DRAFT REPORT ON TRAVEL BEHAVIOR CHANGE AND BARRIERS FOR CHANGE

WP.T2 Deliverable 5.1

ABSTRACT

This summary report presents aggregate survey results of the QS2 questionnaire, targeted at current users of eHUBS (i.e., shared mobility hubs).

This summary report has been jointly produced by Newcastle University and TU Delft and features basic descriptive and advanced inferential analyses.

Gustav Bösehans*, Margaret Bell, Neil Thorpe, Paul Goodman, Gonçalo Homem de Almeida Correia, Fanchao Liao, Dilum Dissanayake

*Corresponding author
Gustav.Bosehans@ncl.ac.uk

Interreg North-West Europe eHUBS European Regional Development Fund

Newcastle University

TU Delft

CONTENTS

TABLE OF FIGURES

INTRODUCTION

This report presents the aggregate survey results of the second eHUBS questionnaire (QS2), targeted at both current users and non-users of shared mobility, fulfilling two main objectives.

The first objective regarding current non-users of shared mobility was to **explore and compare perceived barriers to shared mobility use**. Whereas perceived barriers were already explored in the first eHUBS survey (QS1), in the second survey, approximately one year later, we wanted to explore whether perceived barriers to shared mobility use have shifted or remained the same, as a result or despite of the ongoing COVID-19 pandemic.

The second objective was to **examine current shared mobility users' experiences and mode substitution patterns** in the project partner cities including Arnhem (ARN)/Nijmegen (NIJ), Amsterdam (AMS), Dreux (DRE), Kempten (KEM), Leuven (LEU) and Manchester (MAN). In addition, we aimed to calculate the realised emission savings by people using shared (L)EVs from eHUBS or other shared mobility providers, instead of using their private cars.

In total, survey respondents completed several sub-sections, some of which overlap with the contents of the first eHUBS questionnaire, as outlined in **Figure 1**.

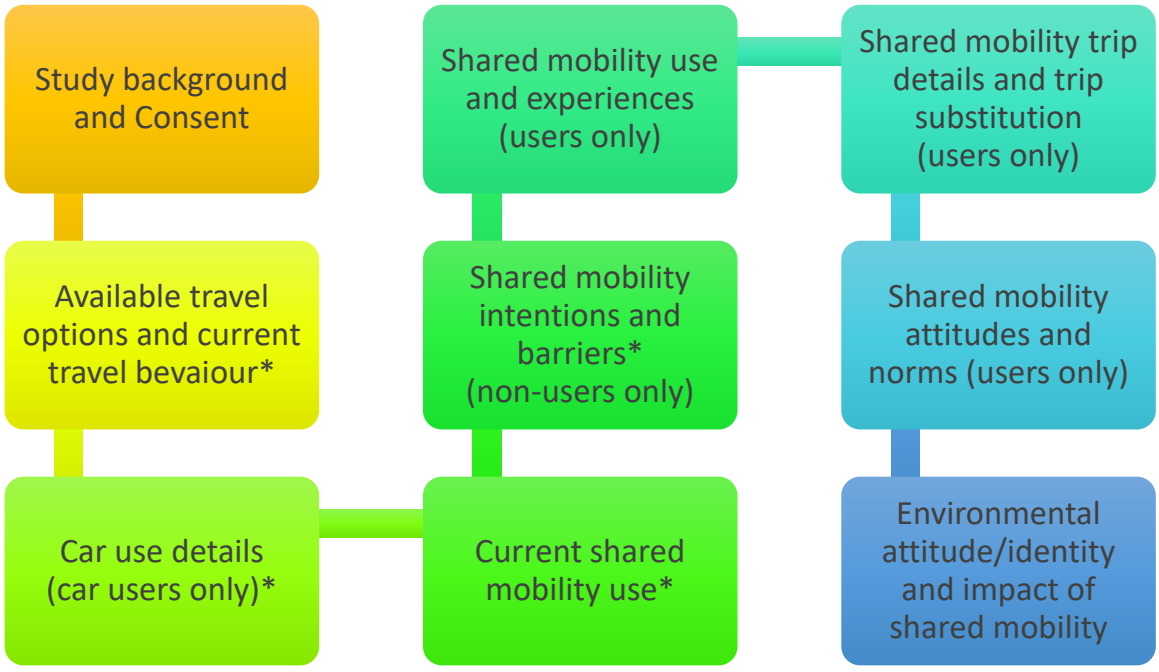

Figure 1. QS2 questionnaire sub-sections completed by survey respondents (Overlapping content is marked with an asterisk)

As with the first eHUBS survey, the second survey was created on the online survey platform SurveyMonkey (now Momentive) and translated from English into Dutch, German, and French, with the aid of city partners where needed.

Data collection for each pilot city was executed via one or more of the following routes:

1) Cities' own distribution channels (e.g., email, social media, website)
2) Data collection via a polling agency (Amsterdam and Manchester)
3) Distribution via shared mobility providers (e.g., newsletter, social media)
4) Follow-up of those respondents who signed up for future surveys in QS1

The diagram below (see **Figure 2**) gives a more detailed overview of the content of QS2.

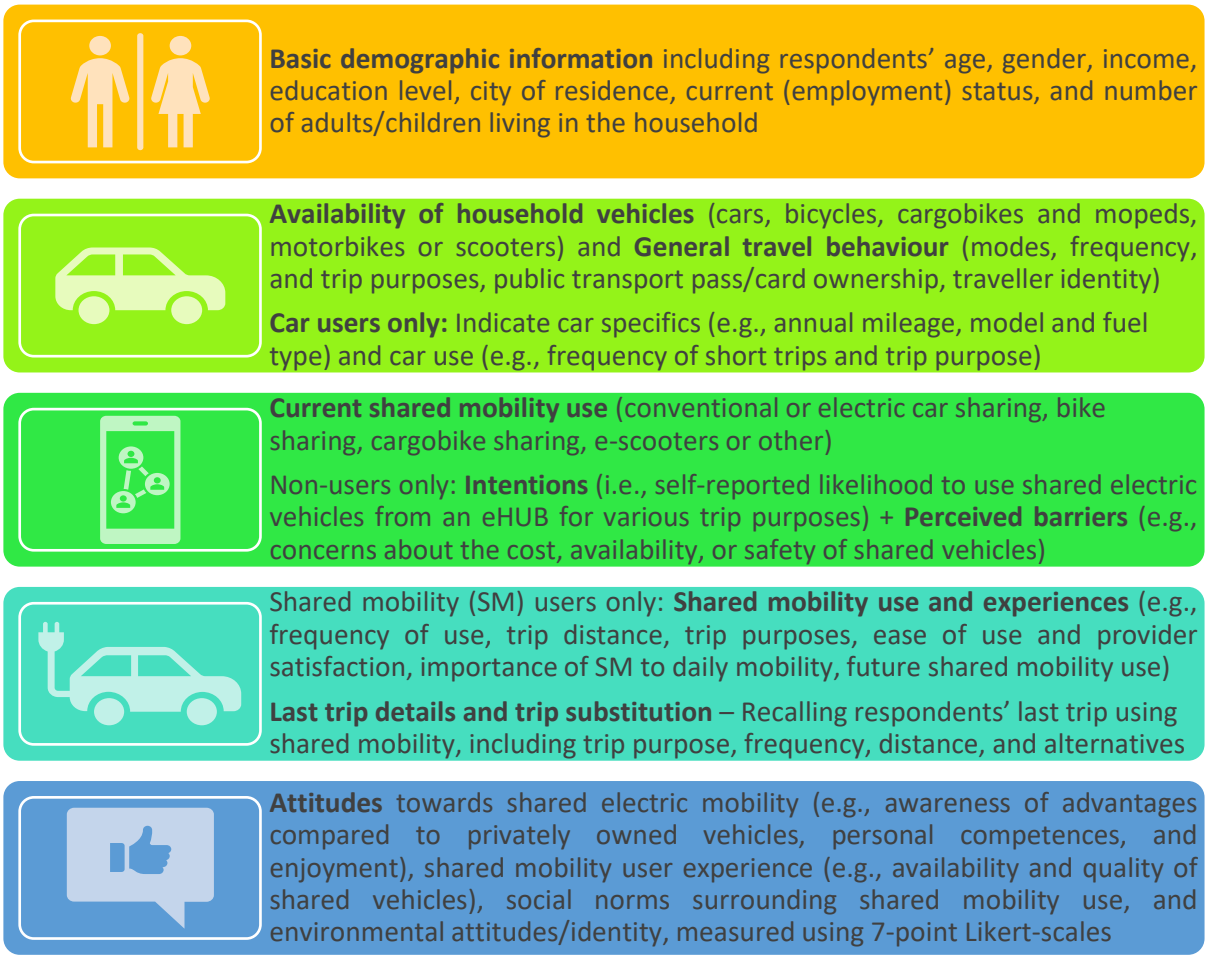

Figure 2. QS2 content outline

First and foremost is the Summary of Aggregate Results, presenting the most important findings and key messages from QS2, aggregated across all eHUBS pilot cities.

For a copy of the questionnaire and data requests, as well as comments, thoughts, or suggestions regarding this report, please contact the survey administrator:

Gustav Bösehans, PhD, Research Associate

Cassie building, School of Engineering, NE1 7RU Newcastle University

Contact: Gustav.Bosehans@newcastle.ac.uk

Reporting guidelines – In the following sections of the report, aggregate (i.e., across eHUBS pilot cities) descriptive statistics are presented for the aforementioned survey sub-sections. For proportions, all results are presented in the same format – that is, first the sample *N*, followed by the percentage of the total, as follows: **(*N = [count]*, %)**. Hereby,

$\mathcal{N}$ represents the total number of survey respondents ($\mathcal{N}$ = 980)

N represents the total number of responses to a specific question

n represents the sample of N that has a particular characteristic

Please note that, throughout the report, analytics are based on the total number of survey respondents of $\mathcal{N}$ = 980, unless indicated otherwise. Minor deviations from this value are due to missing survey responses, whereas larger deviations are due to the skip logic of the survey (e.g., non-car users were not shown questions related to car use).

