60%). Just under half (48%) of those in suburbs had done so, falling to 40% of rural respondents (see appendix B for more details about the proportion of respondents within each FTZ that lived in urban, suburban and rural locations). This was repeated for taxi use (47%, 36% and 28% respectively). Those in urban areas were also more likely to have used the train (48%) than those in suburban (43%) or rural (40%) locations and to have travelled by bicycle (30%) than those in rural settings (24%). Conversely, rural residents were most likely to have travelled by car as a driver (83%) compared to those in suburbs (75%), falling to just over two thirds of those in urban areas (67%).

Figure 2.1 Transport modes used over the past 12 months by household income



2.1.2 Frequency of transport usage in local FTZ area

Use of local public transport

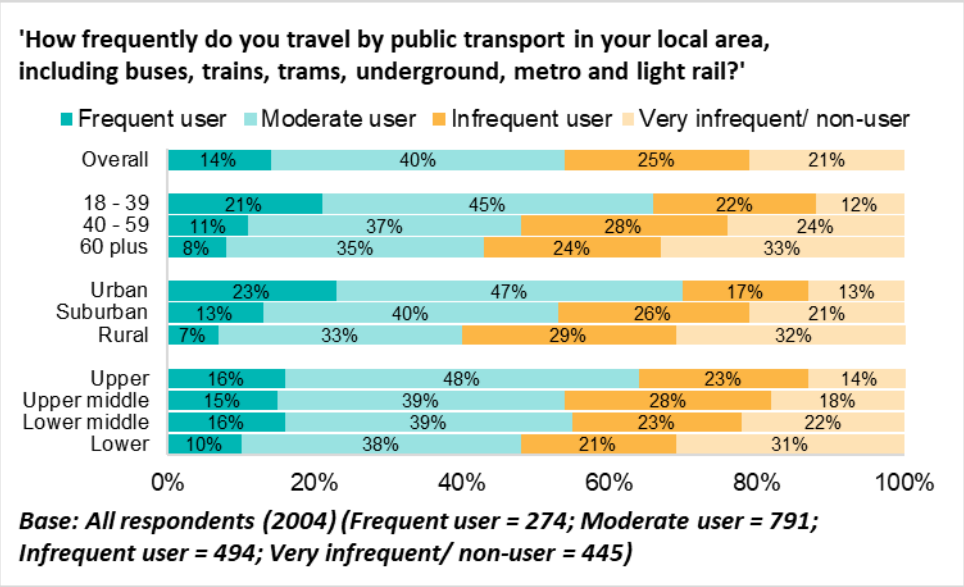
Over one in ten (14%) respondents reported using public transport in their local FTZ area every or most days (frequent users), 40% used it at least once a month, up to three times a week (moderate users), a quarter (25%) used it one to four times a year (infrequent users), while one in five (21%) said they used it less often or not at all (non-user) **[Figure 2.2].**

Those in the youngest age bracket (18 to 39) were the most likely to describe themselves as frequent users (21%) compared to 11% of the 40 to 59s and 8% of the 60 plus category. Those in the lower income bracket were less likely (10%) to be frequent users of public transport than those in the lower middle (16%), upper middle (15%) and upper (16%) income brackets. The opposite pattern emerged for non-use, with 31% of those in the lower income band

saying they did not use local public transport compared to 22% of the lower middle, 18% of the upper middle and 14% of the upper income band.

Over a fifth (23%) of those in urban areas frequently travelled by public transport, falling to 13% of those in suburbs and further to 7% of those in rural areas. At the same time, rural residents were most likely to be non-users of public transport (32%) **[Figure 2.2].** Those without personal use of a car were more likely to be frequent public transport users (21%) than those with use of a car (13%).

Figure 2.2 Frequency of public transport usage by age, location and household income



Use of local public transport by FTZ area

Table 2.1 displays the frequency of local public transport usage by FTZ area (for more detail on mode use by area, see Appendix B). Respondents in the Solent FTZ were more likely to be non-users of local public transport services than those in the other FTZ areas. This may be linked to fact that smaller proportion of Solent's respondents lived in urban areas (see table B.2 in appendix B).

Table 2.1 Use of local public transport by FTZ area[q]

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
Frequent user	16%	15%	12%	13%
Moderate user	42%	42%	36%	39%
Infrequent user	21%	24%	26%	27%
Non-user	21%	18%	26%	20%

Car ownership[r] and frequency of car usage in local FTZ area

Most respondents (86%), personally owned or had continuous use of a car or van. Those in the lower income bracket (64%) were markedly less likely to have personal use of a car than those in other income brackets; particularly the upper

bracket (96%). Geography also impacted car access, with rural residents more likely to report access to a car (91%) than those in the suburbs (85%). Those in urban areas were least likely to report access (80%).

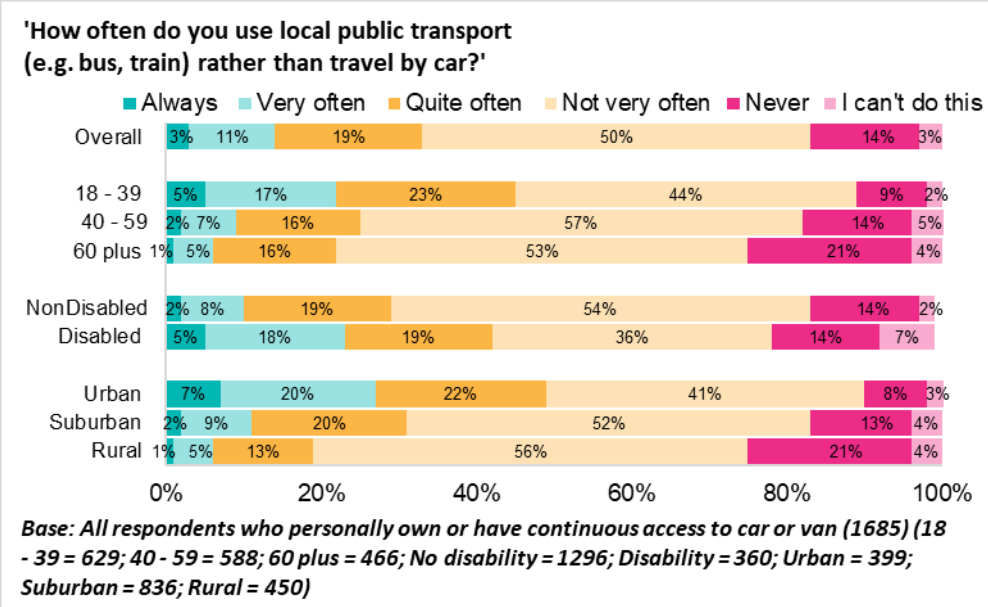
Almost three in five of all respondents (57%) travelled by car in their local FTZ area, either as a driver or passenger, every or most days. Only 3% travelled by car less than once a year or never. Those in the 18 to 39 age category were more likely to be frequent car users (59%) than those aged 60 plus (53%). This was despite access to a car being highest among the oldest age group.

For other groups, frequency of car use mirrored ownership. Sixty-five percent of those in the upper income band reported travelling by car every or most days, falling to 42% of those in the lower income band. Almost one in ten (9%) of those in the lower income bracket described themselves as non-users compared to just 2% of lower middle, 1% of upper middle and 2% of upper income households. Non-disabled respondents were more likely to be frequent car users (60%) than disabled respondents (48%). Geographical location also impacted on car use with those in rural areas more likely to be frequent users (60%) than those in urban settings (53%).

Using local public transport instead of the car

Those with personal access to a car were also asked how often they use local public transport (e.g. bus, train) rather than travel by car. Only 13% said they did so 'always or very often' while almost two thirds (64%) said they did so 'not very often or never'. Those in the youngest age category (22%), disabled respondents (23%)[s] and those in urban settings (26%) were the most likely to make this choice more often **[Figure 2.3].**

Figure 2.3 Using public transport instead of the car by age, disability, urban/rural



Base: All respondents who personally own or have continuous access to car or van (1685) (18 - 39 = 629; 40 - 59 = 588; 60 plus = 466; No disability = 1296; Disability = 360; Urban = 399; Suburban = 836; Rural = 450)

Car ownership, frequency of car usage in local FTZ area and using local public transport instead of the car by FTZ area

Access to a car was high across the FTZ areas (90% in WECA, 89% in Solent and 85% in Derby and Nottingham). People in the West Midlands were least likely to have access with 78% doing so. The same pattern of those living in urban areas and those on the lowest incomes being less likely to have access to a car was found across the four FTZ areas. The proportion of respondents who reported travelling by car 'every or most days' in their local FTZ area was consistent across the areas (between 55% and 59%). While between 14% and 16% of respondents with a car in the West Midlands, WECA and Derby and Nottingham opted instead for local public transport 'very often or always'; people in Solent were somewhat less likely to do so (8%).

2.1.3 Views on local public transport

When asked how they would rate local public transport, 47% of all participants said it was 'very good or excellent', while a third (33%) said it was fair and one in ten (11%) rated it as poor. The proportion of respondents giving a positive rating increased with the frequency of public transport usage. A fifth (20%) of non-users said it was 'very good or excellent'; but this rose to over two thirds (69%) of frequent users **[**

Figure 2.4**].** Views also varied according to age, with likelihood to rate positively considerably reducing as age increased (57% of 18 to 39-year olds, compared to 43% of those in the 40 to 59 age band and 35% of those aged 60 plus). Geography also affected responses, with those in urban areas most like to give a positive rating (57%). Those in suburban areas (45%) were more likely to give a response of 'very good or excellent' than rural residents (39%). However, as younger people and those in urban and suburban areas were also more likely to use public transport, it is not clear whether it is use of public transport or demographics that drive more positive views.

These findings raise a question around cause and effect, that is, whether people avoid public transport because they dislike it or whether they have a negative opinion because they don't use it. The findings may indicate that views are linked to the adequacy of available public transport services to meet the needs of the user, as those in rural areas, who may be less well serviced by public transport routes, were least likely to give a positive response.

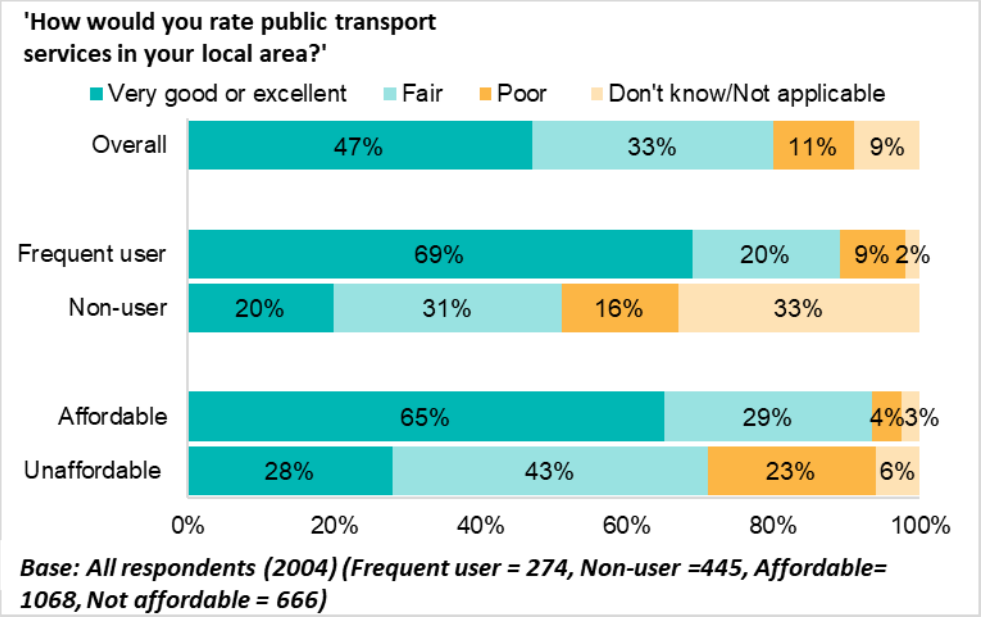
Over half (54%) of respondents reported local public transport to be affordable or very affordable, while 33% said it was unaffordable or very unaffordable. As with other survey responses, there were variations according to age. Those aged 18 to 39 were most likely to report the services as affordable (60%) compared to 51% of the 40 to 59s and 49% of the 60 plus. Those in urban areas were also most likely to view the services as affordable (62%), with those in suburban areas (55%) also more likely to give this response than rural residents (45%).

There was a clear relationship between views on affordability of and overall satisfaction with public transport. Only 28% of those who saw public transport

as unaffordable rated it as ‘very good or excellent’ compared to 65% of those who saw the service as affordable. **[**

Figure 2.4**].**

Figure 2.4 Views on public transport by frequency of usage and affordability



Satisfaction with local public transport by FTZ area

The tables below set out the views on satisfaction with (Table 2.2) and affordability of public transport in each of the FTZ areas (Table 2.3). Respondents in the Derby and Nottingham FTZ area were more likely than those in the other FTZ areas to rate their local public transport as very good or excellent, while those in Solent were the least likely to rate local public transport as affordable. Responses from Derby and Nottingham and Solent were similar in terms of their urban/rural split.

Table 2.2 Satisfaction with public transport by FTZ area

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
Very good or excellent	44%	43%	42%	58%
Fair	35%	36%	36%	27%
Poor	12%	16%	11%	4%
Don’t know/ not applicable	10%	6%	11%	11%

Table 2.3 Views on affordability of public transport by FTZ area

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501

Affordable or very affordable	58%	55%	46%	57%
Unaffordable or very unaffordable	30%	36%	37%	28%
Don't know/ not applicable	12%	9%	17%	14%

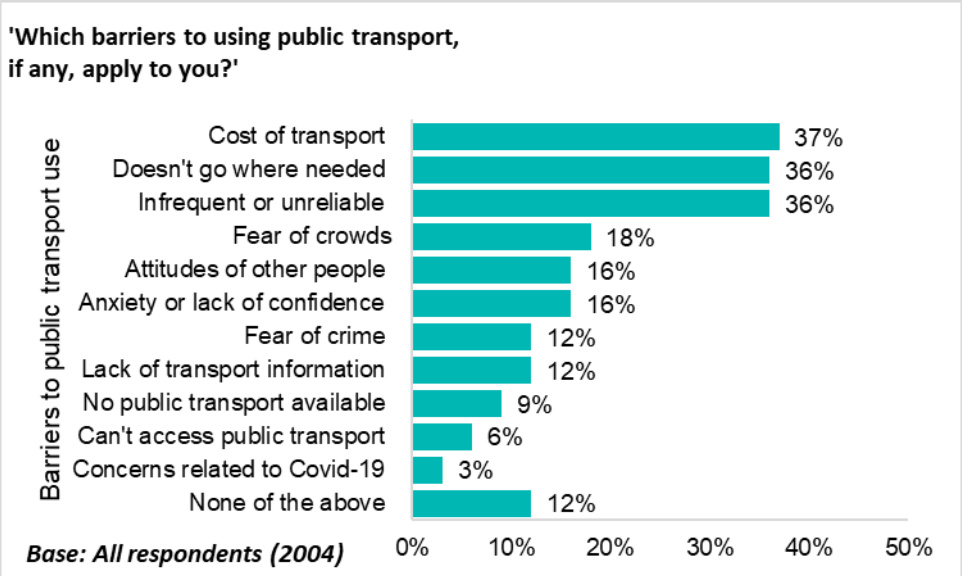
Barriers to using public transport and active travel

Respondents were asked a series of questions about barriers to active travel and use of public transport. All respondents were asked to identify which barriers to walking more in their local area applied to them. The most common response (21%) was 'I walk enough already', followed by a fifth (20%) saying 'it takes too long' and 'poor pavement conditions' respectively.

Again, all respondents were asked to identify barriers to cycling more. 'Road safety concerns' attracted the greatest proportion of responses (29%), followed by 'the weather' (24%). Just under a quarter of respondents also selected 'too much traffic or traffic too fast' and 'no interest in cycling' (23% for each).

When asked which, if any, barriers to using public transport applied to them, the following three reasons attracted the greatest proportion of responses: cost of transport or financial reasons (37%), public transport is infrequent or unreliable (36%), and transport doesn't go where I need it to go (also 36%) **[Figure 2.5].** These were also the main reasons given across all four FTZ areas.

Figure 2.5 Barriers to using public transport



2.1.4 Views on air quality

Half (50%) of respondents said they would agree or strongly agree with the statement 'in order to improve air quality, I am willing to reduce the amount I travel by car' and only 18% disagreed or strongly disagreed. A further 29% were neutral to the suggestion, which indicates that a considerable proportion of

respondents do not reject the idea of reduced car travel and may be open to it if services matched their needs.

