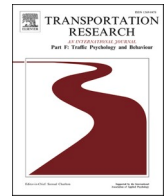




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“A reservation I have is that presumably no travel app will improve the actual services”: Place based perspectives of mobility as a service

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ABSTRACT

Understanding the perceptions and needs of different types of prospective end-users of Mobility as a Service (MaaS) is an important step towards successful scheme and customer-facing app design. The travel behaviour literature typically favours quantitative approaches; however, qualitative methods can offer unique insights in this regard. To this end, this article reports on a series of online focus groups held with 146 residents of a region in which Mobility as a Service is on the cusp of being rolled out. Participants' perceptions of MaaS, in terms of their information needs, the incentives that might help them use it, and the challenges they perceive, were explored with respect to their place of residence: urban, peri-urban, or rural. Inductive thematic analysis of over 30,000 words of text lead to the identification of a variety of themes and sub-themes. Accurate, reliable, and up-to-date information is a core requirement for all. For those in urban areas, the presentation of multiple journey options, with associated information on travel time and cost, are key. For those in peri-urban areas, detailed route information that facilitates the linking of private transport with public transport, and the facilities available at stations and stops, are of particular significance. For those in rural areas, fundamental service provision limitations hamper the potential for traditional, urban-focussed MaaS schemes reliant on public transport networks. A successful rural MaaS system will be distinct from urban MaaS, with a lesser focus on traditional public transport, and peri-urban residents represent an important target group for encouraging modal shift and improving transport system sustainability.

1. Introduction

Mobility as a Service (MaaS) is a burgeoning topic in transport academia, policy, and practice. Hailed by some as a “revolutionary mobility paradigm” (Casady, 2020, p. 1452) and by others as part of the ongoing pursuit for integrated transport (Lyons et al., 2019), it promises users improved accessibility, freedom of movement, and journey efficiency by bringing together journey planning and purchasing across multiple transport modes. In doing so, it aspires to help tackle some of the key transport-related challenges faced by society (e.g., Polydoropoulou et al., 2020). Indeed, some of the espoused benefits of MaaS are so lofty that the extent to which they are realisable has been called into question (Pangbourne et al., 2020). There have also been questions raised about the specificity of MaaS to large, urban areas, with those that live in rural areas or small urban centres at risk of being left out (e.g., Liu et al., 2020).

In Pangbourne et al. and Liu et al.'s work, the topic was approached from a largely top-down perspective, highlighting challenges

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for planning, governance, and business. A similar perspective was taken by [Mulley et al. \(2023\)](#) in their more recent review of rural MaaS schemes. Notwithstanding the importance of those approaches, [Lyons et al. \(2019\)](#) stressed the need to understand user perspectives in MaaS. The research presented in this paper therefore considers the question of whether MaaS can live up to expectations from a bottom-up perspective, focussing on what the potential end-users themselves think of MaaS. These issues are explored in the context of a person's place of residence; rural, peri-urban, or urban (with 'peri-urban' referring to the sub-urban and semi-rural peripheries where rural and urban regions meet; [European Commission, 2015](#)). The over-arching aim of this work (and of the broader project of which this effort forms a part; [Pritchard, 2022](#)) is to contribute to the design of MaaS systems, in terms of both the fundamental service offering and the design of the apps with which end-users will interact, that maximise its uptake and use in place of the private car.

2. MaaS and the user perspective

The term Mobility as a Service (MaaS) first appeared in the academic domain in Sonja Heikkilä's thesis ([Heikkilä, 2014](#)), then in a 2015 paper presenting insights from a field trial of a MaaS system in Gothenburg ([Sochor et al., 2015](#)). That latter work considered the experiences and expectations of end users of MaaS, finding some mismatches therein but nevertheless high satisfaction with and intention to continue using the scheme. Since then, there has been a relative explosion of MaaS research gathering end user data. Much of this work has used the choice experiment survey approach to shed light on the factors that influence of people's behaviour, with a person's willingness to pay for different MaaS offerings a key outcome measure (e.g., [Caiati et al., 2020](#); [Guidon et al., 2020](#); [Ho et al., 2018](#); [Kim et al., 2021](#); [Kim & Rasouli, 2022](#); [Kim et al., 2021](#); [Matyas & Kamargianni, 2021](#); [Merkert & Beck, 2020](#)). Stated intention or willingness to use MaaS also features highly as an outcome variable of study (e.g., [Alonso-González et al., 2020](#); [Lopez-Carreiro et al., 2021](#); [Matowicki et al., 2022](#)).

Quantitative explorations of willingness to pay for, or intention to use different MaaS offerings have provided important insights into a multitude of factors influencing the likelihood that MaaS will be successful (e.g., [Duan et al., 2022](#); [Ho, 2022](#); [Narayanan & Antoniou, 2023](#)). This approach appears to be favoured in transportation research, with qualitative research less abundant ([Lowe, 2021](#)), especially qualitative research exploring end user perspectives. There are many benefits of applying qualitative methods in the study of travel behaviour and decision making, many of which are succinctly summarised by [Mars et al. \(2016\)](#). For Mobility as a Service, and for the research reported in this article, the primary benefit is in their ability to reveal rich insight into the reasons behind the choices made in stated preference studies and the behavioural beliefs and environmental factors underlying the intentions measured in attitudinal, latent class, and hybrid choice research.

Although qualitative techniques have not yet been applied to the exploration of MaaS in rural or peri-urban areas, some such work in urban settings has been undertaken. Much of this is business, policy or governance focussed (e.g., [Kivimaa & Rogge, 2022](#); [Turienzo et al., 2023](#)); however, some examples of end user focused work can be found.

2.1. Literature review: Qualitative insights into MaaS user experience

Drawing on work described in more detail elsewhere ([McIlroy, 2023a](#)), all journal articles (i.e., excluding book chapters and conference articles) available via Scopus or Web of Science that contained the search term "Mobility as a Service" and published in English were considered in terms of the perspective taken and the methods used. Sixteen articles were found that described research taking an end-user (or potential end-user) perspective and using qualitative methods (including focus groups, workshops, and interviews), the earliest of which reported on the reasons people joined UbiGo, a MaaS pilot scheme implemented in Gothenburg, Sweden ([Strömberg et al., 2018](#)). That work also highlighted the impact of the scheme, with a greater usage of public transport and active travel and lower car use than participants had previously expected ([Strömberg et al., 2018](#)).

In [Matyas and Kamargianni \(2019\)](#), focus groups were used to test a stated preference survey design, though details on that aspect of the research are scant as it was not the focus. More relevant is work reported in [Johansson et al. \(2019\)](#), where residents recently having moved in to housing developments with restricted parking (in Stockholm) were interviewed about their expectations and experiences. That research emphasised the importance of everyday life and the mismatch between stakeholder expectation and end-user reality.

In [Fioreze et al. \(2019\)](#) the attitudes and perceptions of potential users located in the Dutch city of 's-Hertogenbosch (coincidentally just south of the river Maas) were studied. Although an overall sense of curiosity came through in the focus groups and interviews, the importance of current travel behaviours was highlighted. This has clear implications for car dependent communities. In a similar vein, [Matyas \(2020\)](#) interviewed London residents in order to understand the potential for MaaS to support a shift away from the private car. That work emphasised the importance of safety, particularly for active travel, and the need for intervention targets to be based on different user groups and their appetite for the use of certain modes. Relatedly, [Alyavina et al. \(2020\)](#) explored the potential for uptake of MaaS in a UK urban context. Their interview study further highlighted the existing prioritisation of the car, leading the authors to argue for promotion of public transport as the backbone of MaaS and the disincentivisation of car use.

In a novel study using workshops with Lego®, [Casadó et al. \(2020\)](#) explored children's perceptions of MaaS. As well as emphasising some distinguishing characteristics unique to younger travellers and stressing that children are active travellers with their own agency (not just extensions of their parents/guardians), Casadó and colleagues noted fundamental concerns with public transport that will need to be overcome if it is to serve successfully as the backbone of MaaS.

[Krause et al. \(2020\)](#) did not explore MaaS directly, though did refer to it in their exploration of people's perceptions of autonomous cargo bikes on a German university campus. Using focus groups and interviews in addition to quantitative questionnaires, they

developed a list of important design attributes. They do not discuss at length the positioning of cargo bikes (autonomous or otherwise) in a MaaS system; however, this has been done elsewhere, with the evidence suggesting a benefit to families (Smith et al., 2022).

Also in a slight departure from MaaS (though couching discussions in terms of MaaS), Sjöman et al. (2020) investigated, using multiple methods including interviews, the impact of different economic interventions on people's everyday mobility. Their findings further highlighted the difficulty of breaking car dependency and the importance of perceptions of the cost (rather than the actual cost) of running a car and of the alternatives.

Looking into MaaS in Madrid, Lopez-Carreiro et al. (2020) investigated the requirements potential users have of a MaaS app, in terms of services and information. Focus group results largely matched requirements identified in a literature review, with some additions arising from the qualitative work, many of which revolved around the importance people placed on access to real-time information.

In Catulli et al. (2021) the focus was on consumer acceptance, with an electric car club taken as a case study and interviews undertaken with users of that scheme. Their research was focussed on consumer identities in a car sharing context and the authors outlined several implications for MaaS, including a reluctance to travel by bus to access car sharing sites, a notable challenge for multi-modal MaaS. Also focussing on car technologies, Dichabeng et al. (2021) explored people's acceptance of shared autonomous vehicles. Those authors used online asynchronous focus groups (the same method as the research described below) to study the attitudes, perceptions, and preferences that influence drivers' acceptance of future autonomous, shared vehicles.

In a focussed exploration of a functioning MaaS scheme, Smith et al. (2022) interviewed households of a new residential complex in central Gothenburg that was built specifically with sustainable transport in mind (e.g., with restricted parking, dedicated bike infrastructure, and a MaaS system for residents). Further to documenting actual use of the system, Smith and colleagues investigated the drivers and barriers experienced at different stages of uptake and use of the service (Smith et al., 2022). Christensen et al. (2022) also took an operational system as their context of study, this time focussing on a car sharing scheme in Copenhagen. Like Johansson et al. (2019), their interviews with families emphasised the routine nature of mobility and the challenges for a MaaS scheme positioned as a flexible alternative to the private car.