Comparisons by city of residence – Where appropriate, comparisons between respondents are drawn based on their reported **City of residence** – that is, in order of contribution to the total sample size (see **Table 1**):

Table 1. Number of completed surveys (QS2) per pilot city as of Jan 10, 2022

City	Non-users	Users	% Users	Total
Amsterdam[1]	23 (284)	11 (93)	32 (25)	34 (377)
Leuven	119	81	41	200
Nijmegen[2]	158	27	15	185
Arnhem	56	7	11	63
Dreux	35	12	26	47
Kempten	8	2	20	10
Manchester	0	0	0	0
Other	48	13	27	61
Subtotal	447	153	26	600
Missing	1	2	67	3
Total[3]	448 (732)	155 (248)	26 (25)	603 (980)

[1] Values in brackets indicate the number of responses collected via polling agency (AMS only).
[2] Arnhem and Nijmegen are considered to be the same city/region throughout the entire report.
[3] Values in brackets indicate the total number of responses including the AMS polling agency sample.

Except for the demographic part of the survey, these comparisons – including responses from 'Other' (non-partner) cities (*N* = 61, 6%) – are generally provided in the Appendix.

Please note that Manchester (UK) had not started data collection at the time of the current report draft. Any aggregate survey results – such as the greater proportion of respondents who cycle at least once a week in QS2 (see **Figure 16**, Section 3), as well as the lower proportion of respondents who identity as car drivers (see **Figure 18**, Section 3.1) – should therefore be interpreted with caution.

Comparisons between QS1 and QS2 – For key variables of interest, comparisons are provided between the first (QS1) and second (QS2) eHUBS questionnaire (see **Figures 16-18** in Section 3 and **Figure 21** in Section 4, in particular). Yet, in the absence of Manchester data, and low sample size for some pilot cities due to difficulties in data collection caused by COVID (i.e., Dreux and Kempten), any direct comparison between surveys should be treated with caution.

Statistical analyses – With few exceptions, this descriptive report contains no advanced statistical analyses. These will be disseminated separately in academic research publications, copies of which will be made available to consortia members. Where statistical tests have been calculated, relevant information is provided as footnotes.

Statistical assumptions – Although statistical test assumptions – in particular, the normality assumption – was not met for all statistical tests performed in Section 4, non-severe violations of the normality assumption have been found to be acceptable for larger sample sizes. In fact, p-values have been found to remain relatively stable even for non-normally distributed data (Knief & Forstmeier, 2021). Therefore, merely significant differences between groups that are close to the significance threshold (i.e., $\alpha = .05$) should be interpreted with caution.

Confidence intervals (CIs) – 95% CIs for mean estimates are reported in Section 4 of the report. A 95% confidence level means that we would expect 95% of the interval estimates to include the population parameter. Confidence intervals can be compared across groups. If the latter do not overlap, this indicates a statistically significant difference at $\alpha = .05$.

SUMMARY OF AGGREGATE RESULTS

On this page, the main findings of the second eHUBS questionnaire are summarised.

- The majority of respondents reported possessing a **bicycle** (92%), whereas levels of **car** ownership were generally lower (73%). In contrast, few respondents reported possessing either a **motorbike** (13%) or **cargobike** (6%) [Section 2].
- Among the car owners, 31% of respondents indicated usually **driving alone**, whereas 69% indicated driving with at least one passenger. Moreover, 25% of car drivers reported using their car for short trips (i.e., < 6 mi/10km) 4 times per week or more.
- **Walking** and **Cycling** represented the two most common modes for respondents' general travel behaviour, with 74% of respondents walking for transport (i.e., other than leisure) and 72% cycling for transport on at least 1-2 days per week [Section 3].
- In terms of **traveller identity**, 31% identified themselves as car drivers or passengers, followed by cyclists (30%) and multimodal users (26%). A minority of respondents identified themselves as either walkers (6%) or public transport users (7%).
- Most respondents reported not using any **shared mobility** options (75%). Among those who did, (electric) car and (cargo-)bike sharing were the most popular (6-9%).
- Respondents' **interest in using shared electric vehicles** from an eHUB was measured using a 0-100 Likert scale [Section 4]. Non-users' interest in shared e-cars was greater (M = 30.77, Med = 21) than their interest in shared e-bikes (M = 25.96, Med = 10).
- The most commonly cited **barriers** towards the use of shared (electric) vehicles included a preference for using one's own car (42%), walking, or cycling (41%), as well as concerns about the availability (31%) and cost (27%) of shared vehicles. The distance to shared vehicle locations was also perceived as a major barrier (24%).
- Among current **users of shared mobility**, most reported that they use shared modes primarily for roundtrips (70%) and 33% of users indicated that shared mobility is an essential part of their daily mobility [Section 5]. Overall, users indicated they were satisfied with shared mobility providers and 75% intend to increase their future use.
- In terms of **mode substitution** patterns, respondents who used either shared conventional or electric cars replaced trips by public transport (31-35%), private car (19-36%), or cycling (5-17%). Shared (e-)bikes were mainly used as a substitute for respondents' own bicycles (24-35%) or trips by public transport (16-29%) [Section 6].
- In general, respondents held a **pro-environmental attitude** and also believed in the potentially positive environmental impact of shared mobility. Current users further indicated that they feel confident using shared vehicles (79%), enjoy using shared vehicles (70%), and that using shared vehicles fits their image (67%) [Section 7].

1. DEMOGRAPHIC PROFILE

In this section, respondents' demographic profile is explored. **Figure 3** shows survey completions by (pilot) **city of residence**.

Most survey respondents were based in the Netherlands (*n* = 659, 67%), with the majority of respondents being resident in Amsterdam (*n* = 411, 42%), followed by the cities of Nijmegen (*n* = 185, 19%) and Arnhem (*n* = 63, 6%).

After the Netherlands, Leuven (Belgium) contributed roughly one fifth of survey responses (*n* = 200, 20%). Finally, Dreux (France) contributed a small proportion of responses (*n* = 47, 5%), followed by non-pilot cities (i.e., Other; *n* = 61, 6%). Survey responses from Kempten only represented a fraction of the sample (*n* = 10, 1%), whereas data collection had not yet occurred in Manchester due to delays in hub deployment.

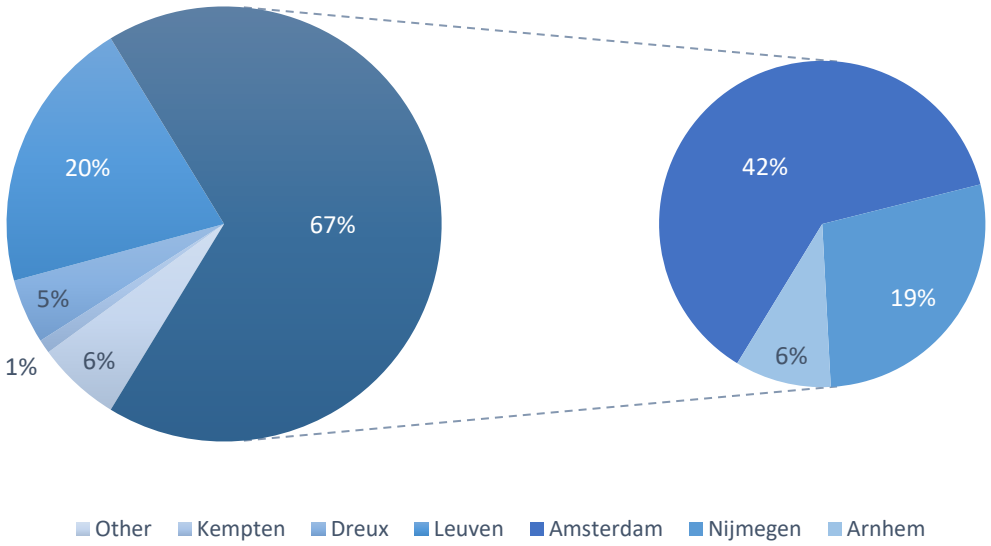

Figure 3. Respondents by city of residence (*N* = 977)

Of those who completed the survey, slightly more than half of the respondents identified themselves as **male** (*n* = 489, 51%), followed by **female** respondents (*n* = 479, 49%), and respondents who identified themselves as 'Other' (*n* = 7, < 1%).

Figure 4 shows the **age distribution** of male and female respondents (please note that non-binary gender proportions are not reported here due to the low number of completions). Overall, only the youngest (18 to 24) and oldest (75+) age group were underrepresented.

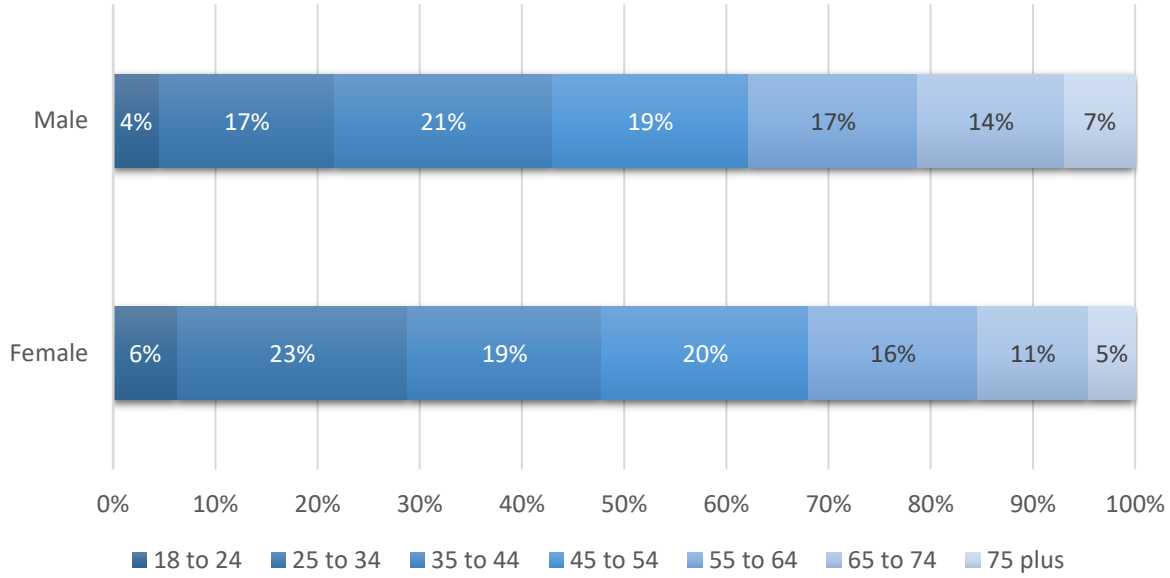

Figure 4. Age distribution of male (*N* = 489) and female (*N* = 479) respondents

As can be seen in **Figure 4**, there were more female than male respondents in the 25 to 34 age bracket (+6%), although no further substantial differences were observed. **Table A1** in the appendix shows the age and gender distribution across the seven pilot cities.