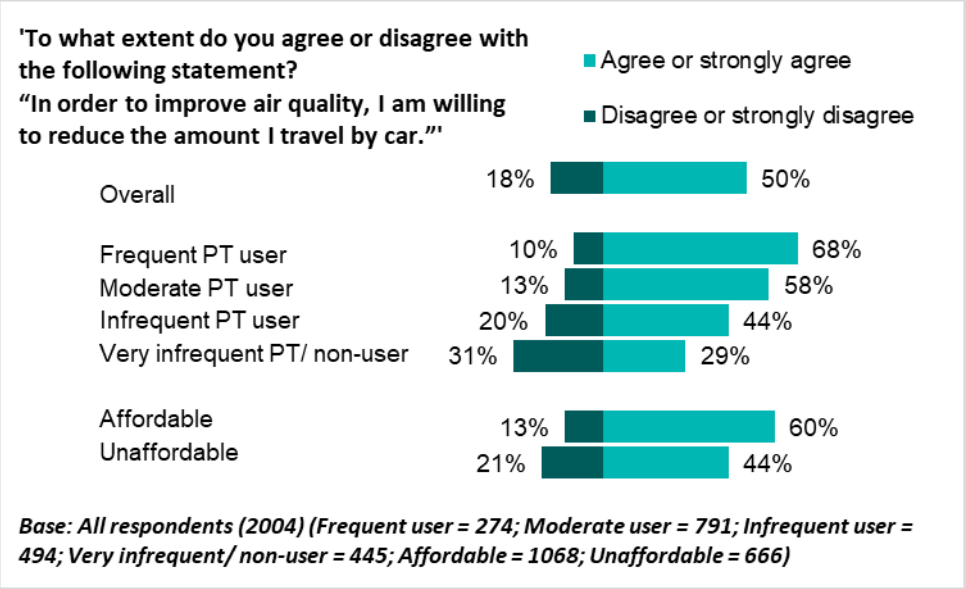
Willingness to act reduced with age, with 37% of those aged 60 plus agreeing that they would reduce car usage compared to 45% of those aged 40 to 59 and 62% of the 18 to 39 age group. There may be a number of explanations for this including generational differences in views on environmental issues, but also the types of journeys taken by different age groups and current level of use. Findings earlier in the chapter indicate that those in the youngest age group are more frequent car users at present than those aged 60 and over and therefore may have more opportunity to reduce use.

Two fifths (40%) of those in rural areas said they would be willing to reduce car travel compared to 51% and 58% of those in suburban and urban areas respectively. While not explicitly explored in the survey, this is likely to be linked to perceptions of access to public transport. Willingness to act also increased with frequency of public transport use, with frequent users much more likely to act (68%) than non-users (29%).

While in theory current frequent public transport users would have less opportunity to change their transport habits to positively impact air quality, the survey findings indicate that this in fact is not the case, as those in the youngest age bracket were both more likely to be frequent public transport users and frequent car users than those aged 60 and over. There was also a clear disparity between those who saw public transport as affordable and those who did not (60% agreeing to act compared to 44% respectively) **[Figure 2.6].**

Around half of respondents in each of the FTZ areas agreed that they would be willing to reduce the amount they travel by car in order to improve air quality. In the West Midlands, 18% disagreed with the statement, 17% did so in WECA, and 16% in Derby and Nottingham, rising to 21% of Solent residents. This could be linked to the fact that respondents in Solent were less likely to see local public transport as affordable.

Figure 2.6 Willingness to reduce car travel to improve air quality by frequency of public transport usage and affordability of public transport



Implications for FTZ MaaS projects

The findings from the survey indicated a heavy reliance on privately owned car travel across all FTZ areas. Responses evidenced particularly high levels of non-use of public transport among some segments; specifically, those aged 60 or over, low income households and rural residents. Overall, it appears that younger urban audiences may be the most receptive to MaaS which has clear implications for marketing around new apps.

Three main barriers to use of public transport were identified: 1) cost, 2) public transport being viewed as infrequent or unreliable; and 3) that it does not go where people need. A MaaS solution has the potential to address two of these; that is, going where people need and making transport more reliable, both by offering additional transport modes and providing authorities better data on journeys and destinations for transport planning.

Concerns around cost appeared to have a substantial bearing on the willingness of individuals to use public transport. Not only was it identified as a barrier to public transport usage by the highest proportion of respondents, but it also impacted on the likelihood to rate local public transport services as 'very good or excellent'. This suggests that for MaaS to drive an uptake in public transport, it *has to be seen to be* offering the best value options. This will largely be influenced by fare structures agreed by operators and local authorities, as well as how effectively apps are marketed.

Finally, the findings on views on air quality and transport suggested that including environmental messaging could be effective in encouraging greater use of public transport, especially in groups that are already using it to some

extent (young people and those in urban areas). A challenge will remain in encouraging those who do not currently use public transport to try it. However, a MaaS product may offer the necessary incentive to change current travel behaviour for some, by offering a service which better meets their existing travel requirements.

2.2 Use of digital tools for journey planning

While the findings indicated that the use of digital tools for journey planning was more popular than non-digital methods, digital access varied by age and income level suggesting that certain segments of the population may be excluded from using MaaS. Almost all (96%) respondents to the survey personally used a smartphone, however, about one in ten of both the 60 plus age group (10%) and those earning under £20,000 (11%) did not. Of those who did have a smartphone, 70% used it for maps, navigation or satnavs, 56% for route planning or route planning apps, 53% for finding out about services available in the area (e.g. restaurants, cafes, shops, garages) and 46% for checking live travel times (e.g. bus, train, tram, flights etc). Younger respondents and those on higher incomes were more likely to have used each of these services than those aged 60 plus and lower income households. Eight per cent of respondents had not used any of the services listed.

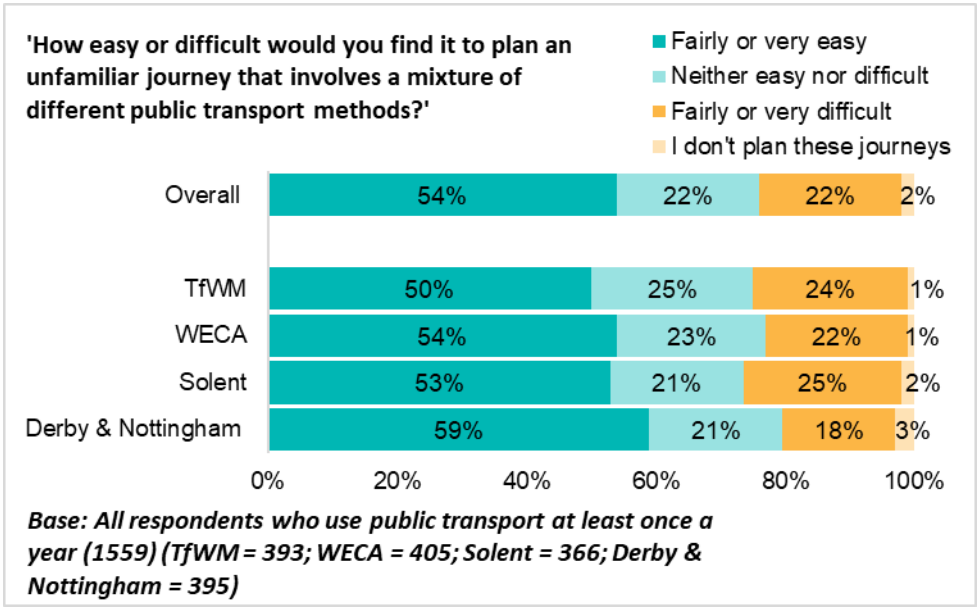
2.2.1 Ease of journey planning

Respondents who used public transport at least once a year were asked how easy they found it to plan an unfamiliar journey involving a mixture of different public transport methods. Over half (54%) reported that they found it 'fairly or very easy' while 22% said it was 'fairly or very difficult'. Those who reported finding it 'fairly or very difficult' were more likely to be disabled (29%) and live in rural areas or small towns (30%).

Experience of journey planning by FTZ area

Experiences of journey planning were fairly consistent across the FTZ areas as shown in Figure 2.7, with over half of respondents in each area saying they found it fairly or very easy.

Figure 2.7 Experience of journey planning by FTZ area

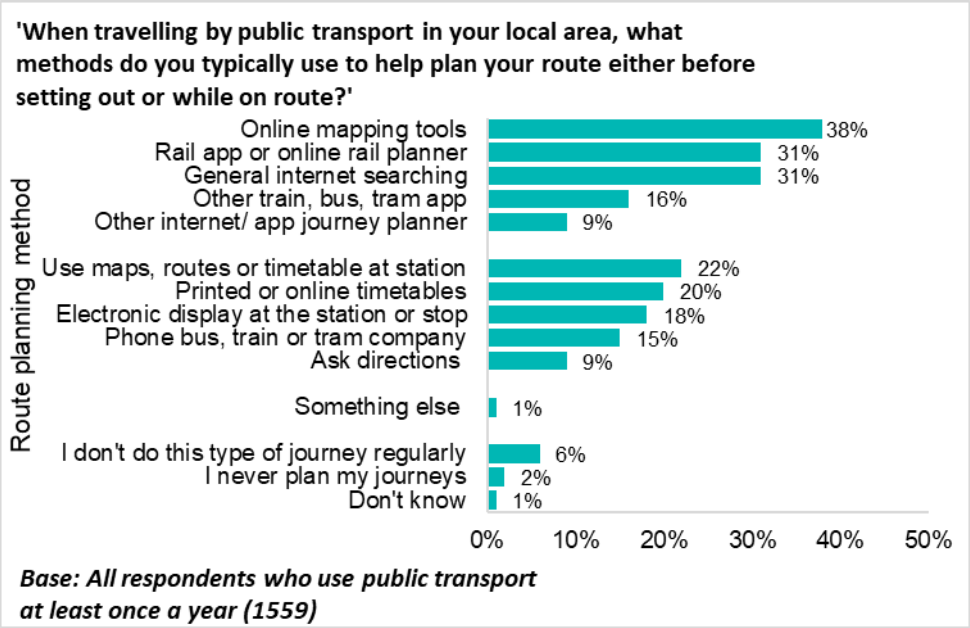


2.2.2 Tools used for local journey planning

Respondents who used public transport at least once a year were also asked which methods they typically use to help plan their route, either before setting out or during the journey. The four most commonly used methods were: online mapping tools such as Google maps (38%); rail app or online rail planner (31%); general internet searching (31%); and use of maps, routes or timetables displayed at station or stop (22%) **[Figure 2.8].**

Those aged 60 plus were considerably less likely (29%) to use online mapping tools than those aged 18 to 39 (41%). This was repeated for rail app or online rail planner (28% compared to 34% respectively).

Figure 2.8 Route planning methods before setting out or on route



Of those who did not report using an online or app-based journey planner currently, over two thirds (67%) said they would be fairly or very likely to use one in the future, while a quarter (26%) said they would be fairly or very unlikely to do so.

2.2.1 Paying for public transport journeys

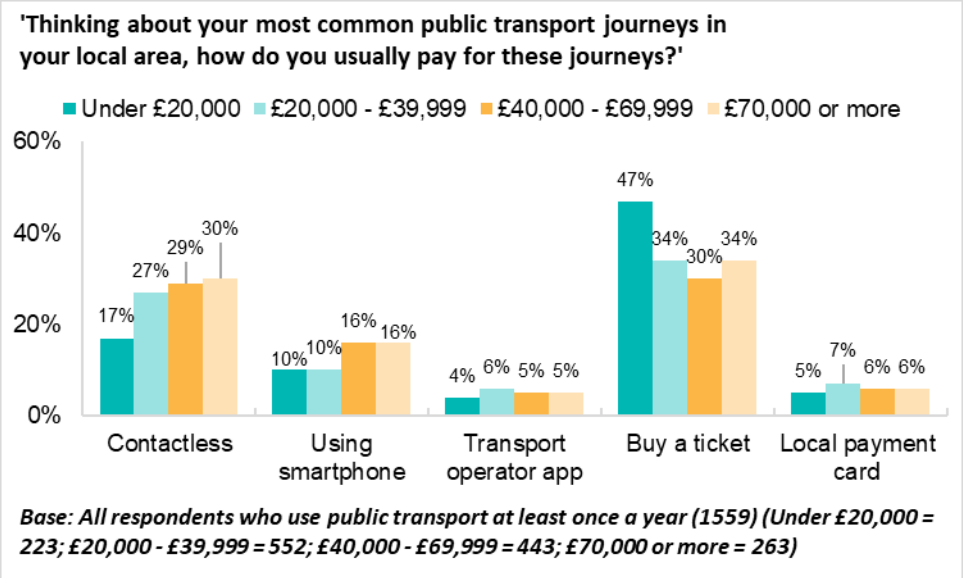
Respondents who used public transport at least once a year were asked how they usually paid for their most common public transport journeys. The three most commonly used methods were ‘using cash or card to buy a ticket’ (34%), ‘contactless credit or debit card payment instead of buying a ticket’ (26%) and ‘smartphone, for example with ApplePay or GooglePay’ (13%). For the 60 plus group ‘a concessionary travel card’ (25%) was the second most cited payment method, with ‘using cash or card to buy a ticket’ remaining the most cited and ‘contactless credit or debit card payment’ coming third.

Looking specifically at the most popular digital only options; paying with a contactless credit or debit card and using a smartphone, there were

considerable disparities according to age and income bracket. Those in the 18 to 39 (28%) and 40 to 59 (29%) age ranges were more likely to use a contactless payment card than those in the 60 plus category (19%). The 18 to 39 group (21%) were much more likely to use a smartphone than those aged 40 to 59 (8%), and the 60 plus group (3%).

Those with a lower household income (17%) were much less likely to use contactless payment card than those in the other income bands (27% lower middle, 29% upper middle and 30% upper income band). At the same time, they were much more likely to use cash or card to buy a ticket (47% compared to 34% lower middle, 30% upper middle and 34% upper income band) **[Figure 2.9].**

Figure 2.9 Paying for most common public transport journeys[t]



Implications for FTZ MaaS Projects

While digital travel and payment services were widely used, particularly in relation to route planning (where they clearly outcompeted non-digital methods for frequency of use among respondents), the survey findings illustrated that there are certain segments of society that may find MaaS inaccessible.

This is indicated, for example, in the comparably lower proportion of 60 plus people using online mapping tools such as Google maps, in addition to rail apps. This concern also related to low income households who appeared to mostly use non-digital payment methods.

However, it is promising that, of those who did not currently use an online or app-based journey planner of any kind, over two thirds (67%) said they would be fairly or very likely to use one in the future.

2.3 Views on MaaS

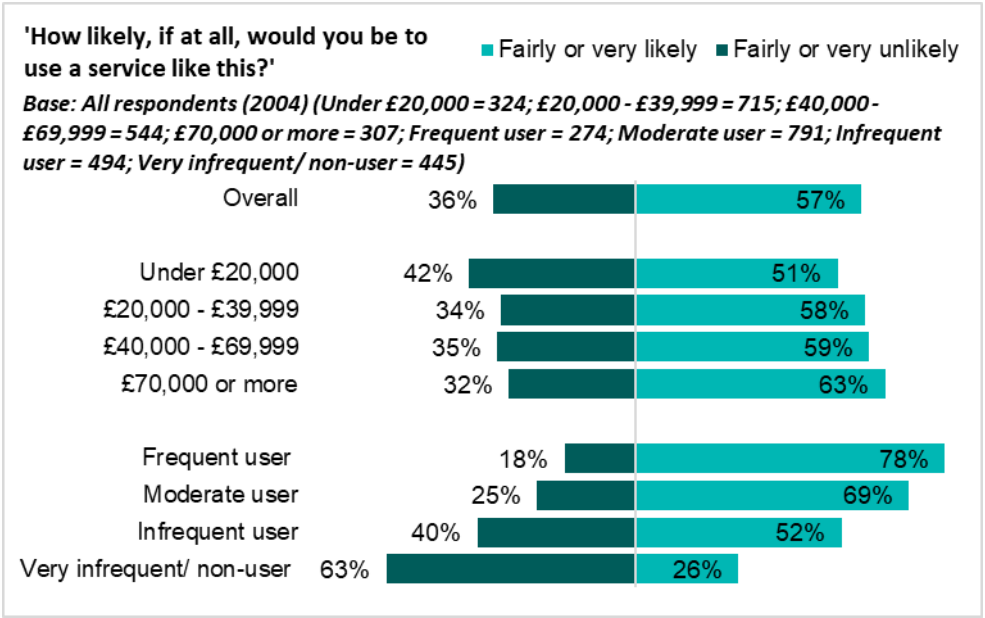
While respondents across the FTZ areas were generally highly receptive to MaaS, the findings demonstrated that it may be difficult to encourage uptake of the service by certain segments of the population. Given that MaaS is a concept that members of the public were unlikely to be familiar with, it was defined within the survey as 'a tool or app which enables you to plan, book and pay for a range of public and private transport options.'