In a mixed-methods study, Huang (2022) explored users' privacy concerns in the Norwegian city of Stavanger, finding different groups of people (clustered by their mobility and purchasing habits, and by age) have different levels of concern about sharing various types of data. Finally, in a study aiming to shed light on common barriers to multi-modal travel, Cooper and Vanourtrive (2022) explored the experiences of mothers of young children in the Belgian city of Brussels. They stressed the importance of retaining sight of basic transportation needs and of meeting the requirements of different users (including encumbered users such as mother with prams), with a warning that not all will be served well by, and hence willing to use shared services, despite their potential benefits (over traditional public transport).

3. The current study

The literature cited above highlights the variation among the views of different groups of people in different locations, and the added value of qualitative insight when exploring end-user (or potential end-user) needs and requirements. The overwhelming majority of that work, and of the broader MaaS literature, is dominated by an urban focus. Although exceptions do of course exist (e.g., Mulley et al., 2023), this has led to a paucity of work exploring how the views of those beyond the urban realm might differ from those of their urban counterparts. The current research addresses this gap in the literature by gathering data from individuals spread over a broad geographical area in a region in southern England that is seeing a MaaS pilot scheme rolled out, and exploring that data in terms of the type of place a person lives, i.e., urban, peri-urban, or rural (distinctions that are defined in more detail below).

In contributing to a more detailed understanding of the perspectives of individuals in different residential locations, this research aims to contribute to an understanding of the incentives that might encourage MaaS uptake, the perceived requirements of a MaaS system, and the challenges end-users envisage for MaaS, with the ultimate goal to inform MaaS systems that work beyond the confines of the city, in terms of promoting a shift from the private car to public transport and/or active travel (and combinations thereof) across settings. This research complements work published in a sister article focussing on multi-modal travel, using different data from the same series of focus groups (McIlroy, 2023b).

3.1. Methodology

Asynchronous Online Focus Groups (AOFG; Sweet, 2001) were used to gather input from potential MaaS users. The method involves the use of internet forums where participants can read and respond to posts made by the researcher(s) and other participants in their own time. Although not without their limitations (Gordon et al., 2021), AOFGs overcome many of the disadvantages of in-person focus groups. For example, participants can contribute whenever suitable for them to do so, hence the method facilitates participation from those that have family responsibilities and/or irregular work schedules. As the participants do not need to physically attend sessions, AOFGs better support those who have poor access to suitable transport at the appropriate time.

3.2. Study context

The Solent region, in southern England, comprises three cities (Portsmouth, Southampton, and Winchester), the Isle of Wight, several small towns and suburban areas, and a variety of semi-rural zones. It has an estimated population of 1.6 million (Solent Transport, 2019). The region is one of four Future Transport Zones, a UK government-funded programme aiming to use new

technology to improve travel (Department for Transport, 2020). The roll-out of MaaS is part of this (Pritchard, 2022).

The region is dispersed and highly car-dependent and is characterised by poor accessibility to and from city centres, large employers outside of urban centres, and de-agglomerated commuting patterns (Pritchard, 2022). It therefore represents a potentially more challenging setting for MaaS than other urban areas in which it has previously been tested. MaaS has been trialled in rural areas before (Eckhardt et al., 2018; Mulley et al., 2023); however, this is the first multi-city scheme in the UK.

3.3. Focus group membership

Nine separate asynchronous online focus groups were held, with membership to each group dictated by a person's place of residence and their desire to be in a single gender or mixed gender focus group. The gender aspect was included to address methodological questions around the impact of online focus group gender make up on participant responding. It is also a major topic of interest in transportation research in its own right, with transport being a highly gendered domain (Parnell et al., 2022). The topic is not addressed here as it is the focus of separate, dedicated work; however, it influenced focus group design, with participants self-selecting to a male, female, or mixed gender group, hence its mention here.

Grouping by participants' place of residence also involved three levels. These were urban, peri-urban, or rural. To assign participants to each of these, they were asked "Of the following three options, how would you describe the place you live? We are interested here in your own perception of the place you live, not in an 'official' definition", with the following definitions provided:

- Urban - considered here as living within the limits of a city or town.
- Peri-urban - considered as living in suburban areas on the edge of a city or town or between cities or towns.
- Rural - considered as living in a small village or in the countryside.

This method of assigning participants has its limitations (discussed in the limitations section) but also its benefits. Mounce et al. (2020) suggest that the definition of rurality partly depends on an area's level of transport accessibility, with Pikora et al. (2006) pointing out that a person's perception of the quality of transport infrastructure and services in an area is closely linked with their overall perception of that area, a perception that has a much greater impact on travel habits than any official definition (Pot et al., 2020). It is a person's own evaluation of their capacity to be mobile that matters, not a normative description of location type (Kaufmann et al., 2004). Indeed, research highlights a mismatch between self-reported perceptions of accessibility and quantitative measures of distance and travel time (Lättman et al., 2018), as well as a lack of consistency between official definitions and residents' own perceptions of where they live (Jacob & Luloff, 1995). Hence, self-identification was considered appropriate.

3.4. Online platform, study design, and questions

The ProBoards® website was used to host all focus groups, with study questions (and study information) posted as separate threads in each of the nine forums. Participation was anonymous. The forums were open for 17 days and participants were emailed every other day informing them of new topics having been posted and/or encouraging further participation in discussions. A new topic was posted every other day and the study websites left open for six days after the last topic was posted. Topic wording, study length, and forum website design were informed by a 12-day pilot study with six individuals.

In total, five topics were presented to participants, of which two are the focus of this article (with another the focus of McIlroy, 2023b). Before the first of those was presented, participants were provided with a definition of MaaS and shown a short, promotional video (embedded in the forum web page) describing the Breeze app, the customer facing aspect of the MaaS scheme being rolled out in the Solent region. The MaaS definition given was a general description adapted from the text provided on the MaaS Alliance's website (<https://maas-alliance.eu/homepage/what-is-maas/>) and is provided in full in the appendices to this article. In addition to describing MaaS, it also highlighted its core aim to provide "an alternative to using the private car that may be as convenient, more sustainable, even cheaper in the long term". The promotional video explained the joint ticketing and multi-modal journey planning aspects of the Breeze app, referring to the multiple transport modes that can be booked and paid for through the app, without having to go to individual transport providers' websites or apps. It also described the provision of real-time service information and the potential to plan walking and driving journeys. It did not mention the provision of additional services beyond those that already exist or the selling of mobility 'bundles' common to other MaaS trials (e.g., Hensher, Ho, et al., 2021) as these are not characteristics of the MaaS offering being rolled out in the Solent region.

Participants were then asked "Would any incentives help you try out such an app or use it for more of your journeys? If so, what you most like to see? How do you think such a system might fail?". The second topic asked "What information would you find most useful when planning journeys using active or public transport? What would the least useful type of information be?". Participants were given some examples to consider, including information regarding the busyness of services, security and lighting at stations and stops or on vehicles, journey cost or time, environmental impact, vehicle conditions like cleanliness or state of repair, and the health impact of the different ways of travelling.

3.5. Recruitment

Participants were recruited primarily through Facebook via private community groups representing villages, towns, suburbs, and neighbourhoods across the study region (and immediately outside). An advert was placed inviting participation from those that live,

work, or frequently travel in the indicated area (the map on the right of Fig. 1 was displayed as part of the advert). The advert stated that participants would be reimbursed £10 for their participation. Ethical approval for the study was obtained from the University of Southampton's Ethics Committee (ID 73638.A1).

Group sizes of 10 to 20 are typical in Asynchronous Online Focus Group (AOFG) research (LaForge et al., 2022; Williams et al., 2012), and a goal of 10 participants per group was considered appropriate. That said, benefits for larger groups have been reported (Stewart & Williams, 2005). It was therefore not considered problematic that a total of 223 individuals emailed in response to the study adverts (26 of whom were university employees), far more than initially planned. A link to a demographic questionnaire (hosted on Qualtrics) was sent to those that responded to the adverts and a unique username (based on focus group assignment) given to each of the 173 individuals that completed the questionnaire. The ages and genders of the 146 individuals that ultimately contributed to the focus groups are summarised in Table 1.

As might be expected given UK population statistics (DEFRA, 2021), fewer rural residents participated than urban or peri-urban residents, and those that did were, on average, older. There was a slight under representation of 18–25 year olds and an over-representation of females, in part reflecting UK Facebook user demographics (NapoleonCat.com, 2023).

3.6. Analysis

Participants' responses to the posed questions underwent inductive thematic analysis. This involved developing a thematic coding scheme to identify patterns or themes in the participants' responses, following the approach described by Braun and Clarke (2006). Two such analyses were undertaken: one on the set of responses to the MaaS incentives and failure points topic, and one on the set of responses to the MaaS information requirements topic. The development of a coding scheme was done iteratively over approximately four passes of a response set. During the first pass, the analyst familiarized themselves with the data and started identifying themes. In the second pass, an initial categorization scheme was derived from the identified themes. The third pass involved applying and refining the scheme, and in the fourth pass, the refined scheme was re-applied to determine code counts. Some additional refinements were made, but an additional full pass was not necessary for those adjustments. All of the analyses were performed by a single analyst.

To assess the extent to which the thematic coding schemes developed could be considered valid representations of the data collected, an inter-rater agreement exercise was undertaken (McHugh, 2012). This involved breaking down all participant comments into the individual segments to which a single thematic code had been applied. About 10 % of these segments were randomly selected from each of the two responses sets. An external individual, who had no connection to the current study, was introduced to the thematic coding schemes. This person was then presented with the selected excerpts from the forums and tasked with assigning one code to each excerpt. Percentage agreement and Cohen's kappa statistic were calculated to give an indication of the reliability of the thematic coding schemes.



Fig. 1. The Solent Future Transport Zone (from explore.osmaps.com).

Table 1
Age and gender characteristics of the sample, separated by focus group membership.