The **number of adults and children per household** is shown in **Figure 5** and is broken down by city of residence in **Tables A2** and **A3**. Most of the sampled respondents reported living in a household with two or more adults (*n* = 671, 70%), whereas the remainder reported being the only adult in their household (*n* = 291, 30%).

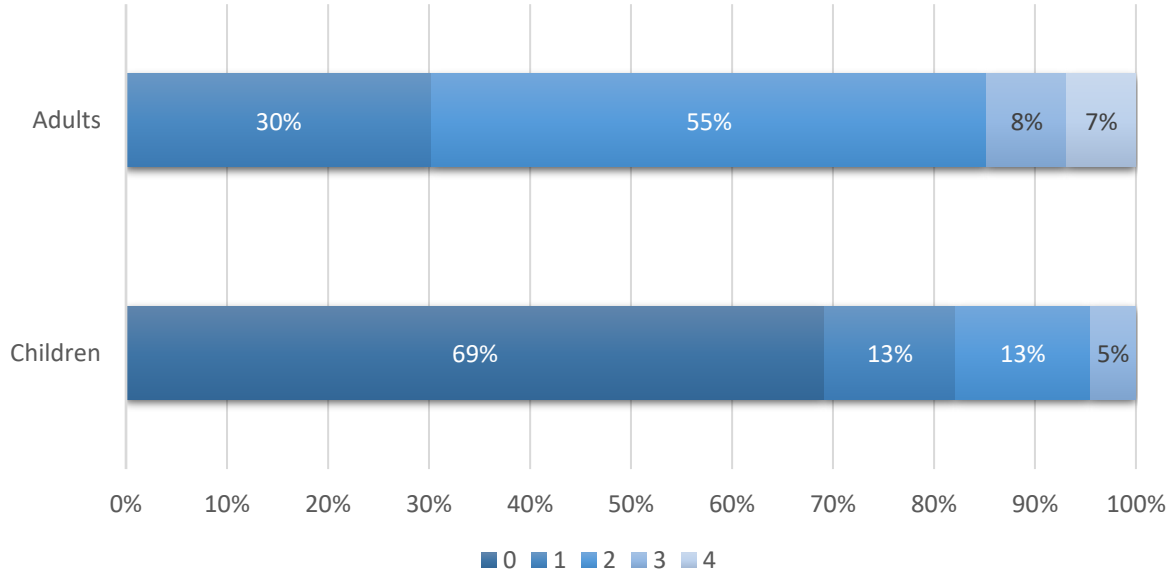

Figure 5. Number of adults (*N* = 962) and children in household (*N* = 942)

The majority of respondents further indicated living in a household without children (*n* = 654, 69%). Of the respondents who reported sharing their household with children, most reported taking care of either one (*n* = 123, 13 %) or two (*n* = 126, 13%) children.

Overall, the majority of respondents possessed either an undergraduate or postgraduate level degree (*n* = 715, 72%), indicating an above average **education level** when compared to the general population of the project partner countries (see **Figure 6**). The complete breakdown of respondents' education level by city of residence is presented in **Table A4**.

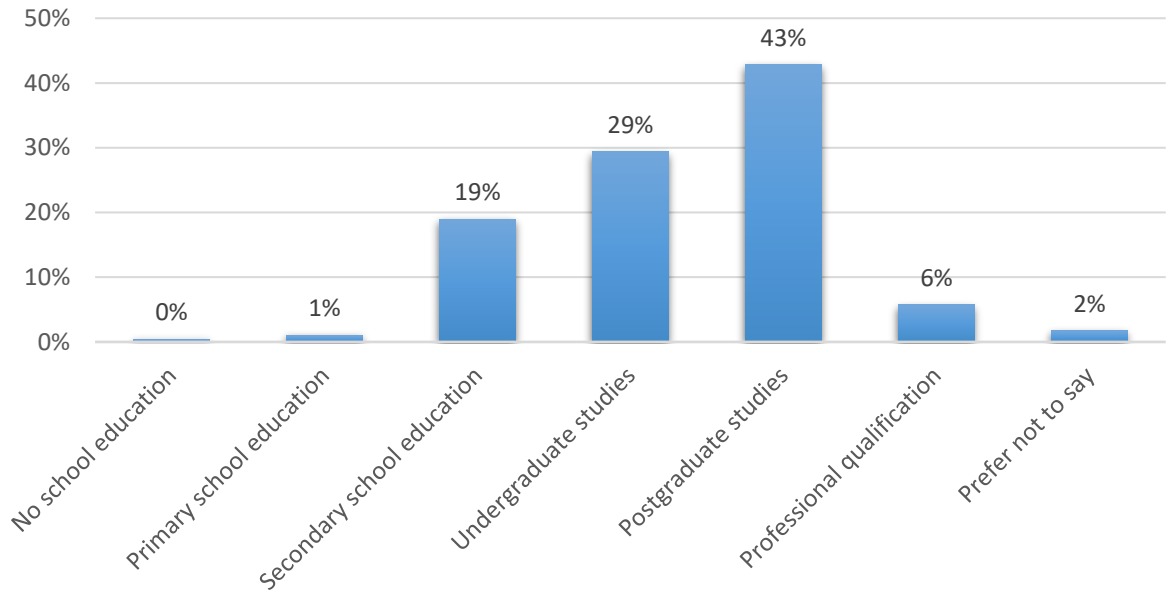

Figure 6. Respondents' highest education level (*N* = 977)

Deviations of the study sample from the general population in terms of age and education highlight some concerns with the representativeness of the sample. These shortcomings can be broadly explained by the varying data collection methods of the cities, self-selection bias (Greenacre, 2016), and lack of older workers in online panels (Chandler et al., 2019). Only two pilot cities hired polling agencies, enabling the specific targeting of older population groups that are frequently 'digital outsiders', showing lower levels of education, income, and online research participation (Lutz & Hoffmann, 2017). Thus, while every effort was made within pilot city budgets to achieve a representative study sample, this could not always be achieved. Hence, findings about underrepresented groups may be less reliable.

In terms of **income**, almost half of respondents reported an annual household income between 24,000€-71,999€ (*n* = 477, 49%) – here, 1€ = £0.80 – whereas a proportion of respondents preferred not to reveal their annual household income (*n* = 169, 17%; see **Figure 7**). The distribution of income by city of residence is shown in **Table A5**.

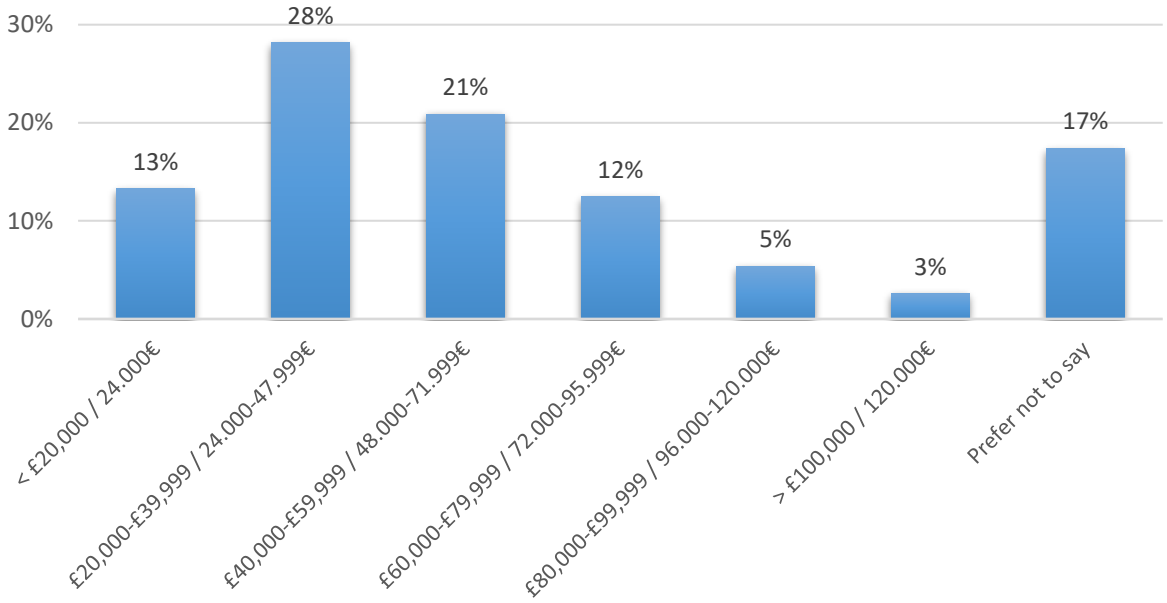

Figure 7. Respondents' annual household income before tax (*N* = 973)

Figure 8 shows respondents' **current employment status** across the whole sample, while respondents' employment status for each pilot city is shown in **Table A6**.