2.3.1 Likelihood to use MaaS

Almost three fifths (57%) of respondents said they would be fairly or very likely to use MaaS,[u] with over a third (36%) saying they would be fairly or very unlikely to do so. Respondents with a lower income were less likely than those in the other income bands to respond positively (51%) **[**Figure 2.10 Likelihood to use MaaS by household income band and public transport usage**Figure 2.10].**

Over three quarters (78%) of frequent public transport users responded positively compared to just over a quarter (26%) of non-users **[Figure 2.10].** The proportion of respondents saying they would be likely to use the service was broadly consistent for both those with and without a car (56% and 58% respectively).

Figure 2.10 Likelihood to use MaaS by household income band and public transport usage



Of the respondents who said they would be fairly or very unlikely to use MaaS, 45% said nothing would make them more likely to use the service. However, others identified factors that may encourage them as follows:

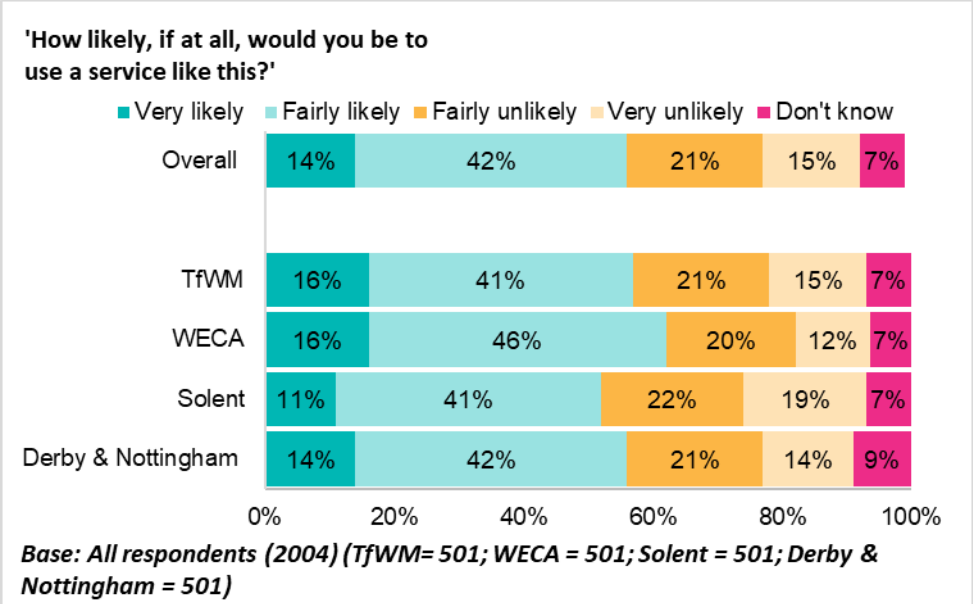
- Knowing they would always get the best price for their journey (29%);
- Knowing the tool or app was showing them all possible journey options (18%);

- If they trusted the tool or app would not favour one transport operator (16%); and,
- If they knew the tool or app wouldn't store their personal data (12%).

Likelihood to use MaaS by FTZ area

Figure 2.11 shows the likelihood to use MaaS by FTZ area which was broadly consistent across all areas.

Figure 2.11 Likelihood to use MaaS by FTZ area



Likelihood to use MaaS was also shaped by demographic factors and views on affordability of transport across the FTZ areas, as set out in

Table 2.4. Across all areas, those who thought public transport was affordable were more likely to be willing to use MaaS. Age was also relevant across all areas, with those aged 18 to 39 more likely than other age groups to be willing to use MaaS.

There were also some differences by whether residents live in urban or rural locations, with urban residents in WECA and Derby and Nottingham more likely to be willing to use MaaS than other residents within the respective area. In Solent rural residents were less likely to be willing to use MaaS than residents in urban or suburban areas. There were no significant differences in West Midlands.

Table 2.4 Those who reported being very or fairly likely to use MaaS by age, geography and views on affordability[v]

Variable	FTZ area	TfWM	WECA	Solent	Derby & Nottingham
	Base	501	501	501	501
Age	18 – 39	75%	78%	73%	75%
	40 - 59	49%	53%	49%	45%
	60 plus	38%	42%	32%	30%
Geography	Urban	62%	73%	60%	72%
	Suburban	57%	57%	54%	55%
	Rural	50%	54%	44%	45%
Affordability	Affordable	68%	71%	64%	70%
	Unaffordable	54%	55%	50%	43%

2.3.2 Perceived advantages and disadvantages of MaaS

Advantages of MaaS

When asked what the advantages of a service like MaaS might be, the greatest proportion of respondents said that 'it would make journey planning simpler' and 'it is more convenient' (28% for each), followed by 'would make travelling easier' (24%) and 'I would know the upfront journey costs' (23%). One in ten (10%) saw no advantages to the service. Those aged 60 plus were much more likely to see no advantages to the service (20%) than those in the 40 to 59 (9%) and 18 to 39 (4%) age categories. Those in rural areas were also much more likely to see no advantages (15%) than suburban (9%) or urban (8%) residents. The four most commonly cited advantages were consistent across the FTZ areas (see appendix B).

Disadvantages of MaaS

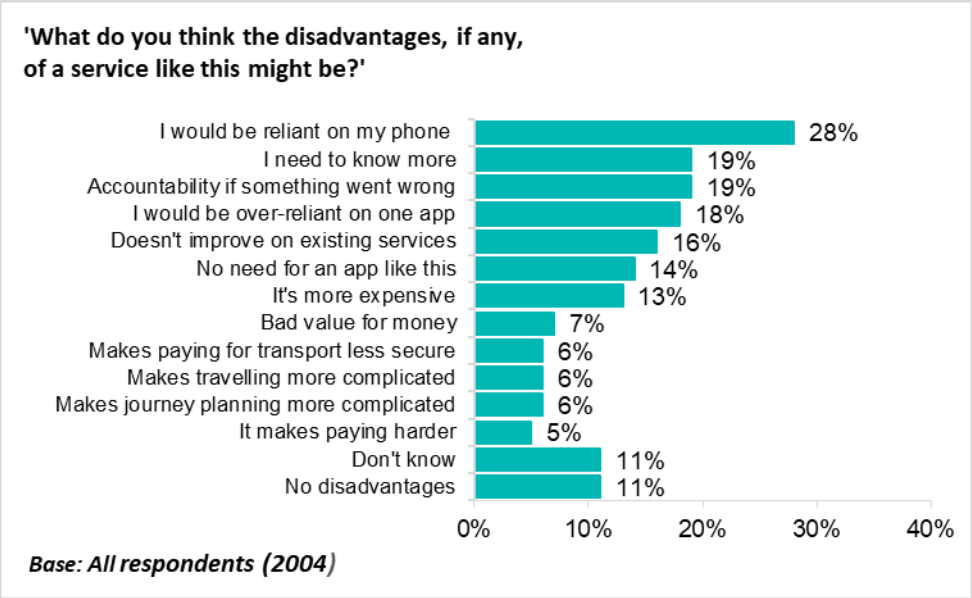
Respondents were also asked what they thought the disadvantages of MaaS might be. The greatest proportion of respondents (28%) selected 'I would be reliant on my phone (battery life, internet access etc)', this was followed by 'don't know who would be accountable if something went wrong' and 'I need to know more or not sure how it would work' (19% for each). 'I would be over-reliant on one app for everything' was the fourth most commonly selected response (18%). Just over 1 in 10 (11%) said that there were no disadvantages **[Figure 2.12].** Those who said they would be unlikely to use MaaS also highlighted over reliance on their phone (23%), over reliance on one app (15%) and lack of accountability (15%) as top disadvantages, but added to this:

- They had no need for an app like that (28%); and
- It wouldn't improve on existing services (19%).

Those aged 60 plus also identified 'I have no need for an app like this' as a top disadvantage (21% compared to 14% of 40 to 59s and 10% of 18 to 39s). Those in the lowest household income category were most likely to cite 'I don't

have a smartphone' as a disadvantage with almost one in ten doing so (9%). This compared to 3% of those with an income of £70,000 or more. Those in rural locations were more likely to cite 'doesn't improve on existing services' (17%) than 'I would be over-reliant on one app for everything' as a most common disadvantage.

Figure 2.12 Perceived disadvantages of MaaS



As with the advantages, highlighted disadvantages in each of the FTZ areas broadly mirrored those of the overall sample, however, in Derby and Nottingham 'doesn't improve on existing services' ranked equally with 'I would be over-reliant on one app for everything' (16% for each) as a top disadvantage. This finding may reflect the comparably high level of satisfaction with local public transport services in Derby and Nottingham noted earlier in the report. TfWM also had a number of additional disadvantages ranked equally with the top four, with 'it's more expensive' and 'doesn't improve on existing services' attracting the same proportion as 'don't know who would be accountable if something went wrong' (15% for each – see appendix B for more details).

Implications for MaaS

While it appears that the target population may be quite receptive overall to the idea of MaaS (with 57% saying they would be likely or very likely to use it), it may be challenging to encourage use of the service by those who are not initially open to it (36%). A considerable proportion (45%) of those who said they would be unlikely to use MaaS also reported that nothing would make them more likely to use it.

The most commonly identified disadvantages to MaaS amongst this group may be difficult to address; namely, 'I have no need for an app like this' and 'I would be reliant on my phone (battery life, internet access)'. However, other disadvantages identified, such as needing more information, not being clear on accountability and not improving on existing services, could be addressed with targeted and clear marketing campaigns.

The survey findings also highlighted an additional accessibility issue for low income households, with almost one in ten identifying lack of smartphone access as a disadvantage.

2.4 Awareness of other sustainable transport modes

While awareness of rental e-scooters and public bikeshare schemes was fairly widespread, the findings indicated a role for MaaS in increasing awareness of other sustainable transport options.

Respondents were asked which of a number of sustainable transport modes they had heard of and, if so, how likely they would be to use it. Almost two thirds (64%) had heard of rental e-scooters. Of these, a fifth (23%) said they would be very or fairly likely to use it, while three quarters (74%) said they would be fairly or very unlikely to use. Awareness of e-scooters increase with age. Those aged 60 plus were more likely to have heard of them (74%) than those in the middle age bracket (65%) who were also more likely to have heard of them than those aged 18 to 39 (58%). This was despite the fact that the younger age group (18 – 39) were more likely to have used an e-scooter in the last 12 months. The number of respondents who reported having used an e-scooter in the last 12 months was small across the sample (117), so subgroup analysis should be treated with caution. More details on willingness to use by FTZ area is provided in Appendix B.

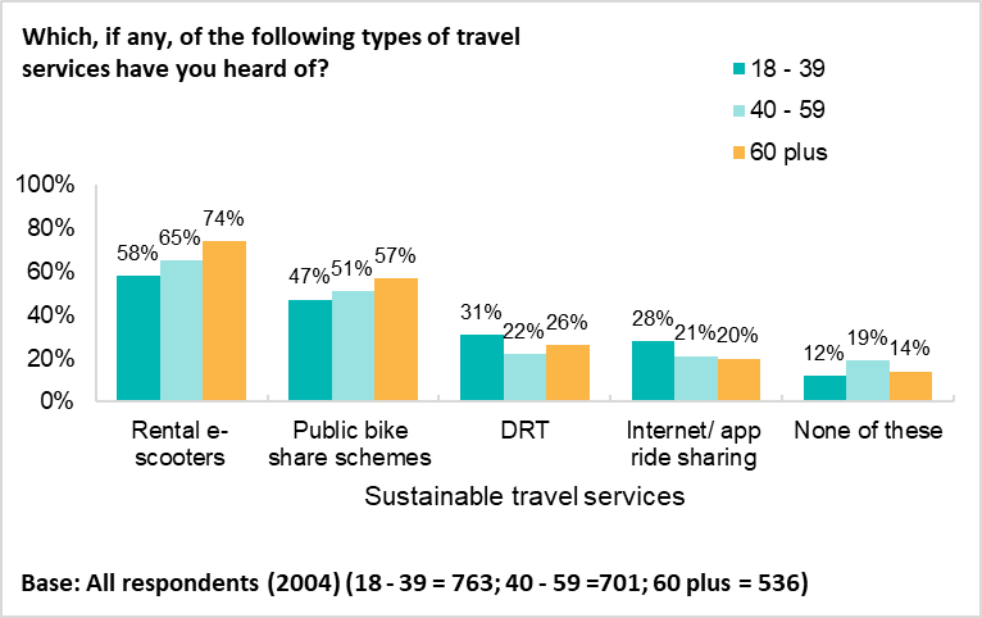
Just over half (51%) had heard of public bike share schemes and just over a quarter (27%) of these said they would be fairly or very likely to use the service, while 70% were fairly or very unlikely to use. Similarly to e-scooters, those in the oldest age category were more likely to have heard of public bike share schemes (57%) than those in the other age categories (51% of 40 to 59 year-olds and 47% of 18 to 39 year-olds).

Only 27% were aware of Demand Responsive Transport (DRT) services[w], but around half (46%) of these said they would be fairly or very likely to use it. A further 49% said they would be fairly or very unlikely to use it. A quarter (24%) had heard of internet-arranged or app-based ride sharing. Of these, 38% said they would be fairly or very likely to use this service, while 59% would be fairly or very unlikely to use it. In contrast to the other services, the youngest group were more likely to have heard of both DRT and ride-sharing (31% and 28% respectively) than the 40 to 59 (22% and 21%) and 60 plus (26% and 20%) age categories **[**

Figure 2.13].

Fifteen percent had not heard of any of the services listed.

Figure 2.13 Awareness of sustainable transport modes by age



Implications for FTZ MaaS projects

While awareness of rental e-scooters and public bike share schemes was quite high, the proportion saying they would be fairly or very likely to use each of these services was considerably lower. A number of factors could be driving this unwillingness, including a lack of availability of such services. It is also possible that as these services become more mainstream willingness to use them may increase. Findings earlier in the chapter indicated considerable willingness within the respondent population to reduce car travel in order to improve air quality, which suggests that, given the correct messaging and adequate accessibility of these services, usage would be likely to increase.

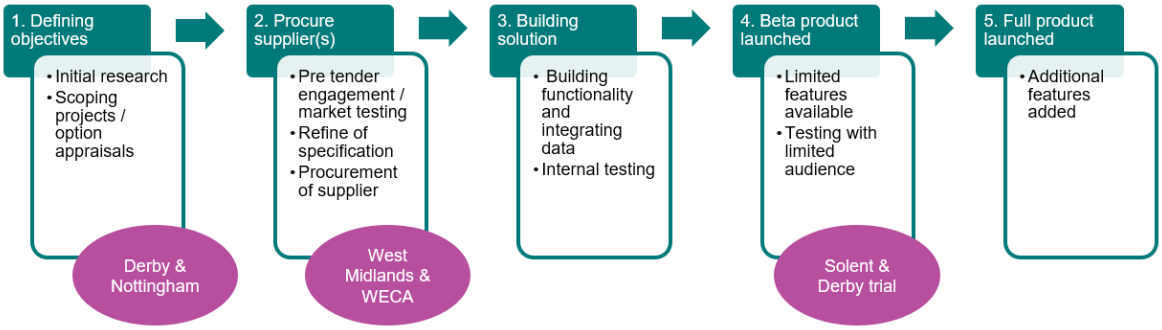
Awareness of DRT services was lower, but there was a clear interest from those who had heard of the service in using it, with almost half saying they would do so. This may indicate that DRT is considered to better meet peoples' requirements for transportation than other sustainable travel modes and suggests that MaaS schemes should carefully consider incorporation of those modes which are likely to have most cross-demographic appeal. Low levels of awareness more generally suggest that there are opportunities for awareness of new modes to be raised through integration in any MaaS solution.

3 Design and Set Up of MaaS

This chapter explores the process that areas are undertaking to design and roll out MaaS solutions in their areas. It also explores, where possible, factors that have impacted on areas' decisions as well as learning from the process to date.