		Number of members	Male	Female	Non-binary	Mean age	Age SD	Age range
Urban	Male	14	15			43.7	12.4	31–71
	Female	18		18		41.2	10.9	29–65
	Mixed	16	5	10	1	44.6	13.8	21–76
Peri-urban	Male	19	19			49.9	14.7	20–73
	Female	26		26		41.5	12.4	21–69
	Mixed	25	10	15	0	46.4	14.9	18–70
Rural	Male	6	6			58.3	3.4	55–64
	Female	11		11		51.7	10.9	37–70
	Mixed	10	4	6	0	56.6	16.3	32–77
	Totals	146	58	86	1	46.3	13.7	18–77

4. Results

Across all nine focus groups, the respondents provided 16,278 words of text in response to the question on incentives to use MaaS and how it might fail, and 14,448 to the question concerning information people would find useful. Figs. A1 to A3 in the appendices summarise the number of posts made across the nine forums and the lengths of those posts.

In the set of responses to the question concerning incentives to use the Breeze MaaS app, eight broad themes were identified, split into 68 sub-themes. In total, 541 segments (across the 146 forum posts made) were identified to which a single thematic code could be applied. Fifty-four of those were randomly selected for the inter-rater reliability calculation. With Cohen's Kappa = 0.82 and percentage agreement at 80.4 % (indicating strong agreement; McHugh, 2012), the thematic coding scheme was considered valid.

In the set of responses to the question concerning the information that would be most or least useful when planning journeys, six broad themes were identified. These were broken down into 48 sub-themes. Across the 129 individual forum posts made in response to this question, 568 segments were identified to which an individual thematic code could be applied, hence 57 were randomly selected for the inter-rater reliability exercise. Cohen's Kappa was 0.91 and percentage agreement was 91.2 %, indicating strong to almost perfect agreement (McHugh, 2012).

The two thematic coding schemes are presented in full in the appendices, with descriptions of each sub-theme and a representative quote from the text. Below, a summary and discussion of the most common themes is provided, with a focus on the similarities and differences between responses of those reporting their residential location as urban, peri-urban, or rural (male, female, and mixed group responses were combined as gender differences are not the focus of this article). Quotes are attributed to an individual user by the username they were assigned. Usernames were created based on the group of which they were a member and the order in which they were signed up (and have no other significance). For each quote, the participant's gender and age are indicated.

Table 2
Broad themes, the number of sub-themes under them, and the extent to which they were mentioned in the responses to question three of those living in urban, peri-urban, and rural areas.

Theme	Description	No. of sub-themes	Number of times mentioned			Total
			Participant home location	Urban	Peri-urban	
Other apps	Comments referring to functionality in other apps, including positive or negative comparisons, what is or can be done, and the need to improve upon them or to stand out in some way	2	10	29	7	46
Positivity	Positive comments expressing a desire or willingness to use the app, with or without incentives	2	27	29	13	69
Negativity	Negative comments expressing a reluctance or refusal to use the app, not trusting the app or the systems behind it, or general scepticism and cynicism concerning its development, functioning, and uptake	2	7	23	7	37
Doubt	Comments expressing doubt or lack of trust in costs presented by the app, the value added, or the accuracy and reliability of the information	2	6	14	2	22
Incentives	Suggestions for incentives to encourage people to use the app, whether for first time users or for retaining users in the medium to long term	6	15	20	6	41
Requirements	Characteristics of the app that are considered important for it to function properly, support users' needs, and ultimately be successful	15	44	78	29	151
Concerns	Comments expressing concerns how the app will support certain use cases, functions, or users, and questions around governance	8	37	48	17	102
Features	Suggested features not critical to app success, but expressed as highly desirable, contributing to success of the app (and the aims of MaaS)	31	28	33	12	73

4.1. Concerning the Breeze MaaS app: Would any incentives help you try out such an app or use it for more of your journeys? If so, what would you most like to see? How do you think such a system might fail?

The eight broad themes identified in the responses to this question are outlined in Table 2. Prominence of each theme across the groups' responses was similar; however, there were differences in the presence of sub-themes. All sub-themes, including descriptions thereof, their prominence in the response sets, as well as representative quotes from the forums, are detailed in Table A1 in the appendix. It is not possible to discuss all themes here, hence the following discussions focus on findings that have clearer policy or practice implications.

4.1.1. Other apps

This theme's two sub-themes, *Google* and *Any other*, were similarly prominent across the urban and rural response sets, with the peri-urban residents standing out in this regard. Participants commonly referred to Google maps as an app that Breeze would have to match or better, sometimes highlighting its limitations, or stating how existing apps already support the functions described in the Breeze promotional video or in the description of MaaS provided in the forum question text.

"I would have to be confident that it was a better alternative to using a combination of Google (for route planning) and transport providers' own websites/apps" mp20, male, 54.

The need for MaaS to offer more than Google has previously been highlighted as a requirement for any MaaS system to be of interest to people and be profitable (Hensher, Mulley, et al., 2021). This is reflected in end-users' perceptions, and highlights the importance of going beyond simple ticketing and journey planning systems to also bring in mobility bundles (Kriswardhana & Esztergár-Kiss, 2023), additional route or accessibility information (Dadashzadeh et al., 2022), or shared services (Narayanan & Antoniou, 2023), for example.

4.1.2. Positivity

The two sub-themes under this category were *Unqualified* and *Qualified*, distinguishing statements that were wholly positive (indicating MaaS to be a good idea, expressing a desire to use it, or that no incentive is necessary) with those that were positive but only if some condition(s) were to be met, if it functioned in a specific way, or if it overcame certain barriers or challenges.

"I think bringing together purchasing of tickets is a good idea, and could replace having multiple different apps" fu7, female, 35 (Unqualified).

"I would definitely use the app if it could provide real time information and guarantee that my ticket purchases are the cheapest or best deal possible" fp16, female, 30 (Qualified).

Considerably more unqualified positive statements were found in the responses of those from urban and rural areas, whereas those from peri-urban areas were more likely to qualify their statements. Taken with the result above, this highlights how peri-urban residents are perhaps more likely than their rural counterparts to have attempted to use travel apps in the past, but more likely than their urban counterparts to have experienced challenges therein, through limitations in the apps (e.g., "I think travel apps are very helpful, but they need to be 'universal' or used for places I visit regularly" usermixp13, male, 33) or in the provision of the transport services on which such apps rely (e.g., "I wouldn't need an incentive to use it if it was genuinely useful but as there aren't enough services nearby, I don't see how an app could help" usermixp21, female, 58). That urban residents are more positive is to be expected given the relative abundance of services and facilities available to them, and the added benefit that a journey planning and ticketing app can provide. The greater positivity seen in rural residents' responses is somewhat contrary to expectations, and to other findings reported below. It is perhaps related to an optimism arising from a lack of experience with other similar apps, optimism that has been dampened by the negative previous experiences of peri-urban residents.

4.1.3. Negativity

The two sub-themes within the *Negativity* theme were *Won't use it* and *Scepticism and cynicism*, the former including any comment expressing a complete lack of desire or ability to use the app, the latter expressing some doubt about the app being any good.

"I cannot see myself using this app" fp1, female, 45 (Won't use it).

"We had 'solent go' which just seemed to fade away. Why will any other apps be any better!" mu8, male, 56 (Scepticism and cynicism).

Here there were also group differences. In the responses of urban residents, there were more sceptical comments than those indicating they simply wouldn't use it (at a ratio of six comments to one), for peri-urban residents the two sub-themes were similarly present (a ratio of 10 to 13), and in the responses of those in rural areas, the lack of desire or inability to use was much more common (at a ratio of five to one). This is likely to arise in part from differences in transport provision in the different areas, as well as from experience with other transport apps. In rural areas, car dependency, driven by a lack of other options, is a major issue (e.g., "I would not use this app. There is not enough modes of transport in my area to bother with it" userfr6, female, 37). MaaS will only overcome this if it includes, for example, novel ride-sharing or dynamic demand responsive transport options, with low-level MaaS that only includes journey planning and ticketing for services that already exist unlikely to succeed in these areas (Mulley et al., 2023).

In residents of urban areas, the negativity expressed was less immediately dismissive and more descriptive of the problems that such a system might face, again drawing on issues with the public transport services and active travel infrastructure currently present

(e.g., “*The infrastructure and services seem to be the issue, not the ease of ‘booking’ them.*”, usermu6, male, 45). Only one urban resident stated that they simply would not use the system: “*Nothing will get me out of my car. I have previously explained why - it is a medical issue*” (usermu9, male, 67). Although some MaaS proponents have argued that it could contribute to greater transport accessibility through relatively simple information provision (skedgo, 2022), the challenges faced by disabled travellers will not be fully addressed by a system limited to journey planning and ticketing. Just as with the rural challenge, for MaaS to be successful in facilitating greater transport accessibility among disabled travellers, it will require additional services to be included in the offering. Given the higher average age of rural residents (DEFRA, 2021), and the mobility challenges that go along with that, these issues are interconnected.

4.1.4. Suggested incentives

Five sub-themes were identified under the *Suggested incentives* broad theme, two of which were more common than the others: *Travel discounts* and *Loyalty scheme*. The sub-theme titles are somewhat self-explanatory, with the former expressed more often as a means to get people to start using the app, the latter more often framed in terms of incentivising continued usage. Perhaps surprisingly, despite the question specifically asking participants what might incentivise them to use the app, this was one of least the most prominent themes identified. It may be that a well-functioning app requires no further incentive (as expressed by several participants and captured under the *Positive – Unqualified* sub-theme), with participants choosing to focus on expressing other sentiments.

No substantial differences were found between the three groups in the prominence of this theme, or its sub-themes, with the only noticeable difference being urban residents’ slightly greater tendency to talk of travel discounts. Cost is likely to be more salient to travellers who have some public transport options available to them compared to those individuals for whom public transport is not even considered an option (e.g., “*why does a single bus ticket pre 5 pm from The Avenue to the city centre cost £2.50 when the same length journey in central London is cheaper*” usermu11, male, 34).

4.1.5. Important requirements

Collectively, sub-themes under this broad theme (of which there were 15) were identified more times than any of the other eight parent themes. All referred to functions, features, or characteristics that were expressed in a way that implied if they were not fulfilled, provided, or complied with, then the app would not be used and therefore not succeed.

The most common sub-theme across all three groups’ responses was *Service information*. This covered all comments referring to the need to present live, reliable, accurate, joined up information on public transport services (“*I think the absolutely most fundamental thing about the success of the app will be whether it’s reliable. Does it tell you the right information?*” mixu4, male, 37). The *Price* sub-theme was also prominent across groups. Comments categorised under this sub-theme stressed the need for the app to give the best price for journeys (“*a guarantee it’s always cheapest to book through the Breeze would be good*” fu7, female, 35).