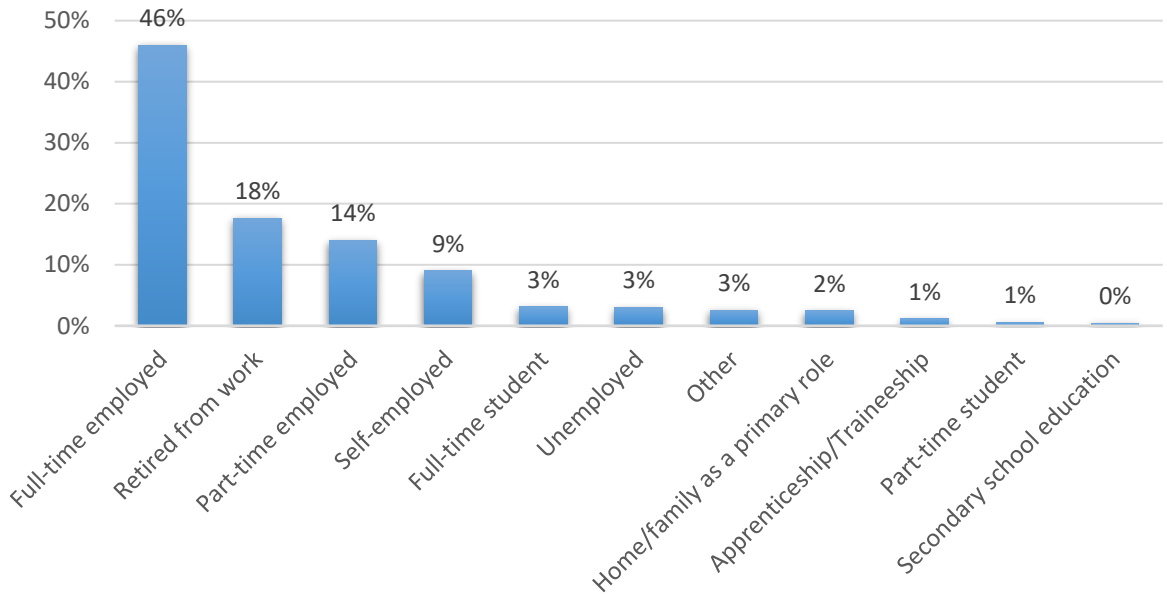

Figure 8. Respondents' employment status (*N* = 929)

At the time of the survey, most of the respondents were either full-, self-, or part-time employed (*n* = 641, 66%), whereas a considerable proportion of respondents reported being retired (*n* = 164, 18%). The remainder indicated being either in education or training (i.e., full- or part-time student, apprentice-/traineeship, or secondary school; *n* = 49, 5%), unemployed (*n* = 28, 3%), or fulfilling home/family roles (*n* = 23, 2%).

2. AVAILABILITY OF VEHICLES AND CAR USE

This section explores respondents' **availability of household vehicles**, their car use, and their general attitudes towards car use. For further summary data on respondents' car use by city of residence, please refer to **Tables A7 and A8** in the appendix.

Figure 9 shows the availability of conventional and electric vehicles across all of respondents' households. Most respondents indicated having at least one bicycle available in the household (*n* = 875, 92%), whereas almost three quarters of respondents also reported having at least one car available (*n* = 700, 73%). As expected, the availability of motorbikes (*n* = 119, 13%) and cargobikes (*n* = 50, 6%) was much lower.

With regard to their electric counterparts, e-bikes (*n* = 295, 33%) were more prevalent than e-cars (*n* = 88, 10%). Finally, both electric motor- and cargobikes were less popular than their conventional counterparts (*n* = 35, 4%, and *n* = 52, 6%, respectively). The availability of household vehicles across cities is shown in **Table A7** in the appendix.

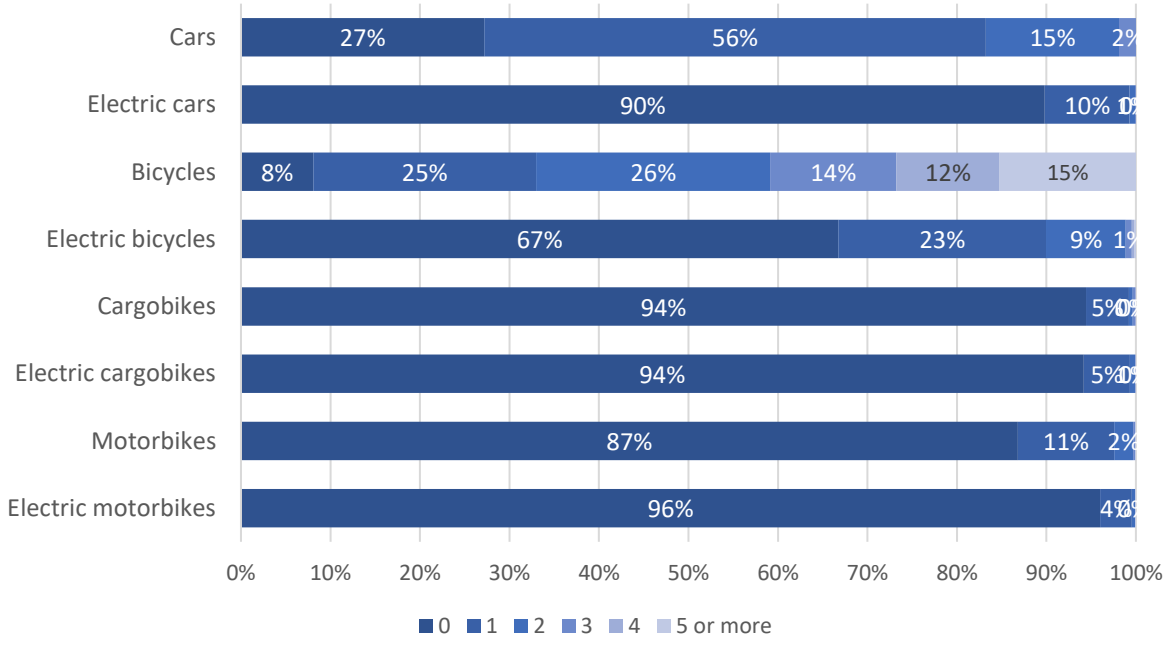

Figure 9. Availability of household vehicles (*N* conventional/electric vehicles: Cars = 961/863; Bicycles = 952/887; Cargobikes = 896/891; Motorbikes = 902/877)

2.1. Respondents' general car use

The majority of respondents who had at least one car available in their household (*N* = 709) also reported holding a **driver's licence** (*N* = 682, 96%; or 70% of the total sample $\mathcal{N}$ = 980). Among all car users (i.e., with or without a licence / car available), most indicated that the car

they use most often is either a **petrol** (*n* = 532, 64%) or **diesel** (*n* = 166, 20%). The remainder represented a combination of either **hybrid** or **electric** cars (*n* = 106, 13%), followed by other fuel types (*n* = 21, 3%) as illustrated in **Figure 10**. For a comparison between the different cities of residence, please refer to **Table A8** in the appendix. This table also provides comparisons for subsequent variables of interest in this section (see **Figures 11** to **14**).

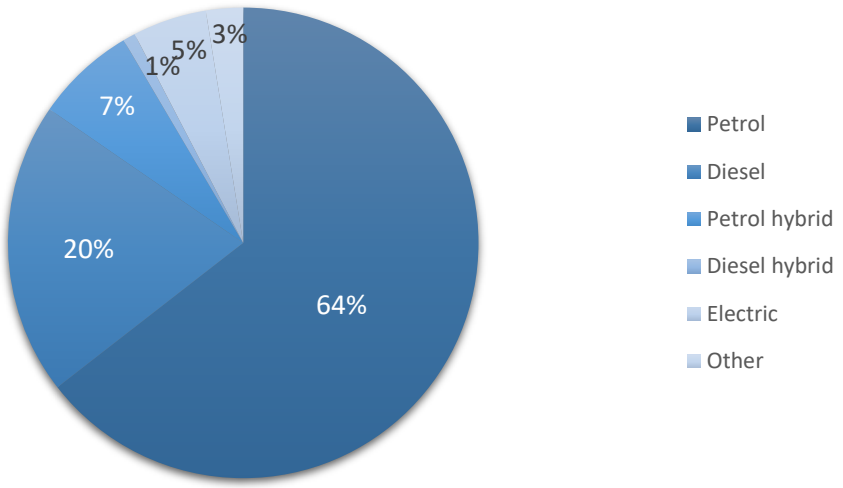

Figure 10. Type of car (the car used most often by the respondent; *N* = 825)

The majority of car users indicated that they are usually the **driver** (*n* = 511, 61%) rather than **passenger** (*n* = 144, 17%), as shown in **Figure 11**. The remaining respondents indicated they regularly switched between being either the driver or passenger (*n* = 186, 22%).

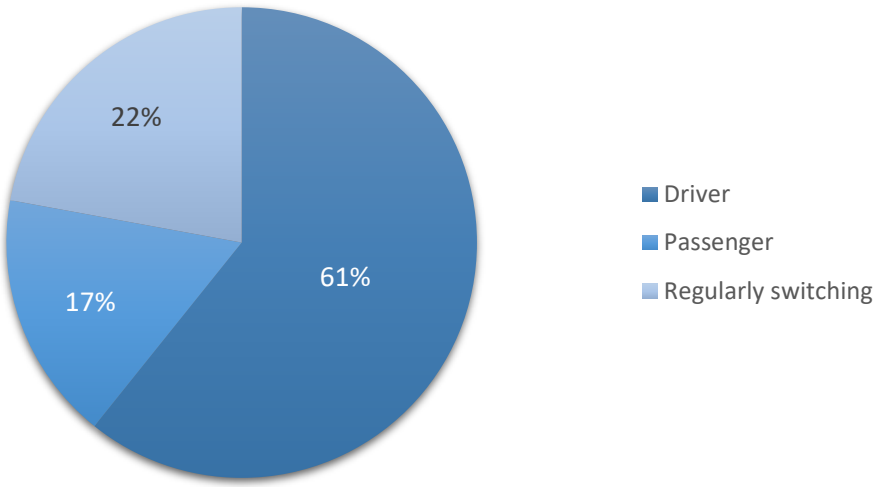

Figure 11. Regular car use as either driver, passenger, or both (*N* = 841)

About a third of respondents further reported **driving alone** on most journeys (*n* = 255, 31%), whereas two thirds of respondents indicated driving with at least one additional **passenger** on the majority of their trips (*n* = 580, 69%). This is illustrated in **Figure 12**.