The FTZ areas are broadly following the same five key steps in developing their MaaS solutions as summarised in Figure 3.1. These steps may not all occur exactly sequentially, they can overlap or involve multiple product testing iterations. At the time of the research in November 2021, the FTZ areas were at different stages in this process. Solent, who were furthest ahead, were moving into step four with a Beta product due for imminent launch in early 2022. TfWM and WECA were both in the second stage, in the process of procuring suppliers. Derby and Nottingham were simultaneously at two stages; working on defining the objectives for their main MaaS solution, as well as running a restricted trial (stage four) in Derby.

Figure 3.1 High level overview of process of developing a MaaS solution



3.1 Planning and set up

To date, there have only been a few limited trials of MaaS in the UK and there has not yet been a successful, long-lasting MaaS solution launched[x]. As a new innovation and a core component of all FTZ programmes, areas have spent considerable time on the scoping, planning and set up of their projects.

As set out in chapter 1, all areas have shared common objectives for their MaaS projects. Key objectives are to facilitate seamless, multi-modal travel across public and private provision by making journey-planning, booking and payment easier. This is part of a wider aim of shifting travel behaviour from private car to sustainable travel modes. Beyond this, areas have slightly different focuses. For example, some, such as WECA, are particularly keen to emphasise the importance of environmental impacts. Others, such as Nottingham, are particularly keen to make travel easier for specific groups such as those on a low income. These objectives shape area approaches to designing MaaS solutions.

3.1.1 Scoping

Three different sources of information informed scoping across the Zones: 1) external expertise; 2) previous trials or experience from other places; and 3) commissioned research. We discuss each one in turn below.

External expertise

WECA, Solent and TfWM sought external expertise from consultants or research partners to help them with scoping and set up work for their MaaS projects.

WECA have been working with three transport consultancies, WSP, Atkins and AECOM, throughout their FTZ programme. These organisations had not only provided their own expertise, but had engaged wider networks, including:

- The former Head of Customer at Transport for London;
- Stakeholders at KPMG who worked on MaaS projects elsewhere; and,
- A transport behavioural scientist.

This scoping work focused on how to put the customer at the heart of the design of the MaaS solution and led to WECA conducting a segmentation of customers that had helped understand behaviours and pain points of different groups.

> *"That was a really big learning experience around, just focus on the customer, that we were being pushed at times by different stakeholders to just move forward with, define the solution, but we were trying to stay in that ideation phase of what are the problems we're trying to address." (WECA)*

Solent worked with their research partners, University of Southampton and University of Portsmouth, and two consultants who advised on the technical elements to inform the procurement process and provided specific insights into operational challenges that could be associated with specific modes.

TfWM also sought external expertise in the development of specific elements of their MaaS project. For example, KPMG reviewed market readiness in the West Midlands region and examined the proposed commercial model for the MaaS solution.

Previous trials or experience from other regions with MaaS

FTZ areas also drew learning from previous UK and international trials to inform the scoping of their MaaS projects.

Stakeholders in both WECA and West Midlands drew learning from the Whim MaaS trial in Birmingham. The West Midlands Whim app was the first of its kind in the UK when it launched in 2018. The MaaS solution, operated by MaaS Global – provided an app that integrated the main transport modes: taxis, public transport and car hire[y]. Initially both mobility subscriptions and Pay-as-you-Go payment services were available. However, subscription options proved

unpopular with customers and were phased out. The trial was commercial, with TfWM playing a supportive convening role in bringing the MaaS provider and transport operators together. The trial highlighted the following challenges and successes set out in Table 3.1.

Table 3.1 Successes and challenge of the Whim trial from TfWM's perspective

Successes	Challenges
• People who used the MaaS app liked it • Some reported behaviour change as users started to use their cars less although this was on a small scale	• It was difficult to integrate all the different mobility providers, although this was eventually achieved • It did not have the customer reach needed to achieve significant change in transport use (TfWM could not invest to market it as a commercial trial) • TfWM did not have access to the trial's granular data

The fact that this purely commercial venture failed to achieve wider scale behaviour change and transformation of transport usage, led TfWM to conclude that there was a role for the public sector in acting as a neutral platform provider for any future MaaS solution. This, it was hoped, would enable engagement from the full range of transport operators and mobility service providers and allow the MaaS solution to be provided in line with policy priorities.

Beyond learning from the Whim trial, FTZ areas also sought learning from other regions.

- **International learning**: West Midlands consulted a MaaS provider in Berlin, while WECA consulted with WSP in Norway who had previously run a MaaS scheme in Oslo.
- **Wider learning with UK Local Authorities**: Derby and Nottingham, and West Midlands regularly engage and share learning with a UK-wide network of local authorities who are developing MaaS, known as MaaSterminds. While stakeholders in WECA consulted with the Highlands and Island Transport Partnership (HITRANS), who are running a MaaS scheme in the highlands of Scotland.
- **Cross FTZ learning**: Solent's approach to MaaS emphasised spending less time in the initial scoping phase and instead rapidly moving to procurement, with an earlier launch in order to learn through the trial. The emerging learning had been beneficial to the other Zones, in particular, to WECA and TfWM in order to inform the development of their specification.

In spite of this active engagement, some stakeholders felt more could be done to share learning about MaaS between local authorities as well as with a wider network beyond project managers.

Commissioned research

Derby and Nottingham took a slightly different approach and commissioned a full options appraisal from SYSTRA to scope out their MaaS project. A key question that remains for Derby and Nottingham is whether and how the MaaS solution will be integrated across both cities - a distinct challenge not faced by the other areas. While there was an aspiration in the original FTZ bid to have a single system, practicalities like transport infrastructure and differences in the degree and spread of urban build-up make it difficult. The options appraisal will inform this decision, by considering options for both separate and integrated MaaS solutions.

As part of the options appraisal, SYSTRA conducted research with customers, suppliers and public transport operators in both cities and at the time of this research were working on producing two city specific reports and a wider report that looks across both areas[z].The options appraisal will inform the procurement process by suggesting what the minimum opening MaaS offer should be and recommending functionality that should be added in a final product. Derby and Nottingham were also conducting soft market testing with suppliers, to understand what services they could offer and how they may split the offer between the two cities. Nottingham City Council is leading this process and the responses will feed into SYSTRA's final report.

Derby Go – Restricted MaaS trial

Alongside the options appraisal, at the time of the research Derby and Nottingham were running a small scale restricted MaaS trial with Derby University and Derby College staff and students. This opportunity came about through an existing non-exclusive partnership with Toyota to share learnings around future mobility. Practical learning from this trial is expected to feed into the wider research for the full scheme.

The app was launched in September 2021 and was built on an existing product tailored to Derby. At the time of the research, the app contained information about timetables and routes for different bus services across the city – including the UniBus service, a key provision for the student population, but no reservation or payment functionality, nor live bus locations. Access to parking was being integrated through an existing pay-by-phone parking app. There were plans to integrate e-scooters and taxis and to add live maps for active travel. However, it had proved challenging to integrate data from different operators due to pre-existing commercial agreements. The app also provides detailed information about accessibility facilities, for example where ramps and disabled toilets are available and detail about those facilities (such as size of facilities, how doors open etc.).

The trial is being run for eighteen months, taking a ‘live lab’ approach, in which new features will be tested with users. It will also provide the opportunity to test the features identified by SYSTRA to see which prove popular. The aim at the time of the interviews, was to incorporate new modes to the app throughout early 2022.

3.2 Design of MaaS solutions

MaaS can take many different forms and there is no single, agreed-upon definition of the minimum number of features or functionality needed to be defined as a MaaS solution. In addition, the number of modes available in any MaaS app or interface is likely to be influenced by a number of logistical considerations. As a result, although all areas are delivering a MaaS solution, there are considerable variations, with implications for uptake and usability. Design considerations have been driven by 1) the existing transport and technology infrastructure that is available in each area (discussed more in chapter 4); 2) areas' aspirations for MaaS functionality; and 3) practical considerations of what is possible in relation to the local transport marketplace.

3.2.1 Features and functionality

All areas have aspirations for a MaaS solution that offers 'seamless', integrated travel across a range of modes. Thus, at a minimum, the customer should be able to plan, book and pay for multi-modal journeys using the MaaS solution.

One of the first key decisions for areas, is whether to opt for an existing 'white label'[aa] or bespoke solution. For areas that have not yet commissioned their MaaS solution supplier, this decision is likely to be driven by which supplier is selected and existing infrastructure. Market engagement in WECA had pointed towards a white-labelled solution that is then built upon and tailored. This is likely to offer benefits in terms of speed, with much of the underlying technological infrastructure already in place. Solent were also building upon an existing white-labelled product. For the Derby Go trial, an existing product is providing the 'backbone' in terms of underlying coding, but this is being tailored to make it more bespoke for Derby.

MaaS solutions will evolve over time with a limited number of features available in Beta versions. Increased functionality will be added before full public launch and as the product evolves. Both WECA and West Midlands had approached procurement by specifying features they would like included in a first, second and third iteration of the product plus including a list of additional features that are desirable. Below we discuss some of the key categories of features.

Travel planning

Multi-modal journey planning that includes all mobility services, including active travel, is a key feature of all areas' solutions. This was expected to be relatively straightforward to deliver. Areas also expected the solution to provide customers with real time information about the status of their journey such as delays to scheduled services or information about how busy services are. Reservations of trips (or components of trips) were also mentioned by a number of stakeholders, but were expected to be more important for some modes than others.

Customer service and personalisation

As highlighted in section 3.1.1, areas have put the customer at the heart of their design considerations, aiming to build MaaS solutions that are intuitive, easy-to-use and meet key customers' needs. The interface of the solutions is a key element. While all solutions will involve an app, several areas were, at the time of the research, also planning to have a web interface to enable the technology to be used by those with limited digital access. Customer support services were considered another key element, with WECA considering whether to draw on existing customer support provided through TravelWest (their local journey planning service) or a new service. FTZs expect personalisation to distinguish MaaS from existing journey planning apps. Features highlighted by stakeholders included:

- Providing information on accessibility features (such as in Derby Go described above);
- Displaying information about the carbon impact of each journey;
- Offering different journey options based on personal preferences or demographic information (such as offering larger taxis to families).

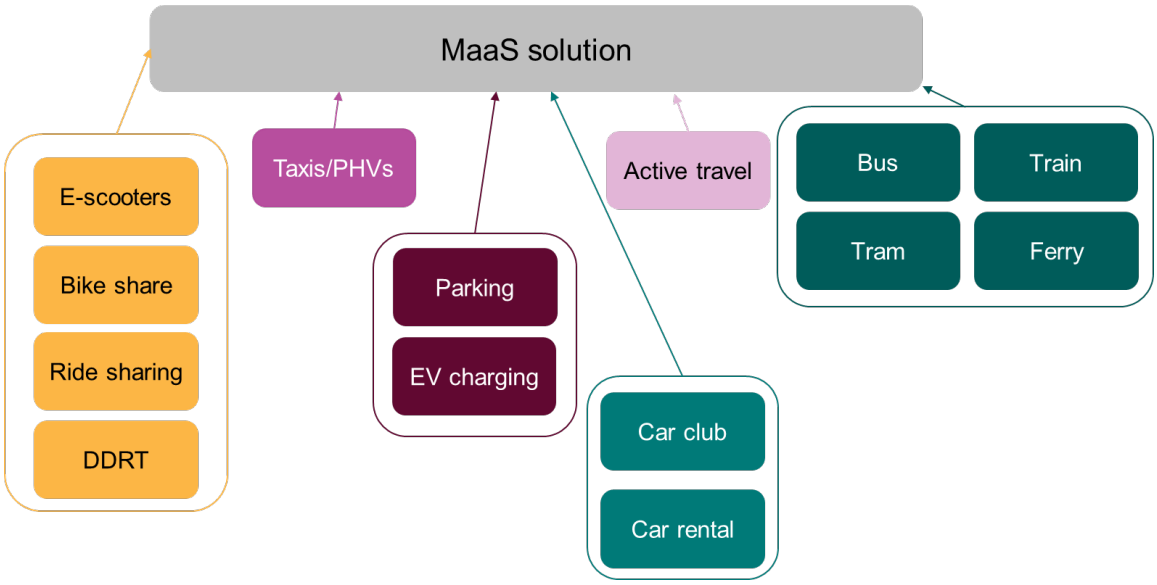
Payment and ticketing features

Much of the ability to offer different ticketing options depends on engagement and agreement with transport operators. All areas were expecting to start with a minimum offer of Pay-as-You-Go, but hoped to build to include multi-operator tickets and fare capping. Most stakeholders were sceptical about the possibility of offering mobility subscriptions, but some said they were hoping to offer a value ticket only available through the MaaS solution. Several areas discussed the possibility of offering different incentives, such as mobility credits, or discounts on certain services to try to influence behaviours of targeted groups. Some areas also had an aspiration to display information about the cost of private car travel relative to other journeys.

Modes available

The modes that will be available within the MaaS solution will vary by area, depending on the transport services available and the agreements that can be negotiated. Figure 3.2 sets out the different modes and mobility services that could be included as part of a MaaS solution. At a minimum, all areas said they plan to include all forms of public transport (bus, train, tram and ferry where applicable); route planning for active travel (walking and use of private bicycle); and new mobility services in the area (e-scooters, bike share, DDRT). Most areas also plan to include taxis and Private Hire Vehicles (PHVs) and car clubs and car rentals. Some areas would also like to build in payment for parking (for Park and Rides or other council managed carparks), low-emission zone charges and electric vehicle (EV) charging.

Figure 3.2 Potential modes to incorporate in a MaaS solution



3.2.2 Commercial viability

While design decisions were driven by scoping work on customer needs, FTZ areas said they are also considering the longer-term commercial viability of the MaaS solutions. A number of stakeholders observed that MaaS had not yet shown itself to be commercially viable in the UK context. Commercial viability relies on ensuring an ongoing revenue to support the maintenance of the app as well as ensuring that commercial transactions driven through the app are at a level that transport operators and mobility providers are happy with, so that they do not withdraw their services from the app. Getting the design right will be important to meet customer need, drive uptake and also ensure that transport operators are incentivised to engage with the MaaS solution.

A key issue raised by stakeholders from all areas was the commercial implications of the MaaS solution, including the following questions:

- Who owns the customer relationship?
- Who owns the intellectual property?
- Who decides on the price points and structures of tickets?

Areas emphasised that operators stood to gain if MaaS led to a growth in the market. However, they acknowledged that public transport operators were wary, due to concerns about losing market share to new mobility service providers.

Areas reported approaching this question in different ways. Stakeholders in Solent discussed different revenue generating options, including a commission model – where a small percentage commission is paid by operators on each ticket sold; a booking fee model – where a charge is put on customers; and generating revenue through advertising or a public subsidy through local authorities. However, bus operators had been reluctant to engage in a discussion about a commission, highlighting constraints faced as a result of the drop in usage caused by COVID-19. Stakeholders acknowledged that modelling

revenue and costs of MaaS was difficult given the number of unknowns in terms of uptake and usage of the app. It was also difficult to predict how fast transport usage would recover following the pandemic. As a result, Solent said that they are planning to run the trial without commissions using FTZ funding to subsidise the scheme, with a view to building an approach to the commercial model at a later stage once the app has proved successful.

West Midlands, who have already had a commercial trial in the region, reported seeking to address the commercial model upfront, with the view that the MaaS solution will become a permanent service for the area. Stakeholders from TfWM believed the previous commercial trial had demonstrated the need for TfWM to act as a neutral platform provider to reassure the public that they are not being encouraged to use certain services by specific operators. The trial also enabled TfWM to further develop the business case for the FTZ project.

While the build and development of the MaaS solution is being funded by FTZ investment, TfWM have built a commercial model in collaboration with their major local transport operators that involved operators paying a small commission on all transactions to pay for operational costs. A commission at this level will be similar to the existing commission charged on transactions for TfWM's Swift system, through which operators are already retailing their commercial transactions. Part of the commercial agreements that TfWM reported working on with its local operators include options to close down existing service specific apps to improve adoption of the centralised MaaS app. Modelling of the number of active users of these rival apps and the fact that TfWM is expected to bring around 750,000 Swift customers to the MaaS solution was an attractive incentive for the transport operators to engage with the project.

3.3 Key stakeholder engagement

Delivering MaaS solutions involves engaging with a range of internal and external stakeholders. This section looks at the types of stakeholders and areas' experiences and challenges of engaging and working with them.

3.3.1 Internal stakeholders

MaaS projects involve a large number of internal transport related stakeholders and internal support teams such as environmental health teams.