The *Route information* theme, which covered comments related to the need for high quality and accurate mapping that shows all lanes, paths, and routes for public transport and active travel (“*Walking shortcuts would be very important and show what the shortcut is suitable for (i.e. a rambler attire or walking in business attire)*” fp6, female, 50), showed some group differences. Such comments were absent from the responses of rural residents, whereas it was 8th most common in the urban focus groups and 4th most common in the peri-urban focus groups. Although one might expect walking routes to be of interest to those in rural areas, the focus of the question was on multi modal trips that include public transport (rather than recreational walking). It is quite possible that participants in rural areas perceive access to the public transport network too poor to even entertain the idea of linking it with walking (or cycling) routes, hence did not discuss this as a requirement of the MaaS app. This is less of an issue in urban areas; however, in peri-urban areas, existing mapping systems have poor coverage of the complex network of footpaths and cut-throughs typical of suburban housing estates in southern England (“*the maps for walking and cycling need to be good - Google maps often miss out cut throughs, footpaths and cycle paths etc.*” fp20, female, 39). This suggests that better mapping could be a key leverage point for those that could combine active travel and public transport if it were made easier (compared to rural residents, for whom more fundamental access and service level issues exist).

4.1.6. Concerns

The *Concerns* theme was the second most common broad theme. The *It won’t solve bigger issues* sub-theme was most common across groups. Comments categorised under this sub-theme expressed the concern that there are bigger problems with public transport and active travel systems that need solving before MaaS can be successful.

“a reservation I have is that presumably no travel app will improve the actual services. Serious improvements must be made to reliability and frequency in order to truly improve public transport” fu9, female, 37.

The prominence of the theme was especially pronounced in the responses of peri-urban residents. This may be a consequence of residents of peri-urban areas being close enough to public transport options, and have journeys lengths that could be covered by active travel given more supportive infrastructure and facilities, for non-car alternatives to be potentially realistic options (compared to rural residents), but not so well supported that these alternatives can yet compete with the private vehicle in terms of convenience, cost, and time (as may be true for many urban residents) (see also McIlroy, 2023c).

Another sub-theme featuring highly across the groups was *What about those less technological?* This was applied to any comment

expressing a concern that the Breeze app (and/or MaaS more generally) will not serve those without access to smart phones, those less technologically adept, or those that do not (or choose not to) have access to the internet outside of the home (“if the service users are not smart phone owners, how could they use the service provided by app? Will there be information points in various locations ie bus stops, train stations?” fr15, female, 50).

4.1.7. Features

Of the eight broad themes, *Features* was comprised of the largest number of sub-themes, each of which described a different potential feature of the app. Eighteen of those 31 sub-themes were mentioned only once (i.e., a feature suggested by a single individual). They are all described in detail in Table A1 in the appendix. Only four of the 31 sub-themes appeared in the responses of those in all three location groups, all of which are already part of the Breeze app and of most (if not all) MaaS systems.

The *Route options* theme covered the suggestion of presenting multiple options of different mode combinations, including combined active travel and public transport, and information about those options, including time, cost, etc. *Single ticket / payment* described a single payment and ticketing system integrated across platforms and services, and *User-tailorable* described features related to user inputted and geolocated requirements, preferences, accessibility needs, saved journeys, etc. This is not core MaaS feature but is common to most journey planning and ticketing apps. Finally, *Downloadable and presentable tickets* covered comments related to being able to store travel tickets in a form of digital wallet to be used off-line.

4.2. What information would you find most useful when planning journeys using active or public transport? What would the least useful type of information be?

The responses to this question were grouped under six broad themes, summarised in Table 3. As for the previous questions, all sub themes, descriptions thereof, their presence in the response sets, and representative quotes from the forums, are detailed in Table A2 in the appendix. Given the wording of the question, the dominance of comments categorised under the *Information* theme is to be expected, as is the presence of comments discussing the *Least useful* types of information. The presence of *Other views* gives an indication of the importance of transport and mobility to all participants, with many using the space to again voice general comments about public transport and active travel.

4.2.1. Information

The abundance of sub-themes within the *Information* theme reflects the participants’ many different requirements. Of the 31 distinct sub-themes identified, 16 were identified in all the three groups’ responses. The most common information requirement was *Live service information*. This sub-theme covered comments related to tracking the live location of services and providing current estimated arrival times (“live tracking of the mode of transport” fr10, female, 59; “real time information is very useful” mixp28, female, 28). This was most prominent in peri-urban residents’ responses and least prominent in urban residents’ comments. This is likely due to the relative abundance of public transport services in urban compared to other areas, with high service frequency rendering this information less critical. Of most prominence in those participants’ responses was the *Route info* sub-theme, concerning information on the routes themselves and timetables linked to maps, with the presentation of various route options (and information about those options) a key concept (“if you put in your start point and your destination, how about something that gives you the options for making that journey (which it is accepted will be multi-modal) and the price/time to complete” mp11, male, 70).

The second most common sub-theme in urban residents’ responses was *Journey time*, concerning total journey times, arrival times, and wait times, and comparisons between modes for these factors (“Cost, arrival time and how long it takes to complete your journey based

Table 3

Broad themes, the number of sub-themes under them, and the extent to which they were mentioned in the responses to question four of those living in urban, peri-urban, and rural areas.

Theme	Description	No. of sub-themes	Number of times mentioned			Total
			Participant home location Urban	Peri-urban	Rural	
Information	Comments describing specific types of information that the participant or other would find useful or consider as adding benefit	31	184	207	68	459
Features	Suggested features expressed as being desirable. Conceptually the same as the <i>Features</i> theme identified in Question 3 responses	6	7	5	2	14
Least useful	Comments stating which pieces of information would be least useful	4	12	17	9	38
Ease of Use	Discussing the way in which information is presented in the app, on services, or at stations and stops (concerning presentation not content)	–	0	3	2	5
Negative	Comments expressing a lack of desire to use the system, general scepticism, the potential for information to over complicate things or create negative affect, and explanations of having choices constrained regardless of information provided	5	4	5	9	18
Other views	Descriptive of people’s experiences, habits, or opinions, comparing (negatively) with other countries and typically complaining about UK public transport and active travel infrastructure and services	–	11	13	10	34

on current traffic times” mu14, male, 39). For peri-urban and rural residents, this was considerably less prominent. A potential explanation relates to the greater availability of route options in urban areas. Where a variety of options are realistic in terms of travel time and cost, information about those options would be valuable. Where viable options are perceived to be limited, for example where users are already aware that it would require a long walk to access public transport and the connection of multiple services to reach a destination (i.e., in peri-urban and rural areas), such comparative information may be considered of lesser importance.

Another sub-theme in which notable differences were observed was in *Car parking*, relating to comments about the presence, availability, and cost of at-station and nearby on-street parking (“*Parking available and cost (if I’m driving to a train or bus)*” fr11, female, 40). This was more prominent in the responses of peri-urban and rural residents. Related to this, the *Bike parking* sub-theme was also more prominent in the comments of those from peri-urban areas. This highlights the potential for cycling and public transport combinations to replace some vehicle journeys for those individuals.

The *Security and safety* sub-theme was similarly prominent across groups. Comments under this sub-theme included those about security at stops and stations and about safety for active travel, including lighting, cameras and their functional status, and the typical presence of people (e.g., whether an area is usually busy), including mentions of human staff (“*If I’m traveling at night i would like to get information on my destination security and the lighting at the stop*” mixp2, male, 43). Interestingly, this information was expressed as potentially conflicting with sustainability goals:

“Although helpful to have information on safety and lighting, if there was a question of safety and lighting I would be wary of walking or visiting the station at night. I have a car and although ideally I want to be environmentally conscious and take public transport, there is no way I would put myself at any personal risk to achieve this. If I hear or think a station is unsafe, I would not go to it” fp12, female, 43.

Although in some instances it was included under *Safety and security*, *Human staff* was also included as a separate sub-theme. The sub-themes could be co-present; however, the distinction was made as some made clear reference to staff in terms of a security presence (“*I wouldn’t use a train if I knew I needed to get in/ off at night with poor lighting and no station staff*” fp22, female, 41), whereas for others the issue of staffing was more related to having a human to talk to in case of any journey complications or difficulties (“*Is there a human being on site at all in case there are any problems. How would I find out about delays / cancellations*” fr13, female, 48). This sub-theme was most common in the responses of rural residents, and of importance to some peri-urban residents; however, it was completely absent from urban residents’ responses. Age may be a factor here, with older individuals more highly valuing human interaction compared to interaction with unmanned information and public transport systems (Harvey et al., 2019; Kassens-Noor et al., 2020). The typically quieter nature of peri-urban and rural areas (compared to urban areas) may also be of influence, particularly in terms of security, with a requirement for human staff perceived as lower at busy stations or areas compared to those that see fewer travellers (Hidayati et al., 2020; Macmillan et al., 2000).

A final sub-theme worth discussing is *Stations and stops*. Comments categorised under this sub-theme related to information about locations and layout of stations and stops, the type of shelter present, and information on the presence and status (e.g., open or closed) of facilities (including toilets and lifts) and shops and cafes (“*Whether there is an open waiting room / what waiting room facilities there are would be helpful*” fp24, female, 41). This was most prominent in the responses from peri-urban residents.

4.2.2. Other themes

Question four specifically asked what information participants considered least useful, hence the presence of the *Least useful* sub-theme. The 38 instances of participants making comments about which information types would be of little use were divided into four sub-themes (*Health, Environmental, Condition and cleanliness*, and *Adverts*). These were similarly present across transcripts.

Within the *Negative* theme, five sub-themes were identified, two of which are worthy of discussion here. The first, *Not interested*, covered comments stating that an individual simply wouldn’t use the app (“*I don’t need that sort of service*” mr6, male, 55), all of which were found in responses from rural residents. This highlights a major challenge for MaaS in rural areas. The second, *Choice constrained*, was not unique to rural residents, but was more common in their responses. This sub-theme covered comments explaining that it doesn’t matter about the information as there is only one service available, and that information doesn’t impact choice (“*in most cases there is no option to choose a greener alternative*” fr14, female, 69).