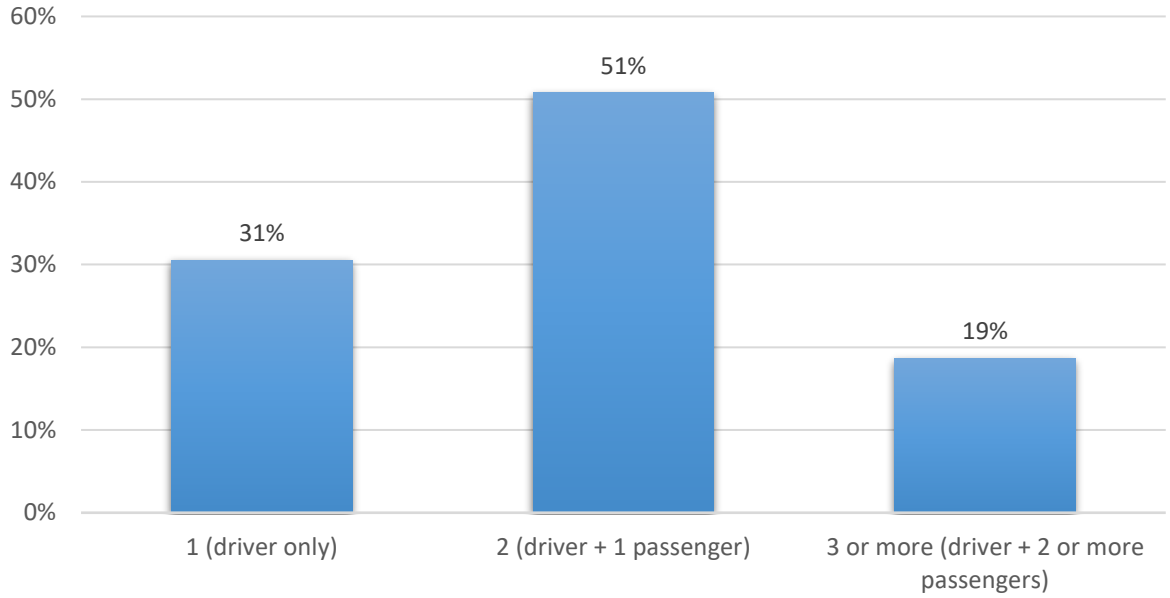

Figure 12. Driving alone or with passengers (*N* = 835)

Furthermore, we asked respondents how frequently they used their car for **short trips**, defined as trips less than 6 miles (10km), see **Figure 13**. While a quarter of respondents indicated doing so for at least 4 days per week (*n* = 199, 25%), the majority reported doing so only between one to three times a week (*n* = 649, 69%), or not at all (*n* = 177, 22%).

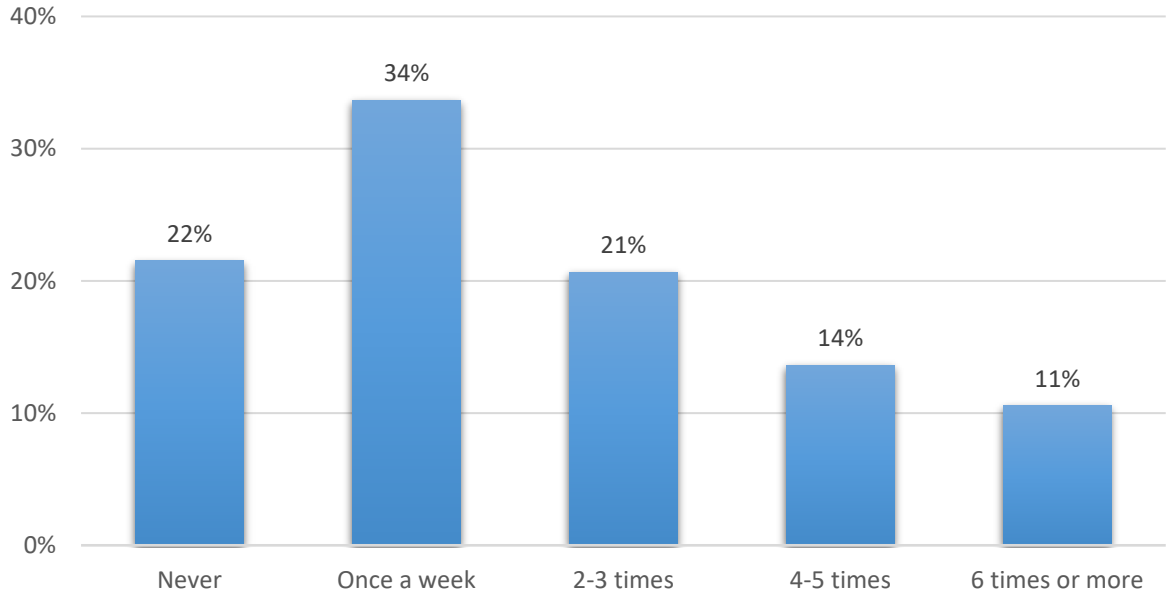

Figure 13. Frequency of car use for short trips (< 6mi/10km per week; *N* = 823)

With regard to **trip purpose** (see **Figure 14**), the majority of respondents suggested using their car primarily for grocery shopping trips (*n* = 472, 56%), visiting friends or family (*n* = 365, 43%), leisure or tourism (*n* = 227, 27%), or for commuting to work (*n* = 216, 26%).

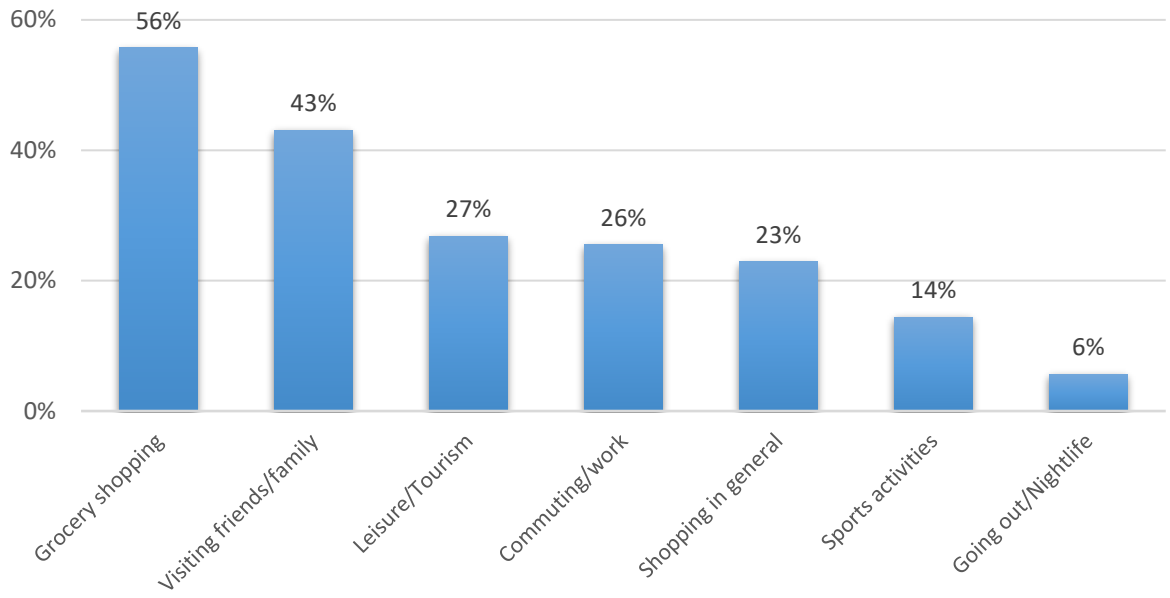

Figure 14. Most common trip purposes for trips by private car (*N* = 847)

3. GENERAL TRAVEL BEHAVIOUR

Both car users and non-car users were also asked about their **general travel behaviour** (see **Tables A9 and A10** for a breakdown of variables by pilot city).

As can be seen in **Figure 15**, the majority of respondents reported using private motorised transport on at least 1-2 days per week (*n* = 615, 64%), with corresponding proportions for walking (*n* = 714, 74%), cycling (*n* = 704, 72%), and public transport (*n* = 341, 36%). For a comparison of reported mode use between surveys QS1 and QS2, please see **Figure 16**. In addition to these 'regular' modes, QS2 respondents were also asked about their use of on-demand ride hailing services, such as Uber. In the current sample, only a small share of respondents indicated using such services at least once per week (*n* = 41, 4%).