- **Core project team**: All FTZ areas reported having a core MaaS project team or working group which focused on delivering MaaS. Team sizes vary and some include consultants.
- **Wider transport teams**: These include public transport operations teams, who work with transport operators to deliver local services and are responsible for negotiating the local Bus Service Improvement Plans (BSIPs). They also include teams from key areas such as parking, ticketing and highways and infrastructure.

- **Internal support teams**: MaaS projects also rely on several internal corporate functions. These include: finance; legal; digital and IT; data protection and procurement teams.

Issues encountered when working with internal stakeholders

Core MaaS project teams encountered a range of challenges when working alongside internal stakeholders, namely time-pressures and lack of capacity, gaining buy-in to the MaaS project and governance-related issues.

- **Time pressures and capacity** issues were cited as a key challenge to working with internal stakeholders. For example, project officers in Nottingham found it difficult to engage with the parking team due to that team's lack of capacity. It was also challenging to engage core corporate teams, such as legal and procurement departments, as there was limited staff resource available, an issue exacerbated by the response to COVID-19. In Solent, a lack of resource available from legal teams delayed contractual agreements with the MaaS supplier. As noted in the Implementation case study, areas have sought to mitigate this by 1) booking resource from other internal teams, such as legal and procurement, based on project plans; and 2) allocating some FTZ funding to other internal roles to ensure resource is available when needed.
- Areas highlighted the importance of **ensuring stakeholder buy-in to MaaS**, as MaaS involves quite a radical shift in approach to transport delivery. Some areas found it challenging to get all internal stakeholders on board with different ways of doing things. The core TfWM MaaS team described the MaaS project as consisting of a substantial business transformation element as it involved significant changes to the work of a number of internal teams.

  "I think in terms of the MaaS delivery, […] the biggest challenge really has been so far getting alignment […] internally, [that] this is the right thing to do, and actually garnering the appetite to really go after this wholeheartedly and accept that you're going to have to do things potentially differently, but the gains are also significant." (TfWM)
- WECA raised **governance-related issues**, such as knowing who is accountable and who needs to approve activities. Stakeholders felt this related to the fact that WECA is a relatively new organisation with a less developed governance structure than other authorities. However, being a small organisation with governance structures still embedding was felt to have fostered agility.

  "If you've got something that needs quick discussion, you can drop it in. That's really helped, that we've been able to table things at management meetings at quite short notice because they're a smaller, more agile organisation." (WECA)

3.3.2 External stakeholders

The external stakeholders that MaaS areas worked with include constituent local authorities of combined authorities, technology suppliers involved in delivering the MaaS solution, public transport suppliers and the general public.

- **Local authorities and other local political stakeholders**. Keeping local councillors abreast of how MaaS could benefit constituents, helped achieved political level buy-in. FTZ areas were also working with constituent local authorities on issues such as integrating parking into the MaaS solution.
- **Technology suppliers delivering MaaS solutions**. Ares flagged that technology suppliers are fundamental to the delivery of MaaS solutions and hence are key external stakeholders. However, as most areas are still in the early stage of working with suppliers, there was limited evidence available at the time the research on working practices.
- **Transport providers**. MaaS involves integrating a range of transport options which requires detailed engagement with transport providers. Areas generally categorised these into Public Transport Operators (PTOs) - traditional transport operators such as buses, trains, ferries, coach companies and trams - and Mobility Service Providers (MSP) offering new modes such as e-scooters, car-clubs and bikeshare. In addition, areas were engaging with the taxi/PHV sector to explore how they could also be brought into the MaaS solution.
- **General public**. To varying degrees, areas reported engaging with potential customers (as described in the section 3.1.1) and key interest groups, such as those who travel on concessionary schemes. Several areas said they were also planning to use panels of customers drawn from the general public in consultation exercises to inform ongoing development of the MaaS solution.

Engaging with external stakeholders

A number of challenges were raised when engaging with specific external stakeholders, which are explored below.

Local authorities

Areas described a range of issues with engaging local authorities. These related to attention being diverted by the pandemic, delays and slow decision-making, and difficulties communicating the value and purpose of certain requests to local authority officers. There had therefore been a concerted effort in some of the areas to improve this by increasing communication and initiating briefings.

Transport providers

Public transport operators

FTZ areas reported engaging public transport operators through existing established channels as well through newly created groups specifically for MaaS. Local bus operators were seen as key as, across the FTZ areas they

provide the largest volume of public transport journeys. However, areas said that they are also engaging with train, ferry and tram operators, as relevant. Stakeholders emphasised the importance of involving traditional providers, such as major local bus operators, from the outset. For example, on the project board, as the success of MaaS depended on getting the right commercial agreements in place with public transport operators. At the time of the research, areas had had varying degrees of success in engaging with operators specifically about MaaS.

Stakeholders in Solent noted that some bus operators were reticent about MaaS due to concerns about losing market share to new services. These concerns were amplified by the reduction in public transport use seen as a result of the COVID-19 pandemic.

> *"In general, they do see this as positive but they are slightly hesitant. Again, relating to COVID, they are coming out of this now and trying to recover. They do see it as a way forward but for some of them it is not at the top of their priority list." (Solent)*

TfWM reported very good engagement with public transport operators, built on existing strong relationships. An existing multi-modal, multi-ticketing working group had been complemented by a MaaS specific working group, which had senior level engagement from operators. TfWM noted that when engaging with bus operators, it has been important to involve both local level stakeholders from the subsidiary company as well as stakeholders from the national group level business. Many bus services are run by major bus operator groups, such as First Bus, with local subsidiaries. This required extra time and consideration to ensure everyone was on board as plans developed.

Other areas reported less detailed engagement with public transport operators about MaaS but described making use of existing forums and engagement activities. For example, Derby has an active voluntary partnership[bb] with local bus operators that has been working on multi-operator ticketing and better information, both of which directly relate to the development of MaaS solutions. Other areas were seeking to use the wider engagement and work being done between local authorities and bus operators on the Bus Service Improvement Plans (BSIPs) as an opportunity to encourage involvement with MaaS. In WECA, this engagement was still in the early stages, but the project delivery team planned to produce a model of potential demand for MaaS, showing operators what demand could be and what it would mean for them in order to mitigate concerns about loss of market share.

Mobility Service Providers (MSPs)

Levels of engagement with Mobility Service Providers[cc] has also differed between areas. While engagement had generally proved positive, some stakeholders felt that providers are cautious about joining a MaaS platform because the economics underpinning their market model is fragile. Again, stakeholder reported concerns about market share levels and questions about whether providers would be better off maintaining their own app.

Across the areas, a common theme was the challenge of engaging with the taxi and Private Hire Vehicle (PHV) sector. The fact that most taxi drivers are self-employed and a lack of a collective body representing hackney carriages (taxis that are licensed to play for hire and that can be hailed as well as booked) in the FTZ areas poses a challenge to engagement. Authorities were wary of being seen to promote certain sections of the market by going through specific aggregators, such as Ola or Gett (these companies offer app based bookable private hire vehicles in a similar service to Uber). In addition, stakeholders reported that companies such as Uber and Ola were also wary of integrating with MaaS as they want to maintain their own digital ecosystem with control over their customer engagement.

3.4 Implementation

This section explores how MaaS solutions have been implemented to date. As most schemes were not yet live at the time of the research, it also includes discussion of the procurement process in areas that had started that process.

3.4.1 Budget and spend

As most areas had not commissioned MaaS solution providers at the time of the research, the bulk of the intervention spending is still to come. Given this is a new service, areas had set their budgets based on market testing and in consultation with other areas to get a sense of costs, but as most areas had not yet contracted a MaaS solution supplier, discussion of spend to budget was limited.

Solent, who were the only area who had competitively commissioned a supplier at the time of the research, reported that their spend had been in line with expectations, apart from a few minor costs that were not foreseen, such as the license needed to develop apps through Apple. Stakeholders acknowledged that at the time of the research, they had not yet done end value calculations on spending versus progress but hoped to do a rough overview going forward.

3.4.2 Procurement

Setting up the procurement process and thinking through the details of the specification so that it delivers a solution that is fit for purpose is a key element of implementing this scheme. The stages of the process and challenges encountered are outlined below.

Pre-tender engagement

As this is a new product, many areas reported engaging the market early in order to understand costs and capabilities of suppliers, and to inform the design of their specification. Areas had been careful to conduct these activities in line with rules around procurement.

For Solent, developing a pre-invite to tender to explore appetite to develop a MaaS app proved to be useful in establishing what suppliers could and could

not do in terms of functionality. Solent had initially planned to offer a simpler app which would have primarily offered journey planning with signposting to other transport apps to book tickets through. However, through the pre-tendering process they realised that some suppliers could provide the function to book tickets via the app and so expanded the functionality that they were seeking in their specification. This pre-procurement process also clarified a view that potential bidders would need to form a consortium to deliver what Solent needed.

WECA also engaged the market with summary information of what they were seeking. They offered suppliers the opportunity to have one-to-one question sessions. WECA also sought to encourage consortium tenders among suppliers, facilitating an exchange of contact details of those who are bidding. This preliminary engagement proved helpful in further developing their specification.

Commissioning a supplier / consortium

Once the specification has been agreed, the process to secure the supplier begins. At the time of this research in November 2021, only Solent had reached this stage. Solent's process of assessing bids proved smooth. Stakeholders explained that their selected consortium offered a high-quality bid involving an ambitious project and a professional-looking solution. The consortium also involved an incumbent technology supplier which had strengthened the bid since it would facilitate integration of the technology.

Key challenges around getting the contract in place arose after Solent's selection of the supplier. This was in part, because the main contractor had not previously worked in the UK instead the supplier had primarily worked in European countries such as Germany to date. Thus, was unfamiliar with the legal system. There were 12 iterations before the contract was agreed, which required lots of time from the local authority's legal team. The contractual issues, however, did not cause a delay to project delivery, as the suppliers began working at their own risk, without a contract in place. This, alongside the flexibility of the authority's procurement team in the approaches taken to procurement, was felt to have helped ensure the project stayed on track.

Key learning on procurement

Getting the specification right. Areas had spent time developing the specification for their MaaS solution but commented that there was a need to find a balance between over prescribing during the procurement process and remaining flexible. They also felt it was important to work with the supplier and transport operators to agree terms and conditions that work for all parties.

Securing internal resource*.* Ensuring that the internal resource from procurement and legal teams was in place was critical to keep the project moving along. Areas sought to provide timescales to internal teams, and to have regular conversations to ensure advanced familiarity with the project requirements.

Data sharing and data protection. In some areas, Data Protection Impact Assessments delayed the process of bringing suppliers on board. Stakeholders in Solent commented on the large number of data sharing agreements that were needed. Getting these in place as early as possible was viewed as important for avoiding delays.

4 Data Infrastructure

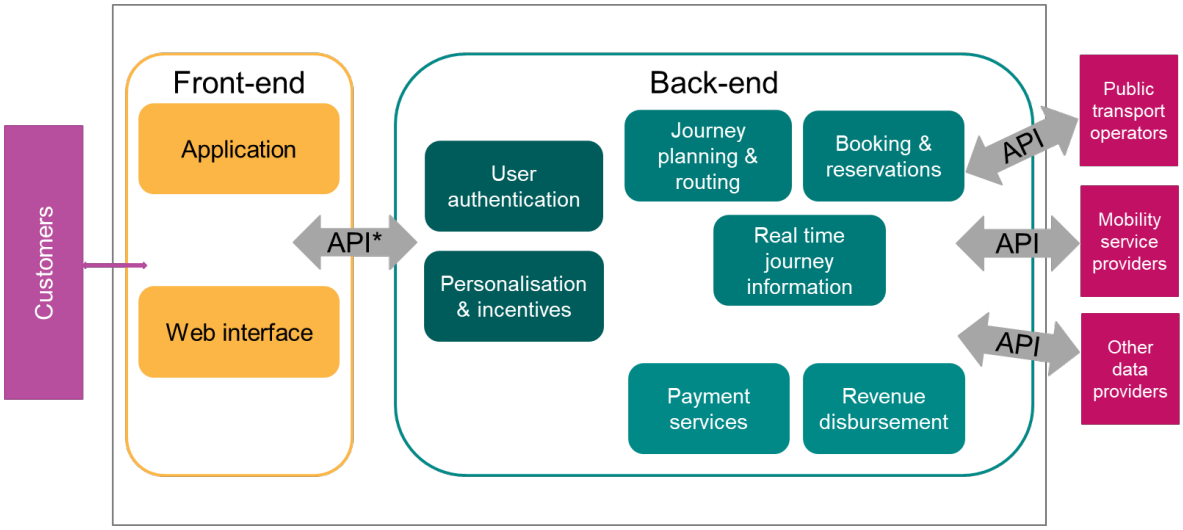
This chapter explores the extent to which areas are using existing technological infrastructure to deliver their MaaS solutions and the opportunities and constraints of doing so.

4.1 Building MaaS solutions

As set out in chapter 1, there is no single, agreed upon definition for what MaaS is. However, in its most ambitious format, it is a complex technological product that offers multiple functionalities. This functionality depends on the availability of different technology and data. Importantly, the functionality available, and how well it works, is likely to be a key factor in achieving public uptake and delivering a transformative transport solution.

Figure 4.1 presents a schematic overview of what a typical FTZ MaaS solution may look like. The back-end of the solution requires, at a minimum, functionality to enable: journey planning, booking and paying for multi-modal and multi-operator journeys, routing functions, reservation services, and a revenue disbursement engine. In most conceptualisations, providing customers with real-time information about journeys (such as delays or disruptions) is also considered core functionality. MaaS should also offer some form of personalisation, which may include incentives. Its functionality will also need to authenticate users for certain services (for example, e-scooter rental requires users to provide a driving licence). At the front-end, all solutions primarily envisage a mobile phone application but many FTZ areas considered a web browser interface to be desirable.

Figure 4.1 Schematic overview of a MaaS solution[dd]



*An API (application programming interface) is a software intermediary which allows two programmes to exchange data

For each FTZ area, designing and commissioning their MaaS solution depends on 1) the degree to which the back-end functions are already in place and 2)

what constraints (such as the availability of data) may affect the building of specific functions. As a result, areas may be commissioning MaaS providers to deliver the front-end and the back-end as a whole package, just the front-end, or the front-end with elements of the back-end. They may also be specifying the inclusion of additional functionality in the back-end, that providers can offer or get added over time.

4.2 Existing infrastructure

At the time of the research, the four FTZ areas varied significantly in terms of how much existing infrastructure they had in place and how this was operating within the existing local transport marketplace. The local transport marketplace is shaped by how many public transport operators provide services within the area; whether the public sector has a stake in any operators or whether they are all private operators; what other mobility services are already in place (for example bike sharing schemes); and the maturity of the multi-operator ticketing offer. These factors have and will influence the design of their MaaS offer.

4.2.1 Journey planning

Derby and Nottingham, Solent and WECA reported that they do not have significant journey planning technology to build on. This means the MaaS provider will develop or build journey planning functionality. For example, while WECA already have a TravelWest web application that provides journey planning, live bus and train arrivals information, and static information on car-clubs, taxi ranks and park-and-rides, this was described as having "*relatively basic"* functionality. As a result, WECA said that they expect the MaaS provider to develop a more sophisticated journey planner that will be integrated with local data as part of the MaaS solution. Similarly, Solent, who had already commissioned their MaaS provider, said that they will be relying on their provider to develop the journey planning tool.

The case was different for TfWM, whose existing app already has mapping functionality which includes static information on bus stops and bike hire stands, and provides real-time information about bus, tram and train services. As one stakeholder described it, "*a lot of the base work is in place*" (TfWM).

4.2.2 Ticketing and payment

Most areas said that they expect to integrate their existing multi-operator ticketing infrastructure into their MaaS solution. However, the level of maturity of the existing offer varies by area, as does the level of usage.

Multi-operator ticketing functionality relies on having both the technological infrastructure in place[ee] – often referred to as Smart Ticketing – and transport operators on-board. Multi-operator ticketing can vary from being a single flat priced, zonal ticket to offering daily or weekly fare capping[ff]. Currently, most multi-operator tickets are run through back-office infrastructure provided by a limited number of technology suppliers – some of whom are common across the

FTZ areas. However, it is transport operators that set fares and conditions, and they may choose not to provide the best value fare through the multi-operator tickets.

At the time of the research in November 2021, Derby and Nottingham each had their own multi-modal smart ticketing system. Each system had been designed for the local market and was at different levels of maturity in terms of what was currently available to the customer and how the back-office functioned.