The *Other views* theme (which was not divided into sub-themes) was identified across all response sets, with a greater prominence in rural resident’ responses. The theme encompassed comments recounting people’s experiences of public transport, active travel, and multi modal travel, as well as those comments suggesting improvements to services and infrastructure. The prominence of the theme, especially in the responses of rural residents, further underlines the difficulties people face in choosing non-car options, and the strength with which people hold views concerning personal mobility.

5. Discussion

The work presented above explored the responses gathered, via a series of asynchronous online focus groups, from 146 residents of an area in which Mobility as a Service (MaaS) is on the cusp of being rolled out. It revealed several insights concerning the characteristics and features that a MaaS app could, should, or must have (or not have) to be successful, and the types of information that end users consider useful or necessary. Focussing on participants’ residential location highlighted some differences in the importance given to certain concerns about the functioning of MaaS and the requirements of a MaaS system if it is to support users across locations, not only those that live in dense, urban areas (a typical MaaS focus; Mulley et al., 2023).

5.1. Common experiences, concerns, and requirements

There was a strong sentiment that no phone app is going to get people out of their cars without accompanying reforms to fundamental services. Given that public transport has been described as the ‘backbone’ of MaaS (Mulley et al., 2023), this highlights a major challenge. This is the case across areas, though especially pronounced in rural areas where well-known and documented challenges are unlikely to be overcome with traditional public transport offerings. There is likely a need to move towards more localised, demand-responsive services, as has been the focus of much of the rural MaaS research (Eckhardt et al., 2018; Mulley et al., 2023). Although a MaaS app may be able to support or facilitate public transport uptake, this is only if the services themselves are improved. MaaS, in this context, is a nice to have, it is “*the icing on an imaginary cake. We need a decent cake*” (mixp16, female, 61).

A second feature common to the responses of participants from the three location groupings was the comparison with other apps (including Google). This reflects Hensher et al.’s (2021) discussion of the need for MaaS to go beyond existing, successful journey planners in order to succeed. If users can already plan their journey, get turn-by-turn navigation, and pay for most transport services (through deep links and the Google or Apple pay systems), what room is there for a new MaaS app, and how can small-scale pilots (such as the Breeze offering of this study’s region of interest) compete with highly resourced tech giants?

Hensher et al. (2021) go as far as to suggest that level two MaaS, that which only includes journey planning and combined ticketing but does not include bundles or subscriptions (i.e., the level at which the Breeze app is currently positioned) (Sochor et al., 2018), is likely to be sufficient for most people, with few needing or wanting subscriptions or bundled service packages. This paints a potentially gloomy picture for Breeze, and for other MaaS systems positioned at this level (i.e., most MaaS offerings that currently exist), as well-established existing mapping services already include these features (to an extent); however, there are some positive lessons that can be gleaned from the results presented above. For example, the most common theme identified in the responses to the question concerning information requirements was related to the provision of live service information, in particular the live location tracking of services (the importance of which was also highlighted by Lopez-Carreiro et al., 2020).

Although Google does now provide live arrival and departure times for many public transport services, it does not currently present vehicle locations on the map (as moving icons), something that was mentioned by participants to the forums as being highly useful. The Breeze app (and several individual bus companies’ apps) does provide this information. This represents a key selling point for this and similar apps (perhaps until Google adds this feature).

In terms of the information required of a MaaS app, a strong sentiment that came through was a need for accurate and reliable data, and that the system will only be as good as the data on which it is based. This highlights a perception that existing public transport data is not generally reliable, a factor that compounds broader service reliability issues, a major problem for multi-modal travel (Rietveld et al., 2001).

Concerns about digital literacy and connectivity were found in the responses of all participant groupings. The benefit of a single digital platform for multi-modal journey planning and ticketing was not lost on the participants; however, the risk of leaving behind those less technologically adept, and in so doing contributing to increased transport inequity, is a real danger. The academic community is aware of this (Alyavina et al., 2022). Results presented here suggest the wider community is too.

5.2. Differences between groups

In the responses of urban residents, positive comments far outweighed negative ones; in rural residents’ responses, there were around twice as many positive comments; but in peri-urban residents’ responses there were almost as many negative comments as positive ones. In terms of the types of comments made (i.e., the sub-themes), urban residents’ negative comments usually involved scepticism about MaaS (rather than outright dismissal), whereas rural residents were more likely to say they simply wouldn’t use MaaS. Where non-car alternatives are more available (i.e., urban areas), negative sentiments are concerned with the specific functioning of MaaS rather than a view that it would be of no use. Conversely, where residents perceive service provision to be poor (and where perceptions likely match reality), an app for journey planning and ticketing is less likely to be seen as helpful (“*I would not use this app. There is not enough modes of transport in my area to bother with it*” fr11, female, 40).

Regarding the peri-urban residents, the greater presence of negative comments (which were split equally between outright dismissal and scepticism) may be connected to poor experience with or perceptions of non-car alternatives in their area, with the issue being more salient than it is for rural residents (where services are mostly absent), and more complex than for urban residents (where service provision is greater). Peri-urban residents’ positive comments were also much more likely to be qualified by some other statement (rather than be simply positive, i.e., it sounds great *but*... I’d use it *if*...), and they expressed concerns about MaaS to a greater extent than those in the other groups.

The greater frustration (and more negative attitudes) implied by the peri-urban residents’ scepticism towards MaaS may arise partly from a conflict between an understanding of the benefits of using public transport and a perception of the barriers to its use (i.e., its disadvantages; Soopramanien, 2011). The complexity of the issue for peri-urban residents, where dominant commuter lifestyles present a challenge for disjointed public services, has long been recognised (Errington, 1994; Ravetz et al., 2013). This represents an opportunity for MaaS given the complex and cyclical relationships between travel mode satisfaction, experience, and attitudes (De Vos et al., 2022), with information provision representing a relatively low-cost route to impacting upon these factors (Chorus et al., 2007).

One way to do this would be to ensure the app has detailed and accurate mapping information, including the small cut throughs and shortcuts that are available to active travellers and that are often lacking in other online journey planning and mapping systems. This was important for peri-urban residents where such information would help those that might be more inclined to link active travel and public transport to replace a car journey. Lending weight to this idea was the greater prominence in peri-urban residents' responses of comments concerning bike parking and other facilities (including shops, cafes, and toilets) available at stations and stops.

Peri-urban residents also stood out in the extent to which they discussed live service information. Again, where non-car services are closer to being perceived as a realistic alternative (vs. in rural settings), but where regularity and connectedness is a more limiting factor (vs. urban settings), such information provision could prove especially valuable. If some of the public transport supply side barriers can be overcome (Butler et al., 2021), MaaS has potential to facilitate modal shift towards public transport and active travel among commuter populations in those areas.

To return to the issue of the MaaS levels, touched upon above in the discussion of Google as a competitor, the current Breeze offering is somewhat limited in scope, doing little more than offering a booking and planning system for services that already exist. Although much effort has gone into integrating timetables and ticketing systems, Breeze sits at level two of Sochor et al.'s (2018) topology as it does not include any form of subscription models. While Hensher et al. (2021) have argued that such a system would be sufficient for most, results presented above suggest this to be true only for residents of urban areas, where the level of public transport service provision and amount of active travel infrastructure are such that these options are at least realistic alternatives to the car. To what extent the inclusion of mobility bundles might encourage more sustainable, non-car travel in those beyond the urban domain remains to be seen; however, the findings presented above tentatively suggest that additional services (e.g., dynamic demand responsive transport) will need to be included to have meaningful influence on travel in rural regions.

6. Limitations and future work

An attempt has been made to focus on those themes and sub-themes that were more common or of more interest to policy and practice; however, this does not necessarily equate to greater importance or potential impact. It is quite possible that the realisation of an idea proposed by a single individual could be more impactful than rolling out a feature identified by most respondents. Equally, a concern raised by fewer voices is not necessarily a concern of lesser validity or importance. The reader is therefore invited to make their own interpretation of the information presented in Tables A1 and A2 (in the appendix).

The self-identification approach to assigning participants to urban, peri-urban, or rural categories avoids the challenges to and inconsistencies in official definitions (Bennett et al., 2019) and the blurring of these concepts (Dymitrow & Stenseke, 2016); however, it results in the possibility that two people with similar residential situations could have self-identified as living in different area types. This has potential to muddy the waters with regards to making comparisons across the three location groupings. Given the clear differences in some of the themes explored, and the qualitative nature of this research, this issue is not considered critical. Nevertheless, it should be acknowledged.

Recruiting wholly online risks excluding those with less access to digital resources, as does the practice of hosting focus groups online (Tran et al., 2021). These disadvantages are, however, outweighed by two significant benefits: the potential for regional representation at low cost (of recruitment through Facebook groups), and the chance for higher engagement with people unlikely to travel to in-person focus groups. It is also worth pointing out that MaaS apps are online, digital systems, and that people who are completely disconnected from the online world would be highly unlikely to engage in such a system anyway. In terms of wider transport system design, their views are of course important; however, given limited resources, they do not represent the most value-for-money target for interventions or recommendations linked to MaaS. The exclusion of their views is therefore not considered a critical limitation of this work.

A common MaaS feature that has not been explored here is the subscription package or bundle. This payment model is not currently being offered in study region (rather it is only a pay-as-you-go (PAYG) system), and details of it were not included in the MaaS definition provided (presented in the appendices) nor in the explainer video shown to participants. There is evidence to suggest subscription packages can encourage modal shift (away from cars) to a greater extent than PAYG offerings (Hensher, Ho, et al., 2021); however, this has not yet been explored in a multi-city region or outside of urban contexts.

Age arises several times in the analyses and discussions presented above; however, this has not been explored in detail. Gender is also a factor of significant importance. Although not directly addressed above, it is likely that comments made by participants, particularly with regards to safety and security, will have differed between people of different genders. Moreover, gender was a characteristic on which focus group membership was based. To devote sufficient attention to the impact of residential location, these two factors were not explored. Age and gender are the focus of future work.

7. Conclusions

This research has highlighted some of the different challenges of ensuring the success of MaaS in rural, peri-urban, and urban areas, taking an end-user perspective to do so. Accurate, reliable, and up-to-date information on individual services is a core requirement for all. For those in urban areas, the presentation of multiple journey options, with associated information on travel time and cost, are key.

In this regard, it is through the provision of rich information that MaaS can offer unique benefits to travellers over and above existing journey planning or mapping systems.