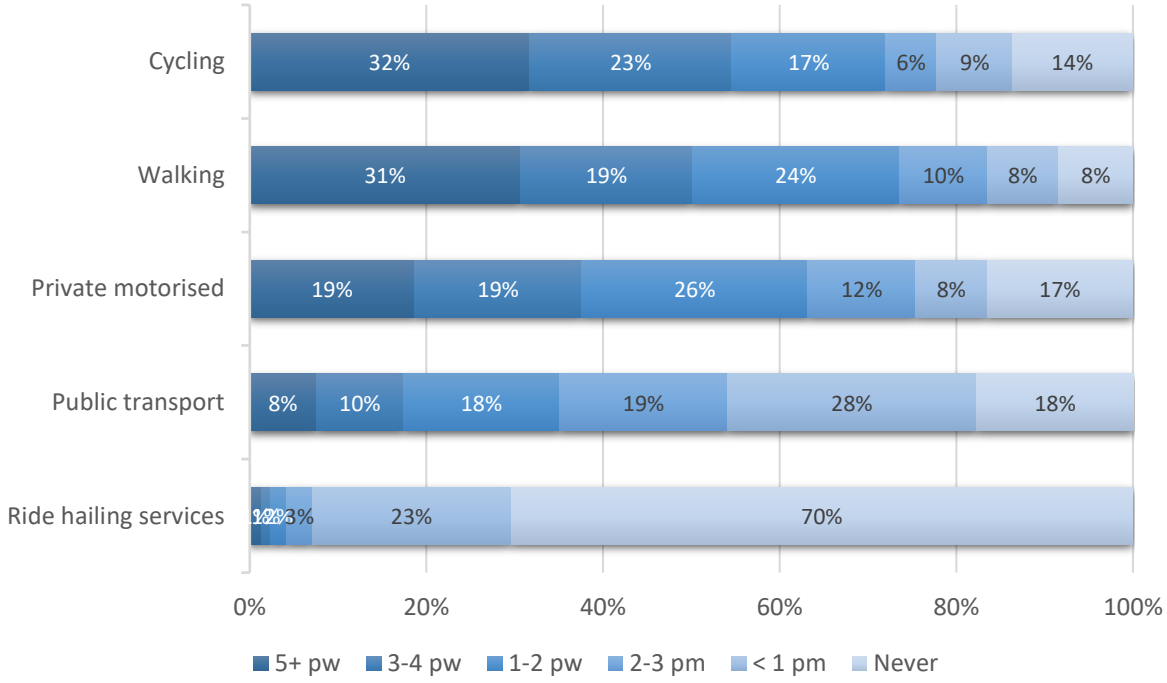

Figure 15. Respondents' mode use in days per week/month (pw/pm; *N* = 980)

Figure 17 shows that a majority of survey respondents reported possessing either a **public transport pass** (*n* = 548, 56%) and/or a **railcard** (*n* = 317, 32%). The proportion of railcard users was similar across QS1 and QS2 (QS1: 30%, QS2: 32%), although a greater proportion reported owning a public transport pass in QS2 (QS1: 38%, QS2: 56%).

On the other hand, about one in five respondents indicated that they did not possess either type of app, pass or card (*n* = 283, 29%), and this proportion was notably lower compared to QS1 (QS1: 45%, QS2: 29%). Finally, only a minority of survey respondents indicated owning or using a **ride hailing app** (*n* = 100, 10%), whereas this category was absent in QS1.

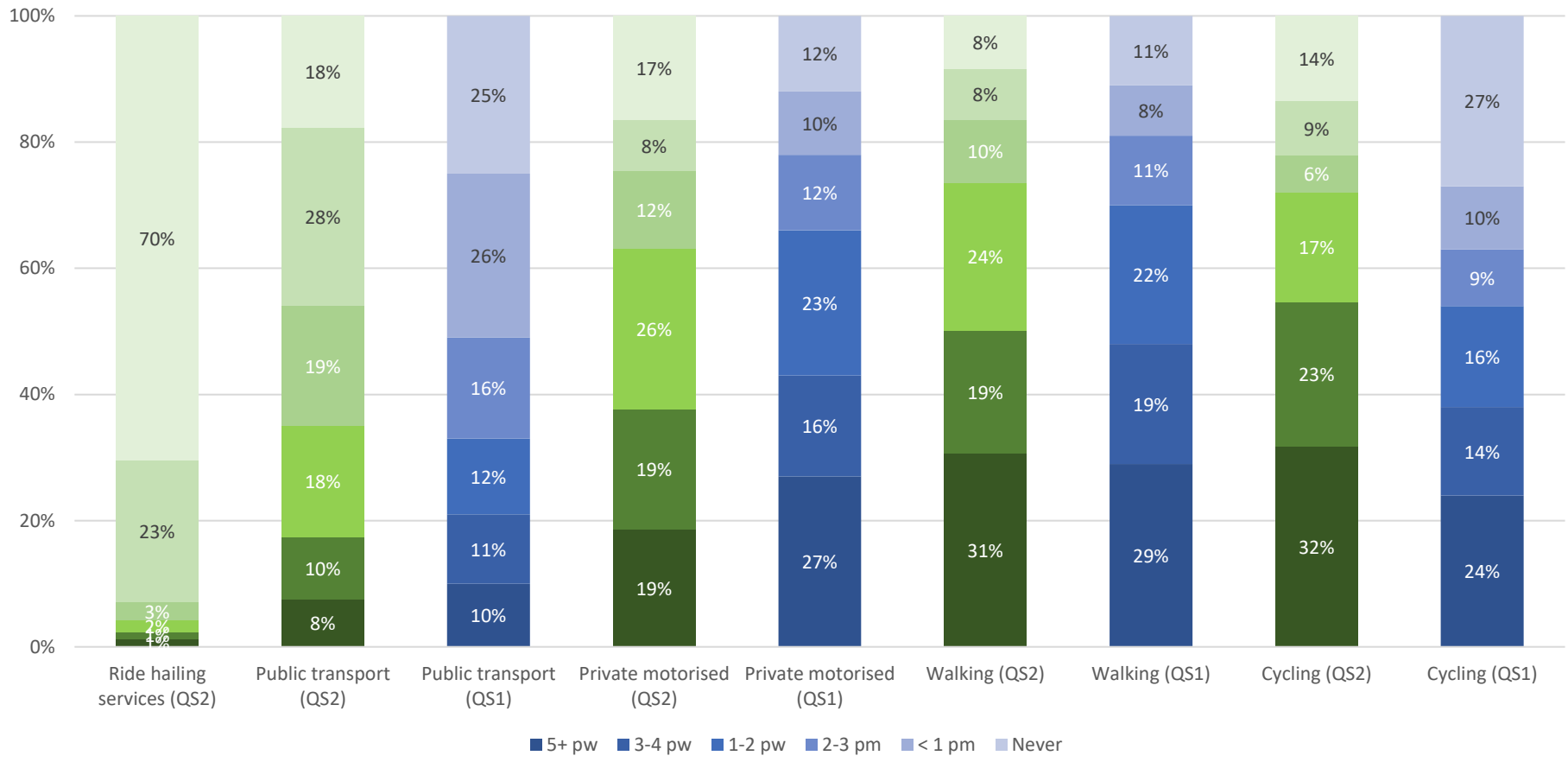

Figure 16. Self-reported mode use between QS1 and QS2. N.B. The green and blue shading share the same definition.

As can be seen in **Figure 16**, the reported transport mode use was found to be similar in the second compared to the first eHUBs questionnaire for public transport, private motorised transport (PMT), and walking (i.e., using at least once per week: Public transport – QS2: 36%, QS1: 33%; PMT – QS2: 64%, QS1: 66%; Walking – QS2: 74%, QS1: 70%). Cycling, however, was more common among QS2 respondents (QS2: 72%, QS1: 54%), which can be explained by the high share of respondents from Belgium and the Netherlands, both countries with a strong focus on cycling.

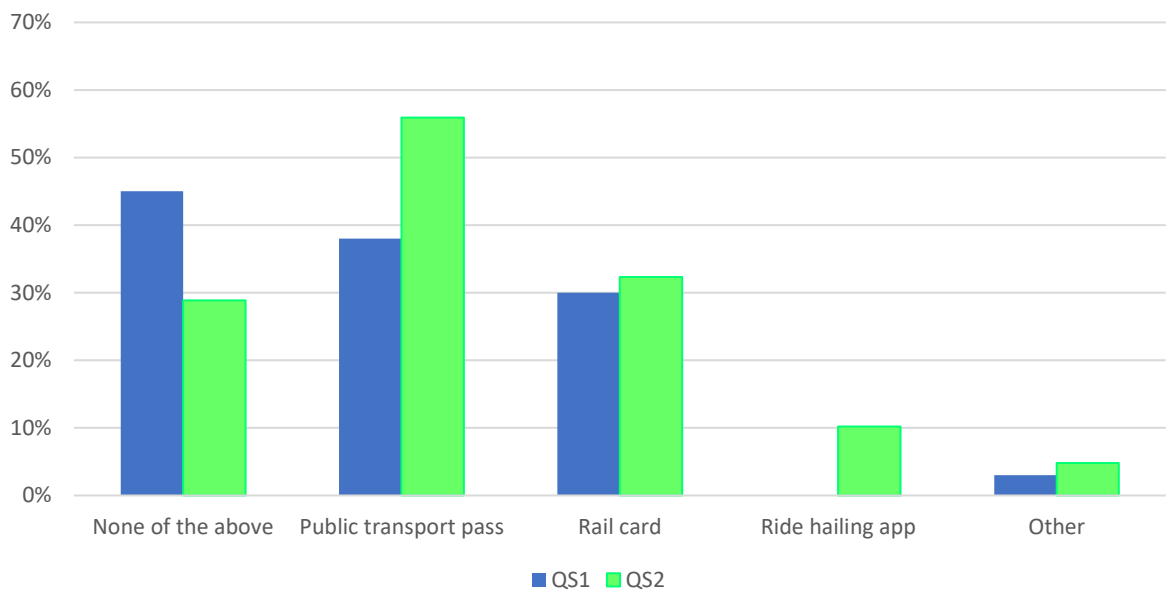

Figure 17. Proportion of respondents who own a public transport pass (*N* = 980)

3.1. Respondents' traveller identity

In addition to general travel behaviour, we asked respondents to describe their **traveller identity** (see **Figure 18**), as the latter has been shown to be strongly associated with people's actual travel behaviour (Heinen, 2016). In particular, we asked respondents to complete the following sentence: "*I consider myself a…*" with car driver, car passenger, cyclist, walker, public transport user or multimodal user being the possible answers.