- **Nottingham's Robin Hood**[gg] has been available for just over a decade and offers multi-modal ticketing on bus, tram and train within Greater Nottingham. There is a retail network in place for topping-up and tickets can be bought online and topped up by mobile phone[hh]. The system offers season tickets, multi-operator pay-as-you-go, English Concessionary travel[ii], day tickets and daily fare capping on bus and tram[jj]. Nottingham City Transport also offers a smartcard for travel on its own network only[kk].
- **Derby**, on the other hand, offers its Spectrum[ll] card that is a multi-operator smart ticket that can only be used on the whole bus network within Derby city. In addition, both main bus operators within Derby also offer their own multi-journey smart or digital ticket[mm]. The Derbyshire Wayfarer ticket[nn] is also available for travel by bus and train within Derbyshire but is not a digital system.

There were questions over whether a single MaaS solution could and should be provided for both cities and if so how this would work with the operability of the two existing systems. As described in chapter 3, Derby and Nottingham had commissioned an options appraisal to explore this and provide recommendations.

> *"The starting point is you've got very different back end piece that the two areas are running." (Derby and Nottingham)*

Solent's existing smart ticket offer, SolentGo[oo], includes a smartcard and other multi-operator bus tickets, and offers flat zonal pricing for travel across bus and some ferry services within the region. At the time of the research it had relatively low uptake – one stakeholder estimated it to be one percent of the market. The SolentGo system will eventually be integrated into the MaaS app, but was being maintained as a separate brand at the time of the research. The existing scheme was built on UniCard's infrastructure, but a move to a MaaS system will require additional functionality such as a disbursement engine[pp]. Currently reimbursement is processed through the local authorities but the introduction of MaaS and more modes will mean the system is too complex to process in this way.

In WECA, the TravelWest[qq] travel card was the smart ticket offering at the time of the research. A number of multi-operator (bus only) or multi-modal (bus and train) tickets were available based on zonal pricing and there were also pay-as-you-go and multi-pack tickets available[rr]. However, the multi-modal tickets were not used at high volume and WECA was not responsible for collecting, processing and disbursing ticket payments for these tickets. With the development of MaaS, it was expected that WECA would take on this responsibility which would require updated governance processes.

TfWM has the most well-developed smart ticketing offer of the FTZ areas. Their existing Swift[ss] system has been offering multi-modal, multi-operator tickets for a number of years, and has a million customers. Stakeholders felt this made the TfWM well-placed to capitalise on its existing infrastructure for their MaaS solution.

> *"In terms of Mobility as a Service, one of the things that's different in our area I believe than anywhere else is we're building ours on the back of our smart-ticketing scheme that's well established." (TfWM)*

TfWM was already retailing transport operators' commercial tickets and thus had well established payment and reimbursement processes in place, including user authentication. Over the course of building this system, TfWM had developed good relationships with the transport operators in the region, facilitated by regular meetings of the multi-modal, multi-operator working group.

> *"One of the biggest strengths is that the operators also use the platform, so [operator 1] do their commercial smart ticketing through it as well, so do [operator 2]" (TfWM)*

TfWM had used FTZ investment to improve their Swift system and ultimately prepare it to become the back-end of the MaaS solution. This involved converting Swift from a Smartcard system to an Account Based Ticketing system. This means that payment has become token agnostic – with payments not linked to a specific token such as a specific Swift Smartcard. Instead payments can be linked to many different types of tokens, such as debit cards and car number plates, which are linked to the individual's Swift account.

This shift will enable the system to be more easily configured to cover payment and charging for other modes which do not rely on a 'ticket' model – such as e-scooters, bike share and parking. The Smartcard will remain available for users who may want to continue to top up their account using cash at local outlets and those without a smartphone. FTZ funding had also been used to develop and introduce one, three and five-day best value fare capping on public transport, building algorithms to calculate the different fares for the different providers.

In summary, areas that have more developed multi-modal smart ticketing offers were building on existing infrastructure as part of the delivery of their MaaS. A mature offer has both necessary technological systems and infrastructure, but also the buy-in of operators and customers. In most cases, technological infrastructure had been developed iteratively, with new functionality being added over several years. Areas whose smart ticketing offer is less mature said they will seek to incorporate these existing systems within their MaaS solutions, but reported being likely to have to adapt or build additional infrastructure for the back-end functionality of their MaaS solutions.

4.3 Integrating data

Whether building on existing or new infrastructure, MaaS back-end functionality relies on the availability of different forms of data. This section sets out some of

the considerations and challenges encountered by areas who were at the stage of building this back-end functionality.

4.3.1 Types of data needed

As Table 4.1 sets out, there are two main types of data needed for MaaS back-end functionality: 'live' data and 'static' data.

- 'Live' data includes data on the location of vehicles (such as the live location of buses) and their status (such as the battery level of an e-scooter), as well as real-time payments.
- 'Static' data includes timetabling and route information, locations of key infrastructure such as bus stops or docking stations, and the structures and pricing of fares.

Both types need to be made available by the data holders – often transport operators and mobility service providers – and this needs to be available for each mode. Certain static data is already available through open source formats (such as on the locations of bus stops) and data suppliers may aggregate and provide data packages. In addition to those data types listed below, additional functionality within MaaS may be added which requires other forms of data – such as from smart traffic cameras.

Table 4.1 Types of data needed for MaaS solutions

Data types	
Live data	*Static data*
Real-time vehicle status	Fares: structures and pricing
Real-time vehicle location	Timetable and route data
Real-time journey payments data	Location of key infrastructure

4.3.2 Accessing data

Areas reported actual and potential challenges in accessing the different data sets. While some authorities may already have access to some data sources, for others gaining access required putting data sharing agreements in place with multiple suppliers and operators. Stakeholders in Solent reported that delays in launching their product were partly linked to delays in engaging with operators to gain access to data.

> *"We've got some quite substantial data protection impact assessments going on. We're working on the privacy policies and terms and conditions and consents and all this kind of stuff. (...) Those are quite chunky documents. The data-sharing with the operators is something that probably is still under discussion." (Solent)*

This can prove particularly complex where operators have pre-existing commercial agreements with data companies or technology providers. Data that is available from larger data suppliers may come with conditions and constraints about how it can be used. Stakeholders in Derby commented that operators

may consider live data such as location or bus occupancy data as commercially sensitive and so can be reluctant to provide access. Derby's MaaS solution provider had been working with the local authority to negotiate with the operators to overcome both technical and commercial barriers.

Data is increasingly seen as an asset that companies are keen to commercialise and, in at least one area, stakeholders reported that some operators asked for payment to license access to their API feeds.

Beyond commercial difficulties, there can be challenges in accessing data in a useable format. For instance, in Solent, the MaaS provider found it challenging to access ticketing machine data for the bus operators in the region. As ticketing machines are all operated by a single supplier, there was an expectation they would be able to provide data for all four bus operators in the region. Initially, gaining access to the ticketing API was a slow process. Once access was granted, the format of the data required additional layers of infrastructure to be developed to process the data. In addition, access to the static fare and ticketing data was not available. This required the MaaS solution provider to code tickets manually in order to build a database for the MaaS app to use, which had not been planned for. Nevertheless, stakeholders were optimistic that the Bus Open Data Service[tt] initiative would resolve this issue in due course. The Bus Open Data currently provides static data on routes and bus stops but is expected to soon include fare data in a standardised, open format that the MaaS solution provider could then integrate directly.

In the West Midlands, data from ticketing machines was secured through a long-standing agreement with operators. TfWM used previous funding to purchase the ticketing machines and lease these out to operators. As part of the terms of the lease agreement, data from the machines was provided to TfWM in a standardised format.

4.3.3 Integrating data

Once areas have access to the data there is a further step involving data integration.

Integrating across modes

A key challenge stakeholders identified was the ability to make use of data across different transport modes within a single system. Stakeholders reported that within each mode, such as buses or trains, there is typically standardisation in the way data is provided – for example, the Rail Delivery Group sets the standard for rail. This causes challenges when bringing data together across modes, particularly for ticketing and payment, where tickets may be provided in different formats such as barcodes or QR codes. Stakeholders within Solent also noted that with every new mode added, there is additional complexity because pricing models and technology varies.

In order to provide a single ticket to the customer, Solent's MaaS provider had hoped to build a QR based ticket that could be read by the ticketing machine supplier who provides the hardware for all operators in the region. However, this

had not proved possible, and so the MaaS provider was planning to offer multiple digital tickets in a way that appeared seamless to the customer in a digital wallet.

> "*It's about joining together the existing standards in a way that doesn't feel too disjointed for the user*" (Solent).

Similarly, for the Derby trial, stakeholders reported challenges integrating available data in its current format. In the short-term, less integrated technical fixes could be found, such as setting up URL hand offs which send customers to outside apps or websites. In the longer-term, stakeholders noted the need to overcome barriers presented by pre-existing agreements between operators and their suppliers.

Stakeholders in the West Midlands also commented that data integration was an on-going process as they prepared the Swift back-end for the development of MaaS. TfWM worked with their existing technology and data suppliers to scope out the details of the back-end API design to develop this infrastructure. This was provided as part of the specification for the MaaS solution providers. Stakeholders acknowledged that this was complex architecture and that the process had involved going down some 'cul-de-sacs', however they were optimistic that the technological challenges could be overcome.

Stakeholders within both Solent and TfWM commented on the challenges associated with multi-modal fare-capping. Although TfWM had an algorithm in place calculating best value fares across different time-frames, at the time of the research in November 2021, this only covered bus, tram and train. Adding other modes such as e-scooters, bike share, and car hire was expected to prove complicated due to the wide variation in pricing models. Solent reported facing similar challenges, although they were starting without a current fare-capping infrastructure. In addition to building the fare-capping infrastructure, Solent also needed to build the disbursement engine to re-distribute revenue to the various operators, although this was not part of immediate plans.

Integrating legacy systems with digital system

A further integration requirement relates to integrating legacy smartcard-based ticketing solutions with a digital MaaS solution. At the time of the interviews this capability was already being built/rolled out in the West Midlands and Nottingham. This technology enables local smartcards to be tapped against smart phones to load new tickets (or other products).

This capability was also being built in Solent and integrated as part of the MaaS solution. This was felt to be very important as a number of customers still rely on smartcards.

> "*Basically you can hold your plastic smartcard against your phone, and your phone will act as if it was a gate reader at a station and it can load tickets on to the card, it can read the card. You can purchase a ticket and instantly load it, rather than having to go to a station or a vending machine or something and tap it. That's been quite a challenge to bridge the old world of people who want to use smartcards, and there are still a*

lot of them, and people who want to use apps, and make it feel like one cohesive journey" (Solent)

Other considerations

All areas reported that ensuring that the right protections are in place for different types of data is a key consideration when building the back-end architecture for the MaaS system. Stakeholders across a number of areas raised cybersecurity as a key concern and something that they were working proactively to address. Any cybersecurity breaches would be likely to undermine trust in the MaaS solution, and stakeholders cited high profile cases of data breaches at Uber as examples of how trust could be damaged.

In addition, stakeholders in the West Midlands highlighted the need to ensure that there were 'ethical barriers' within the system, so that operators only had access to information about customers who actually used their services. Establishing who has access to what data and setting out 'rules for engagement' – agreements for operators about how and when customers can be engaged with – were key considerations. Setting up agreements in a way that operators were comfortable with was also key to ensuring they were at ease with the commercial elements of who had access to customer data.

4.3.4 Using data from the MaaS solution

A further consideration for FTZ areas is how data that will be produced from the MaaS solutions will be used once available. For instance, data on journeys in MaaS may highlight where public transport infrastructure is missing. This thinking was still in the early stages at the time of the research, as most areas were still in the process of scoping and commissioning MaaS solution providers. However, in Derby and Nottingham and WECA, the aspiration is that data from the MaaS app will feed into a data hub or data centre.

WECA's draft specification for a MaaS provider stated that they were seeking one point of data integration between them and the provider. The MaaS solution provider is expected to provide an analytics dashboard for WECA and each transport operator. They had also highlighted the expectation that most of the data would be held by the MaaS solution provider. While WECA also have a data hub project as part of their FTZ programme, the two projects – while in contact – were proceeding independently at the time of the research. However, in the longer term there was an expectation that data from MaaS would feed into the hub.

In Nottingham, the FTZ team worked with their internal IT team on the development of their data hub, with the aspiration that data would flow both from the data hub to the MaaS app and vice-versa. Stakeholders within the West Midlands also explained that, internally, MaaS is increasingly being seen as a policy tool to influence transport planning and behaviours. They reported that there is still some thinking to be done about how this data would be fed into policy teams, but they expected to make use of their existing in-house analytics team to create data dashboards for different teams.

At the time of the research in November 2021, Solent did not have plans to feed the data from the MaaS into any form of hub or data centre, although the data would still be collected. Instead, as part of the trial, data from the MaaS solution will be provided to their research and evaluation partners who will offer insights on user engagement and behaviour change.

5 Lessons Learnt and Conclusion

This chapter draws together key lessons learnt from across the MaaS and data projects and reflects on the implications of the findings from the general public on the development of MaaS solutions. It concludes by considering the next steps for the evaluation.

5.1 Key lessons learnt

Stakeholders were invited to reflect on key successes and challenges as well as lessons learnt from the process of developing MaaS schemes to date. Across the areas, some common themes emerged that have been drawn out below.

5.1.1 Keeping pace

Maintaining momentum across the MaaS project was seen as key to driving it forward. Adopting agile ways of working allowed areas to deliver their projects at pace. Areas achieved agility and speed by having internal dedicated personnel working on the programme from its inception and, in one area, by working to bi-weekly 'sprints' which broke down tasks into smaller achievable components which focussed people's minds. Stakeholders highlighted the importance of making decisions quickly and not being afraid of making mistakes. In order to maintain pace, some stakeholders also highlighted the need to allocate resource to other teams, such as procurement, to ensure there is dedicated resource available when needed.

5.1.2 Collaborative working

MaaS was felt to be challenging, not only due to the technology, but the stakeholder management needed. Areas highlighted that building a collaborative ethos with both internal stakeholders and external partners as key to success. Effective collaboration helped areas to utilise the skills and expertise already held 'in-house', for example by drawing upon expertise within internal IT departments. Getting buy-in internally from senior leadership was also seen as crucial for success and to help drive delivery. Stakeholders within local authorities also valued the expertise brought by external consultants and by MaaS solution providers who were able to identify potential pitfalls and help negotiate both technological and commercial challenges. In order to build this collaborative approach with the range of stakeholders, areas identified two key lessons:

- **Take time to invest in relationships and establish effective working processes**. Stakeholders highlighted the importance of not underestimating the hidden resource needed to build trusted relationships through regular engagement.
- **Make sure key stakeholders are on board with all steps on the journey and are bought into a common vision**. Areas described how, occasionally, project teams were ahead of key stakeholders when

developing various aspects of schemes. They highlighted the importance of 'bringing stakeholders along' on key decisions and throughout the development of the project.

5.1.3 Customer focus and culture change

Putting the customer at the centre of the project was also highlighted as a learning. This meant focusing on outcomes for the customer and defining what the technology should enable for them. This was considered to require something of a cultural shift within local authorities' transport teams but also more widely across the transport sector, where operators may be used to things being done in a certain way. Areas in the development phase of their solution felt that prototype development and early testing would allow them to test certain features with customers to help refine the MaaS solution.

Some stakeholders noted that the cultural change needed within the authority had initially been underestimated. They recommended acting earlier to think about how changes could affect internal teams and ways of working.

5.1.4 Understanding the commercial environment

Stakeholders felt that getting the commercial approach right was key to long-term viability of MaaS. They highlighted the challenges associated with negotiating commercial agreements with multiple parties and navigating pre-existing agreements already in place. Here, they emphasised the importance of understanding the commercial environment. There were two aspects to this.

- **Understanding the changing commercial and regulatory environment** in the transport sector as a result of the COVID-19 pandemic, was critical, in order to see how changes such as the introduction of BSIPs could present opportunities for MaaS.
- **Building an understanding of pre-existing commercial agreements** between operators and technology providers. Establishing who is already working with each other can help to determine where there is a level of pre-existing integration which could facilitate MaaS delivery. This could also help understand operators' concerns or barriers.

Stakeholders generally felt that technological challenges were surmountable, as long as the underlying commercial agreements were in place.

5.2 Implications from research with the general public

The research with the general public also highlighted a number of considerations for FTZ areas to take forward as they develop their MaaS projects. The findings indicated that differences in use of and attitudes towards public transport were shaped by demographic factors such as age, household income level and location of residence (whether urban, rural or suburban). It will

therefore be important that these factors are considered in the design and marketing of MaaS solutions.