For those in rural areas, fundamental service provision limitations hamper the potential for traditional, urban-focussed MaaS schemes reliant on public transport networks. The argument presented by [Mulley et al. \(2023\)](#) stands out here; a successful, rural MaaS system will be distinct from urban MaaS “and we should not, given the characteristics of rural areas, compare with MaaS in urban areas” ([Mulley et al., 2023, p. 82](#)).

Perhaps the greatest potential for MaaS to impact positively on our transport system is in the suburban and peripheral regions beyond the urban core, here collectively referred to as the peri-urban areas ([European Commission, 2015](#)). For residents of these settings, detailed route information that facilitates the use of cut-throughs and short cuts when using active travel modes, the linking of private transport with public transport, and information on the facilities available at stations and stops, are of particular significance. There is a real opportunity here for MaaS to counter negative attitudes and to help travellers link private and active forms of transport with traditional public transport offerings as an alternative to the private car, ultimately contributing to reduced car dependency among commuters.

Although there are opportunities for MaaS to help people out of their cars, the clear message from end users is that a journey planning and ticketing app is a facilitator not a driver of travel behaviour change. This is particularly true for those outside of urban centres. For end users, MaaS will represent a valuable and useful component of a fully integrated transport system; however, it is but one component. The myriad other barriers to active and multi-modal travel must also be addressed, otherwise MaaS will remain no more than “the icing on an imaginary cake”

CRedit authorship contribution statement

Rich C. McIlroy: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing.

Data availability

The authors do not have permission to share data.

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Appendix

Number of posts, number of words and average length of posts across the nine focus group forums.

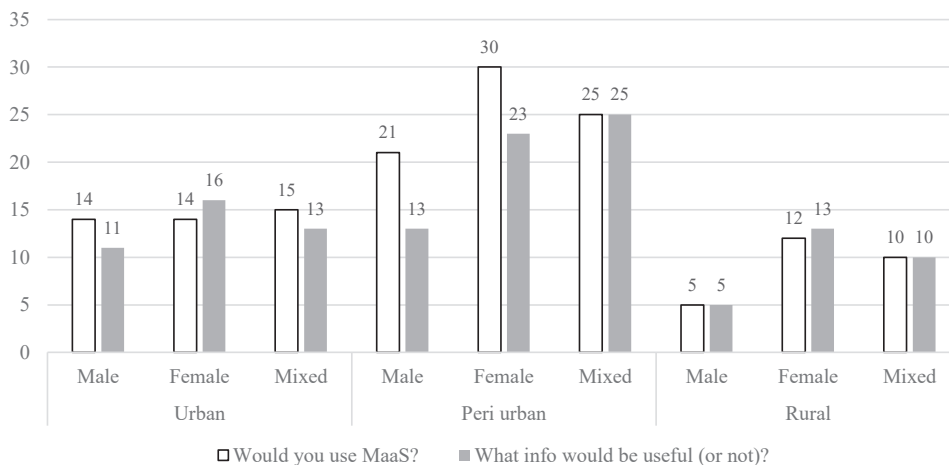


Fig. A1. Raw number of posts made in each online focus group forum.

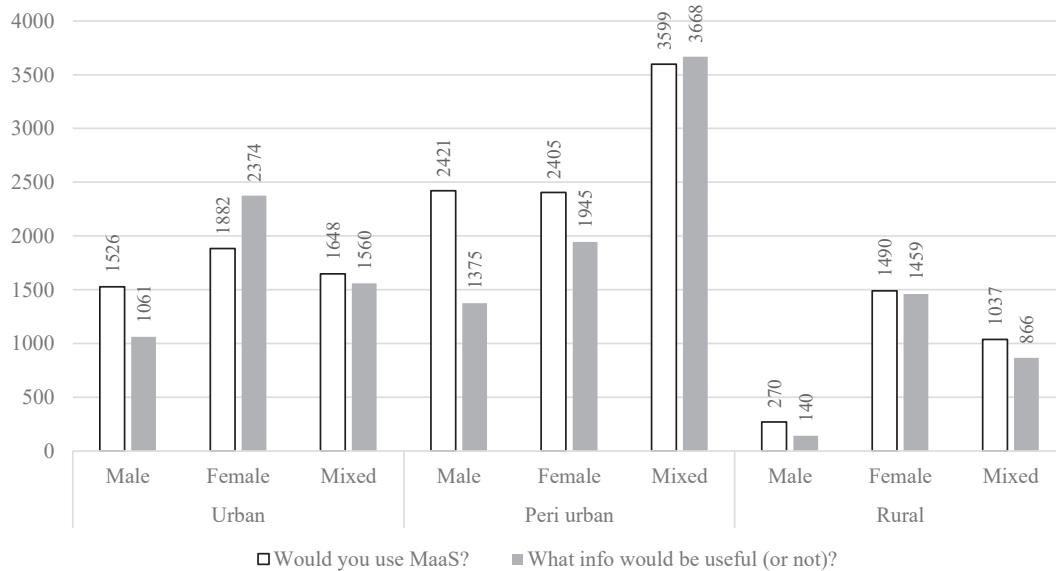


Fig. A2. Raw number of words written in each online focus group forum.

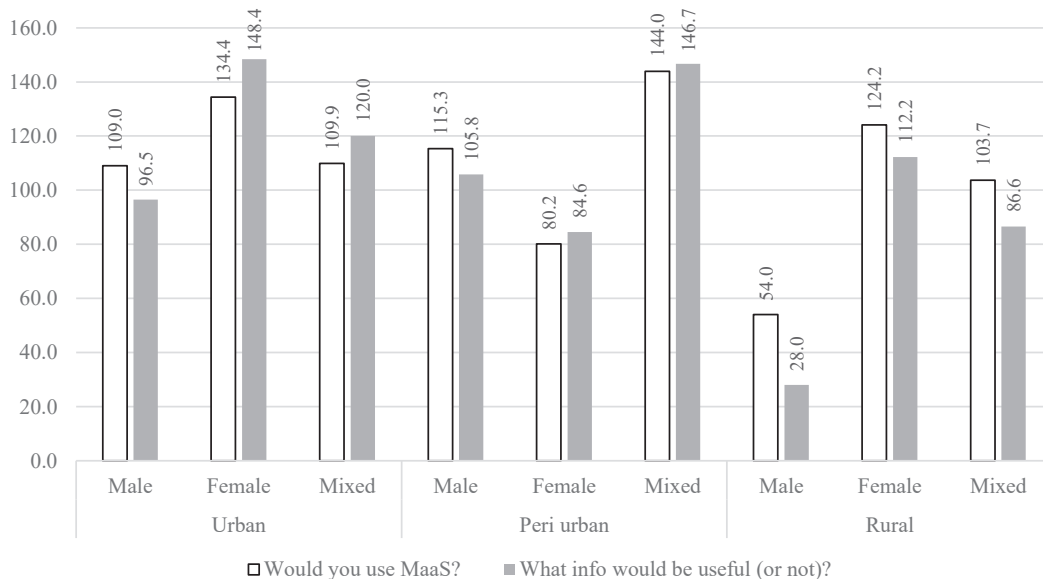


Fig. A3. Average number of words written per post in each online focus group forum.

Table A1

Categorisation scheme for responses to the question “Would any incentives help you try out such an app or use it for more of your journeys? If so, what you most like to see? How do you think such a system might fail?” (following a description of MaaS and presentation of a promotional video for the Breeze app). The number of times each category is present broken down by a participant’s home location.

Category	Sub-category	Description	Example quote	Number of times mentioned			Total
				Participant home location	Urban	Peri-urban	
Other apps	Google	Comparison to other apps, in terms of what is or can be done in those apps and the need to do it better.	“You can already do something like this with trains and busses on Google” usermixp5	5	15	3	23

(continued on next page)

Table A1 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			
				Participant home location Urban	Peri-urban	Rural	Total
	Any other		“it will need to work better than the very clunky Solent Go app” usermixr4	5	14	4	23
Positivity	Unqualified	Stating no incentive needed, app sounds great, would use it.	“It sounds like a good idea where multiple forms of transport are on offer” userfr14	19	14	10	43
	Qualified	Sounds great <i>but</i> ... Would use it if...	“That all sounds great but as others have said, would it mean you also got the best deals on train tickets?” userfp19	8	15	3	26
Negativity	Won't use it	I or others won't or can't use it or would rather use something else.	“Nothing will get me out of my car” usermu9	1	10	5	16
	Scepticism and cynicism	Doubt it's any good, money better spent elsewhere, just another app	“Personally the app seems like a waste of time for now but I wonder if this is the only option available with limited investment options to try and drive more public and active travel” usermu6	6	13	2	21
Doubt	In price	How can I trust it has the lowest prices?	“I would not be convinced that it offered the cheapest ticket price therefore would then compare the app to buying separately which would take longer” usermixp25	3	6	0	9
	In information and functions	How can I trust it has reliable, up-to-date info, and functionality?	“I absolutely do not trust app 'services' which are not run directly by the company I am trying to buy the service from” usermu6	3	8	2	13
Suggested incentives	Travel discounts	Discounts on journeys, especially multi-modal journeys	“incentive wise a reduced cost to bus tickets etc would work well, or if it was possible to combine train and bus tickets and get an overall discount” usermixr11	8	9	3	20
	Initial credits / free rides	An introductory offer to encourage first use of the app	“A good incentive to use the app would be a free bus/train ride when using the app - that would be a good way to try it out!” userfp29	1	4	0	5
	Exclusive deals / bundles	On-going deals on travel exclusive to the app	“Exclusive deals: ability to offer most competitive rates/lowest price tickets” userfu10	1	0	0	1
	Chance to win	Journeys fares, travel credit, or entrances to local attractions	“Loyalty discount if a regular user”	0	0	1	1
	Loyalty scheme	Build points, get more discounts or free journeys	“perhaps a coffee shop style incentive where you collect 'stamps' that build up to something, some kind of discount/free travel or the more you use it, the bigger discounts get” userfp2	4	7	1	12
	Other discounts / incentives	Free entrances to local attractions, discounts at shops and cafes, or employer discounts	“I think some financial compensation from employers for using the app/public transport in general would benefit uptake” userfu14	1	0	1	2
Important requirements	Service information	Live/immediate, reliable, joined up, accurate info and updates on public transport and traffic	“the app will need to be using “live” and accurate information” usermixr2	9	20	8	37
	Route information	High quality and accurate mapping, giving all lanes/paths/routes for public transport and active travel	“the maps for walking and cycling need to be good - Google maps often miss out cut throughs, footpaths and cycle paths etc.” userfp20	3	5	0	8