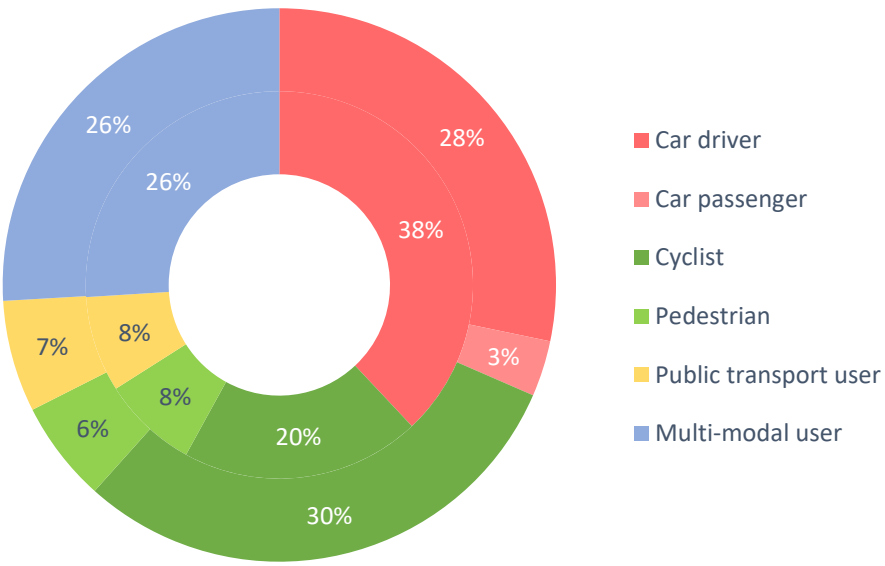

Figure 18. Respondents' self-reported traveller identity (*N* = 980)

Outer circle: QS2, Inner circle: QS1

Overall, respondents considered themselves to be primarily cyclists (*n* = 295, 30%), followed by respondents identifying themselves as either car drivers (*n* = 277, 28%), multimodal (*n* = 254, 26%), or public transport users (*n* = 64, 7%).

A minority of respondents Identified themselves as either pedestrians (*n* = 58, 6%) or car passengers (*n* = 32, 3%). This is at odds with the data which suggested the majority of individuals reported walking as a mode of travel (see **Figure 16**) but, of course, walking also is a component of other modes, such as car, and especially public transport, such as bus or rail.

In comparison to the first questionnaire targeted at non-users (QS1), there was a lower proportion of those who identified themselves as car drivers (QS1: 38%, QS2: 28%), yet a greater proportion identifying as cyclists (QS1: 20%, QS2: 30%), in line with previous findings.

3.2. Respondents' mode use for different trip purposes

In terms of **mode use for different trip purposes**, private motorised transport (PMT) was the first choice for visiting friends and family (*n* = 682, 70%), whereas walking emerged as the first choice for grocery shopping (*n* = 670, 68%) and shopping in general (*n* = 520, 53%; **Figure 19**).

For commuting, both private motorised (*n* = 346, 35%) and public transport (*n* = 304, 31%) were beaten by cycling, which accounted for more than 40% of commute trips (*n* = 430, 44%). As expected, cycling was the dominant mode for sports activities (*n* = 422, 43%), being a sports activity in itself, and also emerged as the preferred choice for going out (*n* = 326, 33%). For leisure and tourism, PMT (*n* = 508, 52%) and cycling (*n* = 533, 54%) were the preferred modes.

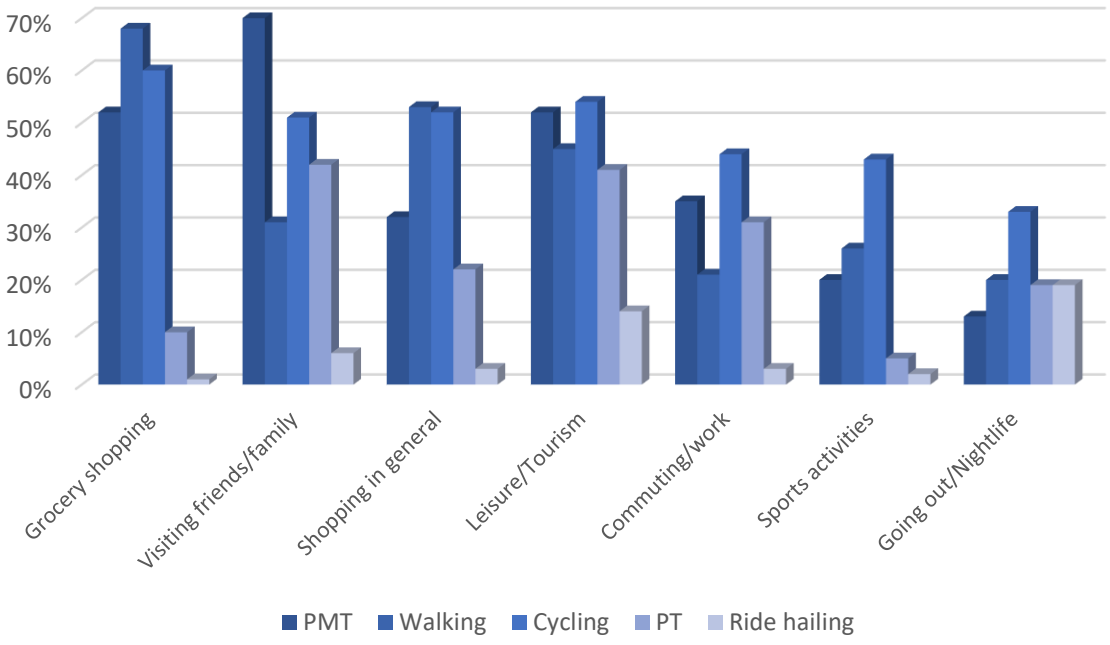

Figure 19. Respondents' mode use for different trip purposes (*N* = 980)

4. NON-USER INTENTIONS AND BARRIERS

A crucial task of the eHUBS project is to gauge people's interest in using shared micro-mobility hubs. As a result, we introduced the questionnaire with a description of an eHUB facility and asked respondents about their **current shared mobility use**.

If respondents indicated that they are not currently using any shared mobility options, they were asked about their **intentions** to use shared vehicles from eHUBS in the future, and to list any **perceived barriers** towards shared mobility use. As in previous sections, results by city of residence are presented in the appendix (see **Table A10** and **Table A11**, respectively).

Our survey results showed that the majority of respondents currently do not use shared mobility options (*n* = 733, 75%), as is illustrated in **Figure 20**. Some respondents reported using shared (electric) cars on a regular basis (*n* = 92-62, 9-6%), followed by shared (electric) bicycles (*n* = 64-63, 7-6%). E-scooters, which still face many legal restrictions and challenges in most countries (Anderson-Hall *et al.*, 2019), were one of the least popular types of shared vehicle (*n* = 35, 4%), as were shared (e-)cargobikes (*n* = 63-21, 6-2%).

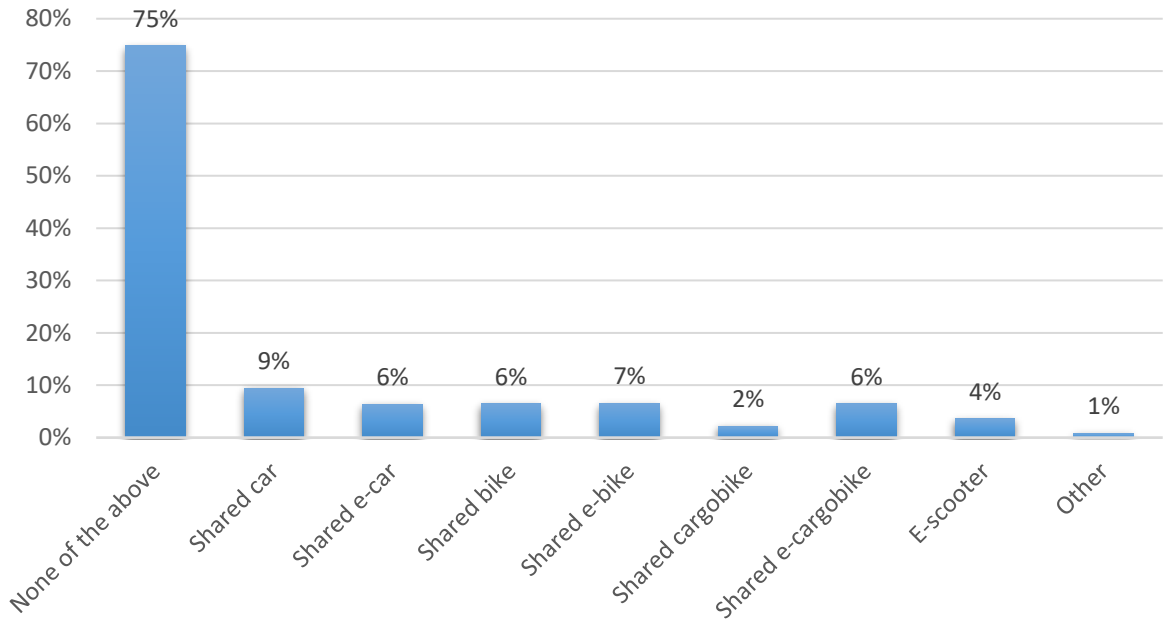

Figure 20. Respondent'' current use of shared vehicles (*N* = 980)

Compared to the first questionnaire, the proportion of respondents who reported not using shared mobility in QS2 was identical (see **Figure 21**) – that is, most respondents reported not using shared mobility (QS2: 75%, QS1: 75%). The proportion of respondents using either shared electric or regular cars (QS2: 16%, QS1: 14%) and bicycles (QS2: 13%, QS1: 10%) was also similar. Finally, e-scooters were only used by a minority (QS2: 4%, QS1: 3%). Please note that the shared (e-)cargobike category was not included in QS1 (QS2: 9%, QS1: 0%).