Marketing MaaS

Younger, urban audiences were the most receptive to MaaS, were more favourable towards public transport and were regular public transport users. In contrast, groups such as those aged over 60 and those living in rural areas were typically unable to identify any advantages to MaaS. This suggests that careful marketing will be needed to demonstrate how MaaS can offer improvements on existing services to these groups as well as addressing concerns about accountability and how the service works.

Cost as a barrier

Views on the affordability of transport had a relationship with satisfaction with public transport, with those who felt that public transport was affordable more likely to have positive views about public transport. Cost was also the most commonly identified barrier to using public transport. This suggests that for MaaS to drive an uptake in public transport, it has to be seen to offer the best value options. However, stakeholders within FTZ areas noted that sometimes best value options are not always available to those on low incomes. Best value options include multi-day tickets, however, those on low income may not have the money available for the higher upfront cost. The findings also showed that those on low incomes were less likely to use digital payment methods, which may reflect the need among this group to closely monitor spending or less access to smartphone technology. Ensuring that best value options are available to all segments of society through MaaS will be an important consideration for FTZ areas.

Digital readiness

Although the findings suggested that use of apps or other digital planning tools for travel was relatively wide-spread, usage was lower among those aged over 60 and those on lower incomes. This, in part, was reflected by lower levels of access to a smartphone among these groups. This highlights the importance of areas seeking to develop MaaS in inclusive ways, such as by having a web interface available in addition to the app and ensuring that smartcards are still available. Nevertheless, it is promising that, of those not currently using an online or app-based journey planner of any kind, over two thirds would be fairly or very likely to use one in the future.

5.3 Next steps for the case study

The key objective of the MaaS and data longitudinal case study is to explore the design and implementation of the FTZ MaaS solutions, the associated data infrastructure needed to deliver them and how and whether differences in approach impact on the public's response to MaaS.

Each area is at a slightly different stage in launching their trial, but this report serves as a baseline, providing data on views of the public in the four areas

prior to any solutions being widely available. The report has also explored progress in terms of designing the MaaS solution and getting the infrastructure in place to deliver it. Throughout, a range of challenges, opportunities and lessons learnt have been highlighted.

In the next wave of research for this case study, due in autumn 2022, we will conduct qualitative research with early adopters of MaaS solutions in the FTZ areas to explore perceptions of usability and functionality. These will be complemented by further interviews with stakeholders to understand further challenges and learning as the build and development of MaaS solutions progress in each area. A final wave in 2024 will then revisit views of the general public through a survey, and further explore how MaaS solutions have been iteratively developed throughout delivery.

6 References

Alyavina, E. Nikitas, A. Tchouamou Njoya, E. (2020). Mobility as a service and sustainable travel behaviour: A thematic analysis study. Transportation Research Part F 73, 362–381, https://doi.org/10.1016/j.trf.2020.07.004.

Bizgan, L., Hollings, P., and Reynolds, M. (2020), Mobility as a Service – Acceptability Research, Department for Transport, available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/925323/Mobility-as-a-Service-Acceptability-Report.pdf

Brown, G., Low, N., Franklyn, R., Drever, E. & Mottram, C. (2017). GSR quota sampling guidance. Available from: https://gss.civilservice.gov.uk/wp-content/uploads/2018/03/Quota-sampling-guidance-4.pdf

Department for Transport (2019), Future of Mobility: Urban Strategy, available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/846593/future-of-mobility-strategy.pdf

Department for Transport (2021), Bus Back Better: National Bus Strategy for England, available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/980227/DfT-Bus-Back-Better-national-bus-strategy-for-England.pdf

Enoch, M. (2018), Mobility as a Service (MaaS) in the UK: change and its implications. Government Office for Science.

Gates, S., Gogescu, F., Grollman, C., Cooper, E. and Khambhaita, P. (2019), Transport and inequality: An evidence review for the Department for Transport, Department for Transport, available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/953951/Transport_and_inequality_report_document.pdf

Goodall, W., Dovey Fishman, T. Bornstein, J. and Bonthron, B. (2017), The rise of mobility as a service: Reshaping how urbanites get around. Deloitte Review.

Karmargianni, M. and Matyas, M. (2017), The Business Ecosystem of Mobility as a Service. 96th Transportation Research Board (TRB) Annual Meeting, Washington DC, 8-12 January 2017.

Linton, C and Bray, J. (2019), MaaS Movement: Issues and options on mobility as a service for city region transport authorities, Urban Transport Group, available from https://www.urbantransportgroup.org/system/files/general-docs/Urban%20Transport%20Group%20%E2%80%93%20Maas%20movement%20report_AW.pdf

Steen, B., McCarthy, H., Mhonda, J., Lucey, G., Vey, J. and Ilic, N. (2022), Inclusive Transport Strategy Evaluation: Baseline Report, Department for

Transport, available from https://www.gov.uk/government/publications/inclusive-transport-strategy-evaluation-baseline-and-technical-reports.

Endnotes

[a] MaaS is a term used to describe 'digital transport service platforms that enable users to access, pay for, and get real-time information on a range of public and private transport options' (Enoch, 2018).

[b] Stakeholders included project officers directly involved in delivering the MaaS solution (internal), technology suppliers and transport consultants (external).

[c] Demand Responsive Transport (DRT – sometimes also known as Dynamic Demand Responsive Transport) is a transportation service (usually a minibus or taxi) that picks up multiple passengers heading in the same direction. This service is sometimes known as Dial-a-Ride, but new routing technology will enable this to be more responsive and bookable using apps.

[d] This is where an existing MaaS supplier offers a product that already offers all back-end functionality which is then built upon and tailored to the area.

[e] See the Government's Bus Open Data Service (BODS) for more detail.

[f] See the Department for Transport's Future of Mobility: Urban Strategy report for more detail.

[g] The DfT commissioned a separate evaluation of the e-scooters trial and as a result, e-scooters are out of scope for the FTZ evaluation.

[h] The most commonly cited international examples include Jelbi in Berlin, a MaaS app delivered by Trafi, and Whim in Helsinki a MaaS app developed by MaaS Global see these examples in the Urban Transport Group report on MaaS.

[i] Quotas were set based on ONS mid-year population estimates for 2020 for age and gender; Annual Population survey 2020 for economic activity; National Travel Survey for car ownership.

[j] In some areas we did not interview any external stakeholders in this wave. This was anticipated for this wave as many areas did not yet have suppliers on board. In future waves of the research, including external (supplier) views will also be important to understanding how the project has been delivered.

[k] Given the small numbers of interviews involved, and the fact that many area project officers are known to DfT, it was possible that individuals within DfT could know who had participated. This was explained to participants and they were given the opportunity to retract any information at the end of the interview that they did not want included in the report.

[l] Given that MaaS is a concept that members of the public were unlikely to be familiar with, it was defined within the survey as 'a tool or app which enables you to plan, book and pay for a range of public and private transport options.'

[m] For the purposes of the survey, a disabled respondent included anyone with 'any physical or mental health conditions or illnesses lasting or expected to last for 12 months or more and which reduces your ability to carry out day-to-day activities'. The non-disabled and those with a disability that does not impact on daily activities were grouped together for analysis purpose and referred to throughout the survey as 'non-disabled'.

[n] For the remainder of the chapter, the household income bands are defined as follows: under £20,000 as lower income; £20,000 to £39,999 as lower middle; £40,000 to £69,999 as upper middle and £70,000 or more as upper income.

[o] See for example, p. 9 in NatCen's evidence review for the Department for Transport

[p] Previous research has found that disabled people take on average fewer trips than the non-disabled population but are more dependent on use of a private car. However, they are more likely to be driven as a passenger. See the Department for Transport Inclusive Transport Strategy

[q] Throughout the report, highlighting in tables indicates significant differences between areas.

[r] Throughout this section of the chapter, 'car' is used to refer to both 'car or van'.

[s] This may reflect wider socio-demographic differences between the disabled and non-disabled populations, for example, disabled people are on average on lower incomes than the non-disabled population. See the Department for Transport Inclusive Transport Strategy

[t] Examples included in the response codes for local travel payment care were Travel West travelcard, Swift card, Solent Go travelcard, Robin Hood card, the Spectrum card, and Mango card.

[u] In the survey questionnaire this was described as 'a tool or app which enables you to plan, book and pay for a range of public and private transport options.'

[v] Bases (TfWM 18 – 39 = 190; 40 – 59 = 175; 60 plus = 135; Urban = 144; Suburban = 263; Rural = 94; Affordable = 289; Unaffordable = 149)

(WECA 18 – 39 = 208; 40 – 59 = 171; 60 plus = 121; Urban = 178; Suburban = 206; Rural = 117; Affordable = 272; Unaffordable = 183)

(Solent 18 – 39 = 150; 40 – 59 = 185; 60 plus = 165; Urban = 86; Suburban = 263; Rural = 152; Affordable= 225; Unaffordable=189)

(Derby & Nottingham 18 – 39 = 215; 40 - 59 = 170; 60 plus = 115; Urban = 105; Suburban = 262; Rural = 134; Affordable = 282; Unaffordable = 145)

[w] This was described to respondents as: 'This is where you can book a service (usually a minibus or taxi) that picks up multiple passengers heading in the same direction. This type of service is sometimes known as Dial-a-Ride.'

[x] See p. 18 in the Urban Transport Group's MaaS movement report for examples of trials around the UK and internationally.

[y] Car hire refers to 'traditional' car hire where you rent a vehicle by the day or week, rather than for short one hour periods. The trial did not include car share, e-scooters or bike share as some of these services had not yet been launched.

[z] At the time of the interviews, it was expected that these reports would be completed by early 2022. An update in March 2022 confirmed they had not yet been received.

[aa] A white label technology product is provided without branding so other companies can add their own branding.

[bb] This was a non-statutory partnership that was to be upgraded to an Enhanced Partnership as part of the local Bus Service Improvement Plan.

[cc] Mobility Service providers is a catch-all phrase to refer to those offering mobility services that fall outside the remit of public transport such as bike share, e-scooters, and taxis.

[dd] This figure was inspired by a similar representation provided to the NatCen research team by WECA's FTZ team.

[ee] Smart Ticketing schemes rely on a standardized IT specification called the ITSO specification. This is a secure platform upon which ticketing schemes can be built and ensures that operators' fare charging systems are able to talk to one another. See ITSO's what is smart ticketing for more details.

[ff] Multi-operator ticketing is enabled by the Public Transport Ticketing Scheme Block Exemption which has been in place since 2001. This provides the legal mechanisms under which such schemes can operate under competition law.

[gg] See Nottingham's Robin Hood Network for more information.

[hh] Technology within more recent smartphones that enable digital wallets (such as Android's NFC) allows phones to act as ticketing 'gateways'. This means that a customer can pay for a top-up online and then hold their smartcard to their phone to have the top-up added to the smartcard.

[ii] The English National Concessionary Travel Scheme offers free off-peak travel to bus passengers aged over 65 and disabled travellers.

[jj] Contactless payment has also been recently rolled out across the bus and tram system (excluding Trent Barton services) and will soon offer daily fare capping across tram and bus see Nottingham contactless 'where to use' for more detail.

[kk] See Nottingham City Transport Easyrider for further detail.

[ll] See Derby City Council Spectrum page for additional information.

[mm] Trent Barton advertise their own smart ticket Mango card, while Arriva have introduced an app to pay by mobile.

[nn] See Derby connected bus ticket guide.

[oo] See the Solento webpage for more information about the Solento Go travelcard.

[pp] A disbursement engine is software that manages complex payment processes that span multiple payment channels and manages payments to multiple payees.

[qq] Information on travel west tickets and travelcards.

[rr] As an example, there are three main Rider tickets, PlusBus and Freedom passes which each operate within specific zones with certain operators and with different pricing. See travel west tickets and travelcards.

[ss] TfWM swift and tickets webpage.

[tt] This policy requires bus operators to provide open data on timetable, fares (simple and complex), real-time vehicle location and historic punctuality data. There are different deadlines for the different data types to be made available, for more detail see Government's Bus Open Data Service (BODS).

Appendix A. Survey sample

Table A.1 Sample breakdown by FTZ area

Variable		Overall			TfWM			WECA			Solent			Derby & Nottingham		
Base (unwtd/wtd)		2004/ 2004			501/ 501			501/ 501			501/501			501/ 501		
		Base (unwtd)	Base (wtd)	Wtd %	Base (unwtd)	Base (wtd)	Wtd %	Base (unwtd)	Base (wtd)	Wtd %	Base (unwtd)	Base (wtd)	Wtd %	Base (unwtd)	Base (wtd)	Wtd %
Age	18 - 39	763	852	43%	190	210	42%	208	225	45%	150	175	35%	215	240	48%
	40 - 59	701	611	30%	175	160	32%	171	145	29%	185	160	32%	170	145	28%
	60 plus	536	541	27%	135	130	26%	121	130	26%	165	165	33%	115	115	23%
Gender	Male	986	997	50%	249	251	50%	249	256	51%	245	245	49%	243	345	49%
	Female	1012	1007	50%	251	251	50%	251	245	49%	255	256	51%	255	256	51%
Income	Under £20,000	324	310	15%	98	98	20%	58	53	11%	69	65	13%	99	94	19%
	£20,000 - £39,000	715	726	36%	191	193	39%	164	168	34%	178	180	36%	182	186	37%
	£40,000 - £69,999	544	555	28%	115	116	23%	156	159	32%	142	144	29%	131	136	27%
	£70,000 or more	307	309	15%	70	70	14%	95	96	19%	81	84	17%	61	60	12%
Ethnicity	White	1808	1798	90%	415	410	82%	465	463	92%	467	465	93%	461	460	92%
	Non- white	181	195	10%	80	86	17%	35	37	7%	29	32	6%	37	40	8%
Disability	Disability affecting daily activities	458	455	23%	124	129	26%	114	107	21%	113	113	23%	107	107	21%

	No disability/ disability not affecting daily activities	1502	1511	75%	368	364	73%	373	381	76%	377	378	75%	384	387	77%
Geography	Urban	513	512	26%	144	149	30%	178	170	34%	86	87	17%	105	106	21%
	Suburban	994	992	50%	263	259	52%	206	209	42%	263	263	52%	262	261	52%
	Rural	497	500	25%	94	93	19%	117	122	24%	152	151	30%	134	134	27%

Appendix B. Additional tables

Transport usage by FTZ area

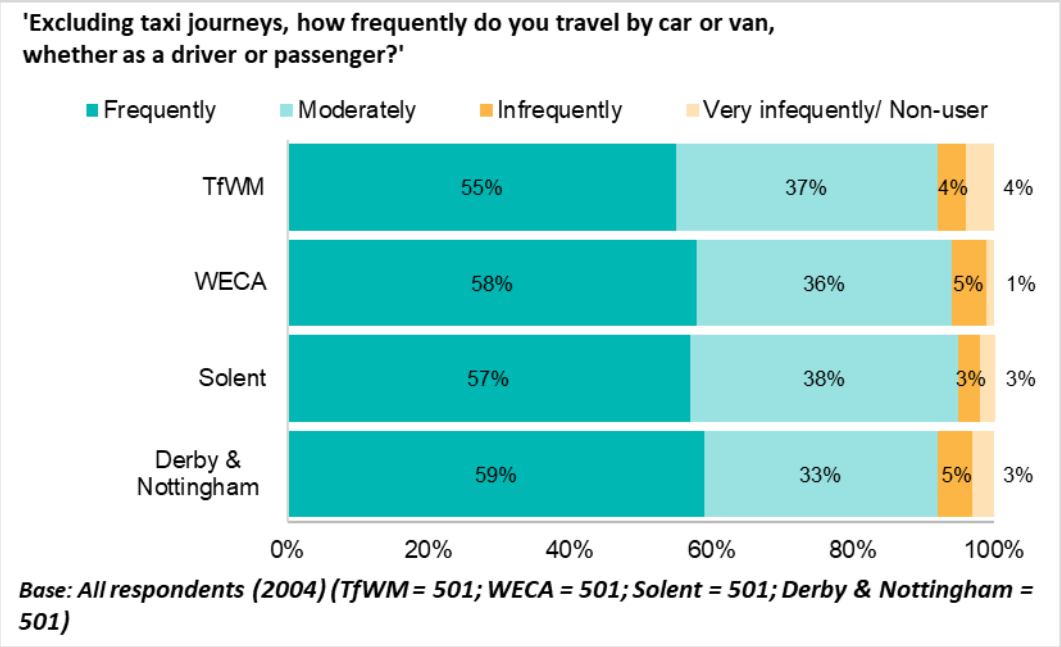
Table B.1 Mode use over the past 12 months by FTZ area (multiple options possible)