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Table A1 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			
				Participant home location Urban	Peri-urban	Rural	Total
	Robust, easy to use app	Stable, functional, reliable, updated, easy to use app	“A local app would need to be reliable and work almost perfectly from launch” usermixp7	4	12	2	18
	Customer service	Good, on-going customer support (especially if/when things go wrong)	“I think making sure there is also a phone line that you can call or text is important for people who don’t have digital access. But the phone line would need to be well resourced” usermixu10	3	0	0	3
	Free to download	Have no initial cost to the user	“It should be free to access” userfr15	0	1	5	6
	No adverts	Have no in-app advertising	“Adverts would also frustrate me in using this app” userfr9	0	1	2	3
	All phones	Work on all (smart) phones	“The Breeze Journey Planner is not available for my phone. My connection to a Garmin Edge does not work anymore because I ‘need’ to update my phone. My phone works very well for me thank you” usermp24	2	1	0	3
	All ticket types	Support all ticket types and offers / discount codes, including employer discounts, bus passes, concessions, etc. for whole or parts of journeys	“It would hopefully have all the ticket options that are available including discounted tickets that you might be able to get” userfr11	5	4	3	12
	Resilient and adaptable	Be reactive to delays and cancellations, updating information on the go and allowing transfer of money spent if changing plans	“How adaptable is the app? If I was to change my plans halfway through my journey, could the app accommodate for this? Or can the app adapt to delays?” usermixu7	4	2	0	6
	Include all transport	All buses, taxis, trains, ferries, micromobility, etc. It only works if it is fully comprehensive	“Might fail if...not all providers participated eg it was an incomplete system eg one bus company wouldn’t join but offered similar or alternative routes” usermixp15	2	3	2	7
	Promotion	Wide promoting and advertising is crucial to app take up and success	“It needs to be really well advertised and promoted in the trial area” userfp27	0	3	1	4
	Data security	Including personal privacy, between companies, and regarding payments	“It should be free to access and also ad-free with heavy focus on data privacy and security features” userfr15	0	2	2	4
	Price	Must give the best price available	“I’d need to feel confident that the tickets bought were the cheapest” userfp20	8	19	4	31
	Accessibility	Must contain accessibility info on ALL journey aspects and links to passenger assistance	“It would need to take into account people with disabilities they need to know about disabled access can the taxi take a wheelchair user” usermixp5	4	4	0	8
	Driver awareness	Public and shared transport and taxi drivers must be aware of the app and accept the tickets	“all services etc. need to know about it and be aware of it, if you booked via the app but your bus driver had never heard of it and wouldn’t accept your ticket or something then again, it will get ‘bad press’” userfp2	0	1	0	1
Concerns	It won’t solve bigger issues	There are bigger problems with public transport and active travel that need solving before MaaS can work	“a reservation I have is that presumably no travel app will improve the actual services” userfu9	12	28	6	46
	Only as good as the data	Are all companies involved? Will they provide all the necessary	“Reliance upon various company’s ‘inputting’ their data	3	2	2	7

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Table A1 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			
				Participant home location Urban	Peri- urban	Rural	Total
Features		data? Can accuracy and reliability be guaranteed?	and keeping it up to date. I can imagine links to resources may break or go out of date, in the case of a single app trying to pull together information on so many different transport providers” userfu10				
	Bad experience	One bad experience will impact use disproportionately. Success highly dependent on first use.	“One bad experience (i.e., not real time info leading to missing a connection or realising you could have got your ticket elsewhere) will stop people using it and it will be very hard to re-build trust in the system once it is lost” userfp2	0	2	1	3
	What about those less technological?	How to help those with no smart phone, who don't use apps or digital payments.	“if the service users are not smart phone owners, how could they use the service provided by app?” userfr15	7	4	4	15
	Safety	Generally questioning how an app will help	“One of my main concerns with travelling to certain areas in Hampshire is still safety, but I'm not sure how the app can address these” usermixu15	1	0	0	1
	Responsibility / accountability	Who will be accountable for journey disruption? What about interoperability, blame if something goes wrong, refunds, compensation?	“If for example it was a train that was missed who would you then go to for compensation for delays etc. Would this be the train provider or breeze?” userfu8	5	0	0	5
	Geographically limited	To the Solent region and/or to urban areas	“I feel that the service is hugely limited by it's geographic boundaries. There is obviously a place for this when journeys are entirely within the South Hampshire area” usermp8	3	8	2	13
	Phone charge, signal, data	What happens when battery runs out? When signal is poor? When you've used up your data?	“I'd also be wary that I'd need my phone to always be charged and always have a signal” usermixr9	6	4	2	12
	Route options	Give multiple options of different mode combos, inc. combined cycling and public transport, and info about those options (time, cost, etc.)	“I need to be able to first put in start and end point then get options to travel from point to point that include mode of transportation including walking, time for each, cost for each, timeframes” userfu12	5	4	2	11
	Parking info	Show nearby parking for bikes and cars, including presence, type (for bikes), availability, and cost	“It'll be great if the app has included in its map details such as nearby parking for both personal bikes and cars” usermixu15	2	1	0	3
	User-tailorable	Support user inputted and geolocated requirements, preferences, accessibility needs, saved journeys, etc.	“It would be good if you can save journeys and routes that you prefer to use” userfr11	2	2	1	5
Detailed route information	Including lighting, surface quality, safety, joined routes up or not. Crowd sourced or 'official'.	“Information about very good public transport/walking/cycling/e-scooter routes will be helpful in terms of time/money saving, safe routes. Local knowledge should be integrated where possible” userfu1	1	2	0	3	
Stations and stops	Provide info on toilets, lifts, shops, cafes, etc. Their presence and their status.	“I'd want to know if the lifts and toilets at the train station were out of action on a particular day” userfp18	0	2	0	2	

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Table A1 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			
				Participant home location Urban	Peri-urban	Rural	Total
	Legitimacy/capturing	Support the option of splitting following journeys into single, personal journeys to reduce cost	"being able to split tickets to avoid any pain of the journey and dependence on individual preferences of a longer journey" userfp21	0	0	0	1
	Set arrival time	Allow users to set their desired time of arrival and work backwards, for different route options	"were I to have an appointment in Portsmouth at a specific hour I would wish to enter that time and then for the app to propose a schedule on how to get from eg Ventnor to Portsmouth by that time" usermixu2	1	0	0	1
	Links to transport companies	Provide phone numbers of transport service providers and links to official websites	"The system should include live updates with relevant links to official sites" usermixu2	2	0	0	2
	Personalised history and recommendations	Suggest routes, passes, or other fare offers based on personal journey history	"It would also be great if the app stored the history of all of your previous transactions/routes, seeing as it would make a desired repeat journey both quicker and more efficient to revisit" usermixr2	1	0	1	2
	Micromobility availability	Show number of physical vehicles (e-scooters, bikes) at a location and their charge status	"Re e scooters and e bikes will the app tell you definitely how many are available at that moment so you can plan? Nothing worse than thinking I will use the e scooter to get down or up ryde pier to find they've all gone!" usermixr8	0	0	1	1
	Contactless	Support contactless ticketing through the app	"It should allow contactless ticketing" usermixr4	0	0	1	1
	Bikes on trains	Information on spaces and availability	"It would also be good when getting a train ticket to be able to book a place for your bike to go on the train if you are cycling to the station on your own bike to use at the other end" usermixu6	1	0	0	1
	Location format options	Support a variety of ways to input location (e.g., map, postcode, OS ref, coordinates, names)	"I don't always know the postcode, or the correct name of the place. If you had input options of postcode, street name, town name, OS reference, geographic reference, then that would give options" usermixp16	0	1	0	1
	Near miss reports	Provide a tool to report near misses, as any type of road user	"Portsmouth County Council have a "Near Miss" reporting tool that people walking or cycling could use to report an issue on the road (working the "hazard triangle"); perhaps a link into that and have a common reporting approach across the area?" usermixp6	0	1	0	1
	Road and lane block info	Information on road and cycle lane blockages, including two types: 'official' data and crowd-sourced data (including illegal parking)	"could/should also include information from the Highways/one.network and the local councils (including Parking Authority) on roadworks/closures & diversions and any reported issues to assist, especially those walking/wheeling to determine if the pavements are blocked by works, or enable a one shot way to report issues with them; be that pavements or crossings blocked	0	1	0	1

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Table A1 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			
				Participant home location Urban	Peri- urban	Rural	Total
			by illegal parking, undeclared works (looking at you + cable companies) or other such crowd funded information" usermixp6				
	Companion website	To plan journeys at home or at the workplace	"I'd want a site as well as an app so I could lookup stuff while at work" userp14	0	1	0	1
	Fare cap	A daily cap above which users will not be charged more	"Daily fare caps (similar to TFL)" usermp21	0	1	0	1
	Single ticket / payment	Single payment and ticketing system integrated across platforms and services	"to be able to make single payments for multiple providers" userfu13	5	5	3	13
	Season tickets	Support season ticket purchases through the app	"Could you buy a season ticket through the app?" userfu14	1	0	0	1
	Car share	Provide car share options	"Possibly include the option to share car journeys?" userfr11	0	0	1	1
	Journey gamification	For the encouragement of interaction with the app and with journeys	"game like element for kids to get involved with, helping families plan weekend journeys etc. might work" userfp2	0	1	0	1
	Weekend and school holiday discounts	To support families and encourage use of the app	"Another incentive could be to encourage family use at weekends or school holidays, not just the daily commute" userfp13	0	1	0	1
	Street View	Link to Google's Street View® and/or photos of an area	"I like that I can "see" what the site/area looks like before I am actually there" userfu12	1	1	0	2
	Service capacity	Information on how busy a service is	"Knowing how busy services are would be helpful. I used to commute by train to London and could be standing for an hour if the train was very busy" userfp12	0	2	0	2
	Downloadable tickets	Allow downloading of multiple tickets to a wallet for use when offline (no wifi, no data)	"I'd like to see a feature where you could store the tickets in your digital wallet" userfr9	1	4	1	6
	App accessibility	Ensure the app is accessible through screen readers and voice prompts, talk to text, and text options for hard of hearing	"it needs to have clear visuals so those with poor reading levels can still use it. Has it been designed using accessible technology eg screen readers and voice prompts? What involvement in the design process from the disabled sector?" userfu4	2	0	0	2
	Crowd-sourced route info input	Allow users to suggest routes or comment on existing routes for safety, quality, suitability for scooter or bike, wheelchair or buggy, etc.	"will need a very efficient way for contributors to suggest new routes / shortcuts and check if paths suggested are suitable" userfp6	0	1	0	1
	Advance billing	Support addition of credit online in advance, or allow users to buy tickets in advance	"It would be useful to be able to purchase tickets in advance" usermu15	1	1	0	2
	Share journey	Send a particular to others	"Be able to send journey to phone and share with others" userfu12	1	0	0	1
	Feedback	System to feed data back to the DfT and service providers for system improvements (e.g., so they put on more services where required)	"I also think that the app, used in the right way, could give the department for transport useful insight in to people's travel requirements, allowing them to offer services in areas that are lacking suitable public transport options" userfr9	0	0	1	1

Table A2

Categorisation scheme for responses to the question “What information would you find most useful when planning journeys using active or public transport? What would the least useful type of information be?” The number of times each category is present broken down by a participant’s home location.

Category	Sub-category	Description	Example quote	Number of times mentioned			Total
				Participant home location	Urban	Peri-urban	
Information	Route options and information	Information on route services, maps, timings, timetables, legs, platforms, etc. for all stops, whole routes, with good mapping. Give options.	“Options - that is the other much needed source of information - if you put in your start point and your destination, how about something that gives you the options for making that journey (which it is accepted will be multi-modal) and the price/time to complete” usermp11	22	17	7	46
	Live service information	Tracking live location and current estimated arrival times (inc. delays, cancellations, etc.)	“The most useful information when planning journeys is up to date live and accurate information about the service” userfr9	19	39	14	72
	Journey time	Total journey times, arrival times, and wait times, and comparisons between modes	“The travel times as a given (the most important aspect for me)” usermixu8	20	9	3	32
	Cost and fares	Including whole journey and leg costs, comparison against petrol and parking costs, fare details, reveal cheapest fare	“I still look at the cost of the journey in all cases to compare prices whether to take the car or take public transport. I add up all the costs usually (tickets + car park) vs taking my car to the location” userfu11	16	21	9	46
	Deals	Information on the deals and discounts available; suggest ways to save money including splitting train tickets	“there is never any info on bus ticket prices other than a very standard single or return - where’s the evening deal one?” userfp18	5	4	1	10
	Stations and stops	Including locations and layouts, available facilities and shelter, and local shops and cafes, including info on presence and status	“It’s also useful to know if there’s any facilities at stops for example food outlets or toilets and if these are in working order so you can plan a longer journey more effectively” userfu8	15	17	1	33
	On-board services	Including types of carriage, toilets, charging facilities, no. of bikes allowed, availability of space on bus for buggies or wheelchairs, etc.	“On trains for example it would be useful to know the type of train and what facilities it has. My heart sinks when the clapped-out Southern ‘Coastway’ trains trundle into the station. You know you will be crammed into an old carriage with no tables, no toilets, no charging points and a lot of background noise for the entire journey” usermu10	10	4	2	16
	Human staff	Presence of human staff members on services or at stations	“Is there a human being on site at all in case there are any problems” userfr13	0	7	4	11
	Accessibility	On services and at stops and stations. Step free, disabled toilets, space for wheelchair on service, space for buggy, ramps, lifts.	“For a while I had serious mobility problems and the only time I studied information about stations and made different choices was when lifts were out of order and I’d need to cross the tracks to travel the right way” usermixr9	2	9	3	14
	EV Charging	If present and available for use	“EV charging info - including if the spaces are reserved for EV’s all the time” userfp26	0	6	0	6
	Car parking	Including presence, availability, and price, also including nearby street parking	“Parking available and cost (if I’m driving to a train or bus)” userfr11	1	11	5	17
	Bike parking	If present and available, and information about it (whether hoops, cages, grouped, etc.)	“the availability, type and location with regard to security and ease of use for bike parking at railway stations and near bus stops” usermixp21	3	9	1	13
	Security and safety	At stops and stations and for active travel. Lighting, cameras and their functional status, staff, parks, typical presence of people, etc.	“From a security angle, information as to where there is poor lighting, skeleton/zero staffing (such as at minor train stations like Shawford)” usermixr2	16	12	5	33
	Capacity and busyness	On services, including likelihood of getting a seat (current and expected for future stops)	“information on the busyness of a service would be useful if you want to avoid overcrowded services” usermu10	13	15	4	32

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Table A2 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			Total
				Participant home location	Urban	Peri-urban	
	Health impacts	Information on the impact on personal health of different journey options	“Information regarding health benefits is a great idea as it may motivate people and encourage them to be more healthy, How many calories they are going to burn if they use the bike or walk or take the bus compare to using the car” usermixu11	2	0	0	2
Features	Security	Alarm function	“Perhaps adding an alarm function on the app to call the travel authorities on a press of a button and alert them to your whereabouts if you feel in danger may again make people feel safer in those environments?” usermixp25	0	1	0	1
	Customisation	Of the app and of information (different people need different things)	“This could be split into new users and frequent travellers” usermp18	2	2	0	4
	Push notifications	To inform of or delays or changes to journeys	“Live pushes to your phone if services have been delayed/changed would be good too” usermu10	1	0	0	1
	Price guarantee	A guarantee that it is always cheapest through Breeze	“ensure that the user is always guaranteed to be getting the lowest price rather than having to seek out the best deal” usermu14	1	0	0	1
	Space to report	Provide system to report any issues about routes, drivers, services, etc.	“I like the idea of being able to report any issues such as vehicle issues and cleanliness” userfr14	2	1	2	5
	Reservations	Support reservations for bikes, wheelchairs, buggies, etc.	“I would want to know likelihood of being able to take my bike on the train and the ability to book this rather than it being a lottery on arrival at the station” usermu15	1	1	0	2
Least useful	Health	Highlighting health impacts to be of little or no use	“I think the least useful information would be stating the health benefits or impacts as these are fairly obvious” usermixp23	4	6	1	11
	Environmental	Highlighting environmental impacts to be of little or no use	“I don’t feel stating the environmental impact would have any effect on decisions to travel as in most cases there is no option to choose a greener alternative” userfr14	5	8	4	17
	Condition and cleanliness	Highlighting the condition of vehicles and/or infrastructure to be of little or no use	“Information I’d find least useful: Vehicle conditions such as cleanliness or state of repair (I’m not in a position to avoid a service just because it’s a bit messy on board)” userfu10	2	3	2	7
	Adverts	Expressing a desire not to see adverts	“The least useful information would be constant adverts popping up when you are trying to plan a journey” userfr9	1	0	2	3
Ease of use		Discussing the way in which information is presented on the app, on services, or at stations and stops	“Clear, well lit signage” usermixr8	0	3	2	5
Negative	Not interested	Comments stating that an individual wouldn’t use it	“I don’t need that sort of service” usermr6	0	0	3	3
	Choice constrained	Explaining that it doesn’t matter about the information as there is only one service, that information doesn’t impact choice.	“Whilst it would be nice to pick the cleaner/more environmentally friendly etc provider, I feel the lack of available choice in most cases means you don’t have a choice in the first place - I pick the only option” usermp14	2	2	4	8
	Generally sceptical	Statements expressing a lack of belief in, or doubts surrounding the app or the underlying data	“Red Funnel nor Blue Star published timetables never seem to be reliable. Late boats and busses. When you ask why its staffing issues, or road works/traffic..... Its a real hit or miss every day. There are good days and bad days, but rarely good weeks! Even the online	1	0	2	3

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Table A2 (continued)

Category	Sub-category	Description	Example quote	Number of times mentioned			Total
				Participant home location	Urban	Peri-urban	
	Negative affect	The potential for information to make a person feel bad about their situation or their choices	apps are not accurate enough to plan sufficiently” usermu8 “I also have mixed feelings about a safety setting - it would be good to know if people had felt vulnerable on some routes and to know how well-lit and how busy routes are - but also worry that it just pushes the onus back onto women, minorities, older people, and people with disabilities to keep themselves safe rather than addressing the issue. It could cause anxiety for people that don't have access to a 'safe' route for whatever reason” userfu14	1	2	0	3
	Over complicates	Suggesting that too much information over complicates things	“Least useful would be any fluctuations in prices which might entail swapping tickets or making things more complicated than necessary” usermixp5	0	1	0	1
Other views		Descriptive of people's experiences, habits, or opinions, often comparing with other countries or generally moaning about public transport and active travel infrastructure and services	“I have a disabled child in a wheelchair and find planning journeys a complete nightmare with poorly trained staff giving the wrong information and one occasion on one station we were stranded on the wrong platform after being given poor information with the lift out of action and there were six revenue officers checking tickets and no other staff but they refused to help as not their job” usermr3	11	13	10	34

MaaS definition

This is the definition of MaaS presented to participants (alongside a promotional video for the Breeze app) before they were asked “Would any incentives help you try out such an app or use it for more of your journeys? If so, what you most like to see? How do you think such a system might fail?”.

“Mobility as a Service (MaaS) is a term used to describe digital transport service platforms (e.g., a smartphone app) that enable users to access, pay for, and get real-time information on, a range of public and private transport options. It integrates various forms of transport and transport-related services into a single, comprehensive, and on-demand mobility service, offering end-users the added value of accessing mobility through a single application and a single payment channel (instead of multiple ticketing and payment operations).

It offers a diverse menu of transport options, such as ferries, buses, and trains, active modes such as walking and cycling, electric shared mobility such as eBikes and eScooters, and on-demand car use, such as taxi use or car rental or lease. Crucially, it supports multi-modal journey planning and ticketing, as well as turn-by-turn navigation, to help the traveller get from door to door without having to rely on a privately-owned car.

By offering travellers mobility solutions based on their specific journey needs on a trip-by-trip basis, Mobility as a Service contributes to its core aim of providing an alternative to using the private car that may be as convenient, more sustainable, even cheaper in the long term.”.

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