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
Walking	70%	73%	74%	71%
Bus	49%	53%	41%	53%
Train	44%	44%	44%	41%
Bicycle	27%	29%	25%	25%
E-Bike	5%	7%	4%	4%
Car (as a driver)	68%	78%	79%	76%
Car (as a passenger)	69%	69%	68%	65%
Van or lorry (as a driver)	5%	8%	6%	5%
Motorcycle or moped	4%	6%	3%	5%
Mobility scooter	1%	3%	3%	1%
Wheelchair (motorised or manual)	1%	2%	2%	1%
Taxi or private hire vehicle (e.g. minicab)	40%	38%	30%	38%
Tram	11%	4%	3%	23%
E-scooter	4%	8%	6%	5%
Other (please specify)	1%	1%	2%	-

Table B.2 Rural/urban split by FTZ area

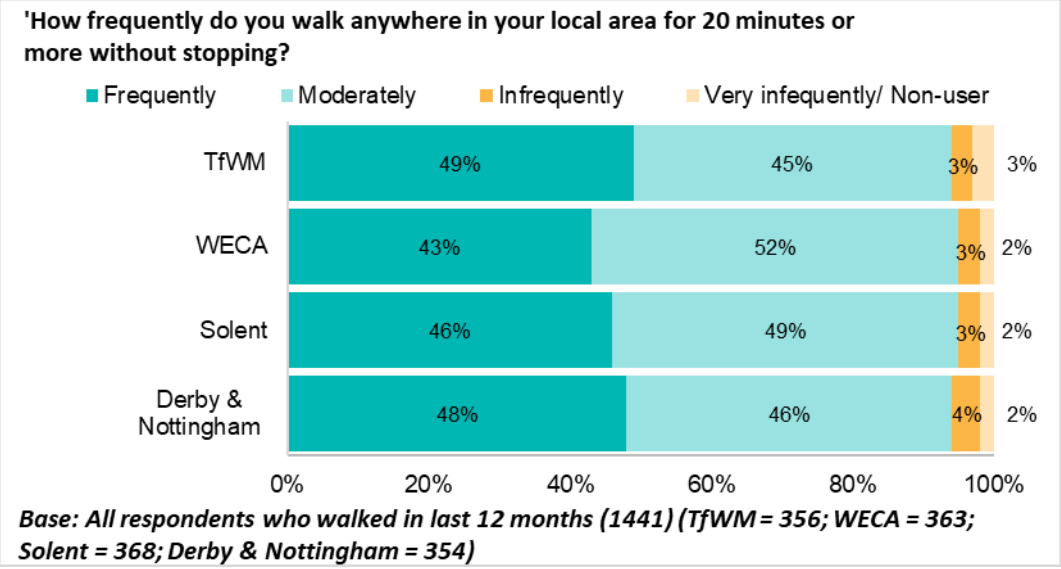
Location	TfWM	WECA	Solent	Derby & Nottingham
Urban	30%	34%	17%	26%
Suburban	52%	42%	53%	52%
Rural	18%	24%	30%	27%

Figure B.1 Frequency of car travel by FTZ area



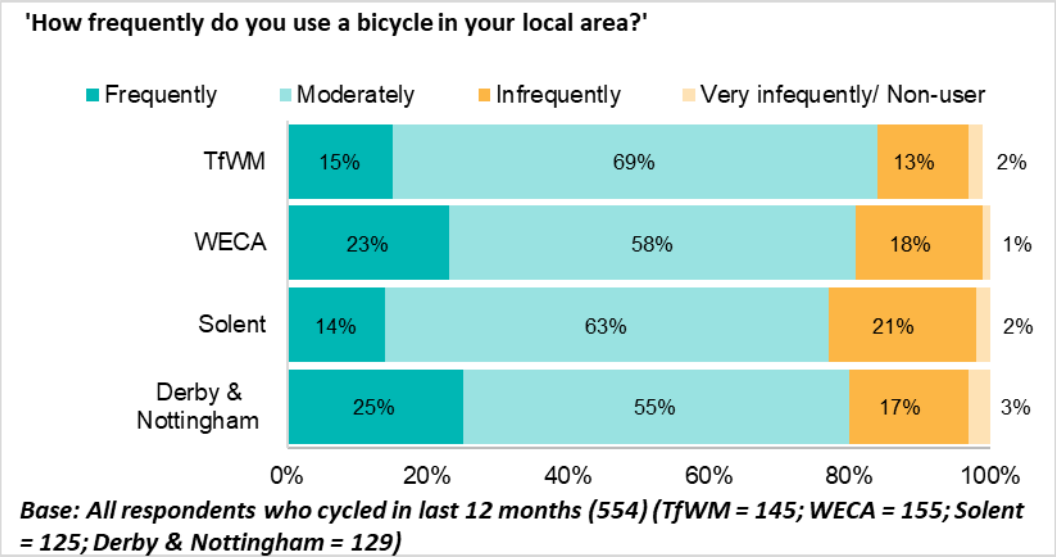
Base: All respondents (2004) (TfWM = 501; WECA = 501; Solent = 501; Derby & Nottingham = 501)

Figure B.2 Frequency of walking by FTZ area



Base: All respondents who walked in last 12 months (1441) (TfWM = 356; WECA = 363; Solent = 368; Derby & Nottingham = 354)

Figure B.3 Frequency of cycling by FTZ area



Attitudes to MaaS

Table B.3 Perceived advantages of a MaaS service

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
Would save me money	15%	16%	17%	17%
Would make journey planning simpler	27%	30%	26%	28%
Would make travelling easier	25%	26%	23%	23%
It chooses the best option for me based on current conditions (for example transport delays)	13%	21%	16%	15%
It makes paying for transport safe and secure	15%	14%	14%	15%
I would know the up-front journey costs	23%	24%	25%	21%
It would be good value for money	15%	16%	14%	15%
I would not need to own a car	7%	7%	8%	6%
It is better for the environment	19%	20%	20%	18%
It is more convenient	33%	28%	26%	25%
Other, please specify	0	1%	1%	1%
No advantages	9%	6%	12%	12%
Don't know	8%	8%	10%	9%

Table B.4 Perceived disadvantages of a MaaS service by FTZ area

FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
It's more expensive	15%	12%	12%	13%
I don't have a smartphone	3%	2%	4%	4%
Would make journey planning more complicated	5%	8%	5%	5%
Would make travelling more complicated	6%	6%	8%	6%
I would be over-reliant on one app for everything	17%	20%	17%	16%
I would be reliant on my phone (battery life, internet access, etc)	24%	30%	29%	29%
It makes paying for transport harder	7%	4%	4%	5%
It would make paying for transport less secure	6%	6%	6%	5%
It would be bad value for money	8%	7%	7%	6%
Don't know who would be accountable if something went wrong	15%	21%	21%	19%
I need to know more or not sure how it would work	18%	21%	20%	18%
Doesn't improve on existing services	15%	15%	16%	16%
I have no need for an app like this	14%	14%	15%	14%
Other, please specify	1%	2%	1%	2%
No disadvantages	12%	11%	10%	13%
Don't know	10%	11%	13%	10%

Table B.5 Factors that would increase likeliness to use a MaaS service by FTZ areas (among those who reported being very or fairly unlikely to use)

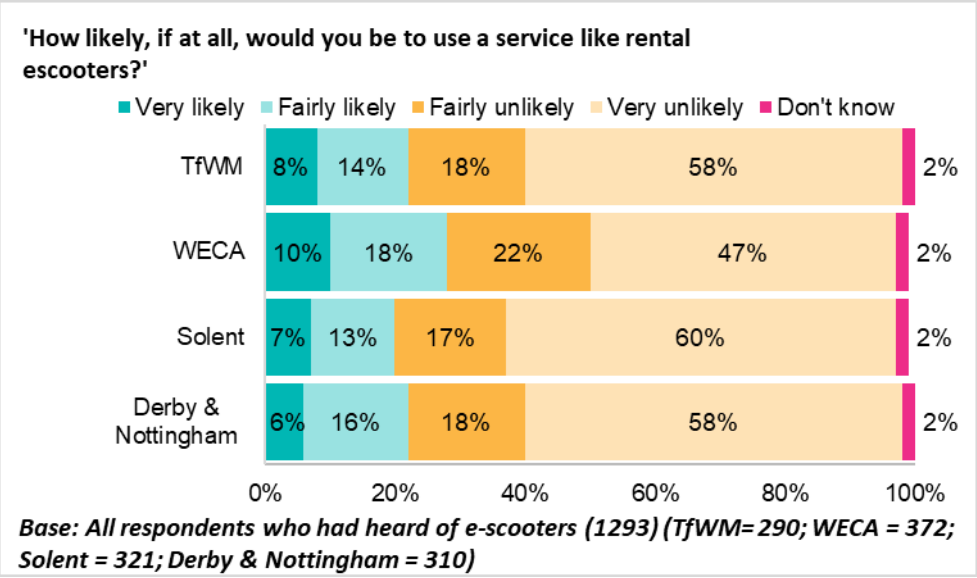
FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	183	165	212	184
If I knew I would always get the best price for my journey	26%	34%	28%	29%
If I knew the tool or app wouldn't store my personal data	8%	18%	8%	14%
If I knew the tool or app was showing me all possible journey options	20%	21%	17%	16%
If I could personalise the tool or app to take account of my preferences...	9%	15%	8%	13%
If I felt more confident using my smartphone	9%	9%	8%	8%
If I trusted that the tool or app would not favour one transport operator	14%	15%	20%	15%
Other, please specify	5%	5%	10%	3%
None of the above	50%	37%	45%	49%

Sustainable transport modes

Table B.6 Awareness of different transport modes by FTZ area

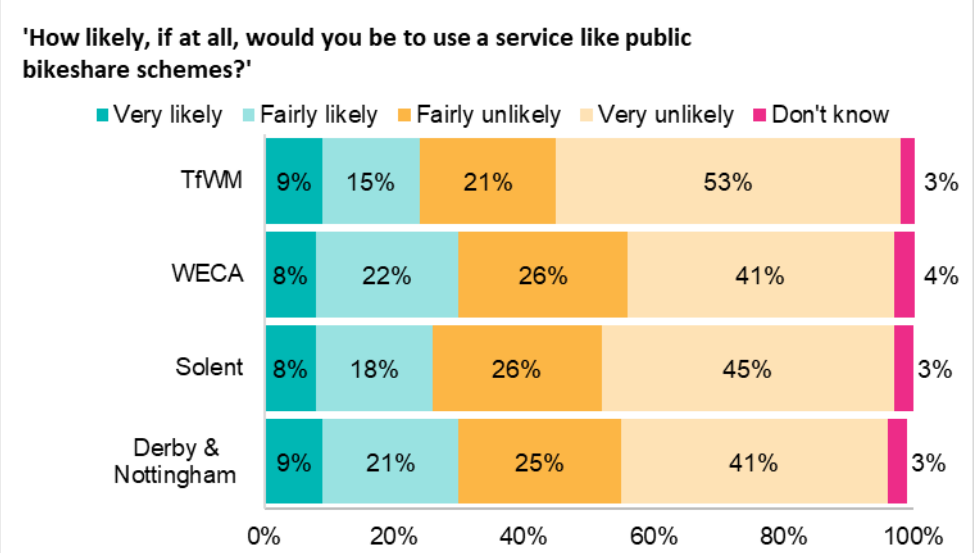
FTZ area	TfWM	WECA	Solent	Derby & Nottingham
Base	501	501	501	501
Rental E-scooters	58%	74%	64%	62%
Public bike share schemes	55%	49%	56%	43%
Demand responsive transport services	28%	28%	28%	23%
Internet-arranged or app-based ride sharing	24%	29%	22%	20%
None of these	16%	10%	14%	19%

Figure B.4 Willingness to use e-scooters by FTZ area



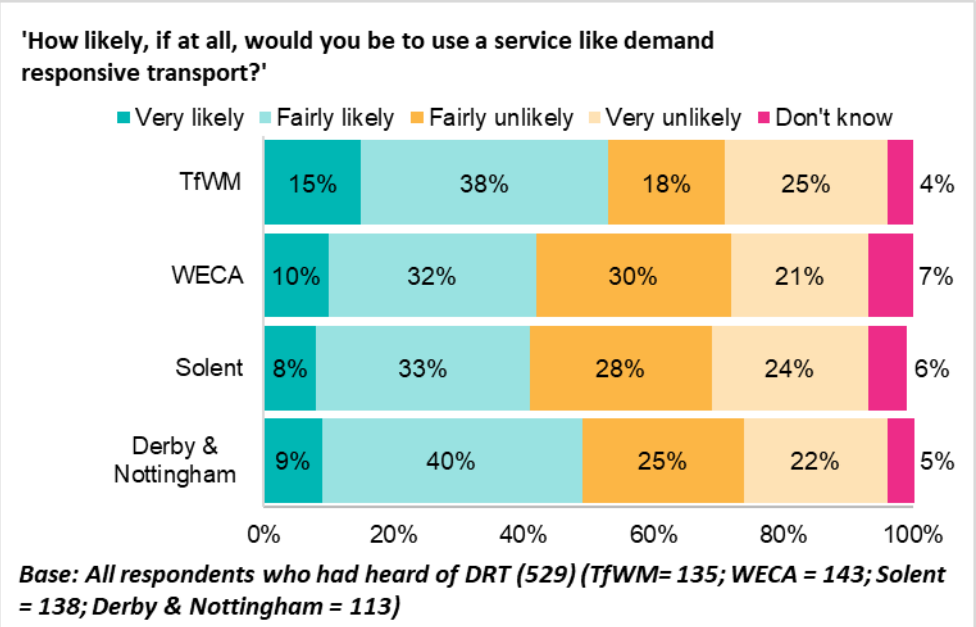
Base: All respondents who had heard of e-scooters (1293) (TfWM= 290; WECA = 372; Solent = 321; Derby & Nottingham = 310)

Figure B.5 Willingness to use bike share by FTZ area



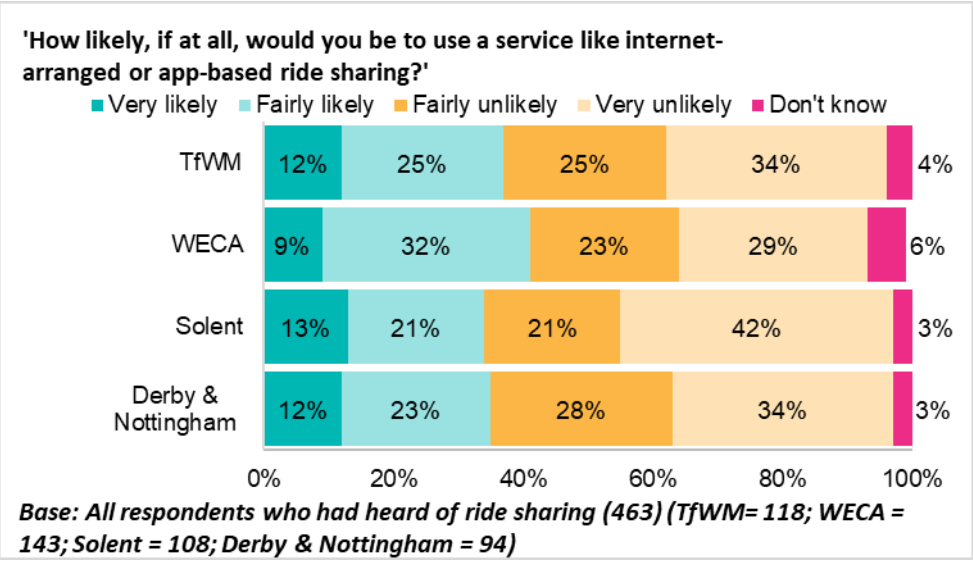
Base: All respondents who had heard of bikeshare (1014) (TfWM= 273; WECA = 251; Solent = 276; Derby & Nottingham = 214)

Figure B.6 Willingness to use demand responsive transport by FTZ area



Base: All respondents who had heard of DRT (529) (TfWM= 135; WECA = 143; Solent = 138; Derby & Nottingham = 113)

Figure B.7 Willingness to use ride sharing services by FTZ area



Base: All respondents who had heard of ride sharing (463) (TfWM= 118; WECA = 143; Solent = 108; Derby & Nottingham = 94)