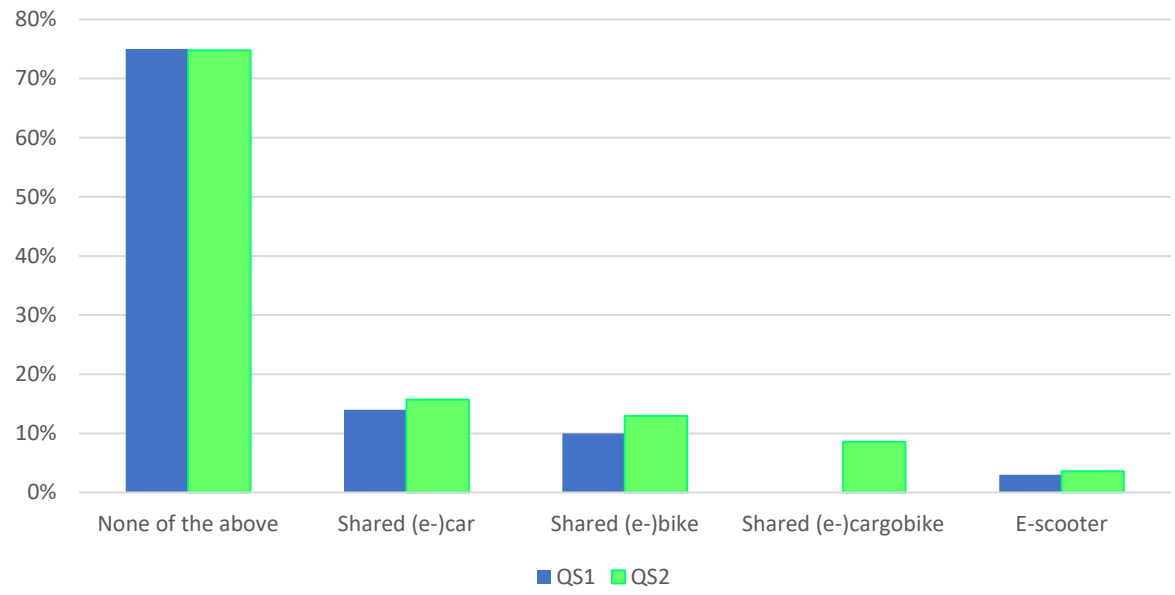

Figure 21. Comparison of self-reported shared mobility use in QS1 vs QS2

Respondents' **interest to use shared electric vehicles** was measured using four statements, "How likely would you be to use [shared vehicle type] from an eHUB in the future if it were available in your city?", rated on a continuous scale ranging from **0 – Extremely unlikely** to **100 – Extremely likely**. The distribution of respondents' intention scores to use shared electric bicycles (*N* = 670), cars (*N* = 640), cargobikes (*N* = 609), or e-scooters (*N* = 575), is shown in **Figure 22** across all survey respondents.

Overall, respondents showed a **moderate** interest in the use of either shared electric cars (*M* = 30.77, *Med* = 21) or shared electric bicycles (*M* = 25.96, *Med* = 10), with a large proportion of "0" responses being observed for each mode. Respondents showed less interest in the use of e-cargobikes (*M* = 21.55, *Med* = 5) or e-scooters (*M* = 18.24, *Med* = 2).

While the low mean values may seem surprising at first, a simple explanation is that the starting position of the slider scales was selected to be 0 instead of the middle – the latter having been the case in the first eHUBS survey. Hence, the reference point was at the lower end of the scale, thus biasing responses toward it.

More important than the absolute numeric mean values, however, are the differences between shared modes, which are clearly congruent with the findings of the first eHUBs report, showing a preference for shared cars over shared bicycles, with shared e-cargobikes and e-scooters, in turn, being the least popular.

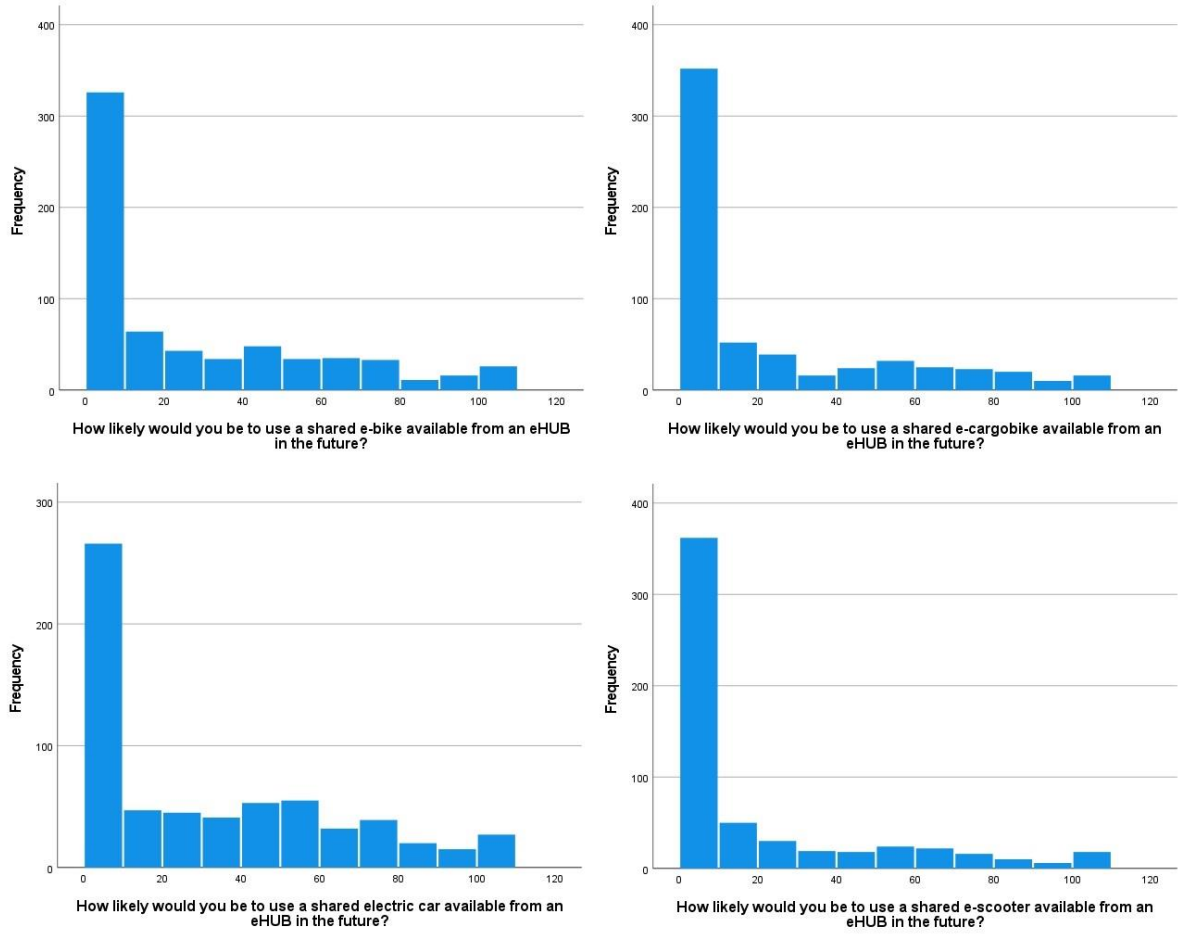

Figure 22. Histograms of respondents' intention to use shared vehicles (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)

4.1. Comparison between non-users and users of shared mobility

The sample of non-users (*N* = 733) was compared to the sample of shared mobility users (*N* = 247) in the survey to reveal any potential differences between the two groups. As might be expected, there were large discrepancies in terms of the observed and expected counts for respondents' age, with significantly higher observed versus expected proportions of young shared-mobility users[4]. No significant difference was observed for gender[5], with a fairly even distribution of male and female respondents, among both users and non-users of shared mobility. A significant difference did emerge, however, for the expected and observed number of children in the household, with shared mobility users actually having more children than would be expected based on chance alone[6]. Furthermore, the results suggested a significant discrepancy of observed and expected proportions in favour of highly educated

[4] $\chi^2 = 104$, $df = 6$, $p < .001$
[5] $\chi^2 = .84$, $df = 2$, *ns*
[6] $\chi^2 = 104$, $df = 6$, $p < .001$

shared mobility users[7], which also was significantly higher than the sample of non-users (81% vs 69%)[8]. No significant differences between observed and expected values were observed in terms of income[9], although non-users were significantly more likely to select 'Prefer not to say' than users (19% vs 13%)[10].

Significant differences between observed and expected values also emerged for possession of a driver's licence[11], private motorised transport (PMT) use[12], walking[13], cycling[14], public transport (PT) use[15], and ride hailing[16], as well as traveller identity[17]. The two strongest effects, however, were observed for ride hailing[18] and PT use[19]. When comparing the use of public transport and ride hailing between shared mobility users and non-users, it can be seen that the former. use both public transport (54% vs 29% at least once per week, p <.05) and ride hailing significantly more often (20% vs 3% at least twice per month, p <.05).

From the preliminary analysis of shared mobility user and non-user data, several conclusions can be drawn. Firstly, shared mobility users tended to be younger than non-users and a greater proportion reported being highly educated (i.e., holding a university degree). In the current sample, shared mobility users also tended to have more children in the household, suggesting that shared mobility might be more attractive to (possibly car-dependent) families. Secondly, in terms of general travel behaviour, shared mobility users reported using both public transport and ride hailing significantly more often than non-users, whereas a significant difference in the use of PMT was only observed for two categories (i.e., Never and 1-2 days per week). Finally, shared mobility users were significantly less likely compared to non-users to identify themselves as a car driver, while they were significantly more likely to identify themselves as a cyclist. For the interested reader, the breakdown of demographic variables and general travel behaviour for shared mobility users and non-users is presented in **Table A12** and **Table A13**, respectively. A comparison of shared mobility users and non-users' actual and intended use of shared vehicles for different trip purposes is presented in **Figure 23**.

[7] χ^2 = 18.21, df = 3, p < .001
[8] Comparison between cells, p <.05
[9] χ^2 = 6.86, df = 6, p > .30
[10] Comparison between cells, p <.05
[11] χ^2 = 5.64, df = 1, p = .02
[12] χ^2 = 23.43, df = 5, p < .001
[13] χ^2 = 16.36, df = 5, p < .01
[14] χ^2 = 27.13, df = 5, p < .001
[15] χ^2 = 86.35, df = 5, p < .001
[16] χ^2 = 100.56, df = 5, p < .001
[17] χ^2 = 12.17, df = 5, p = .03
[18] Cramer's V = .32
[19] Cramer's V = .30

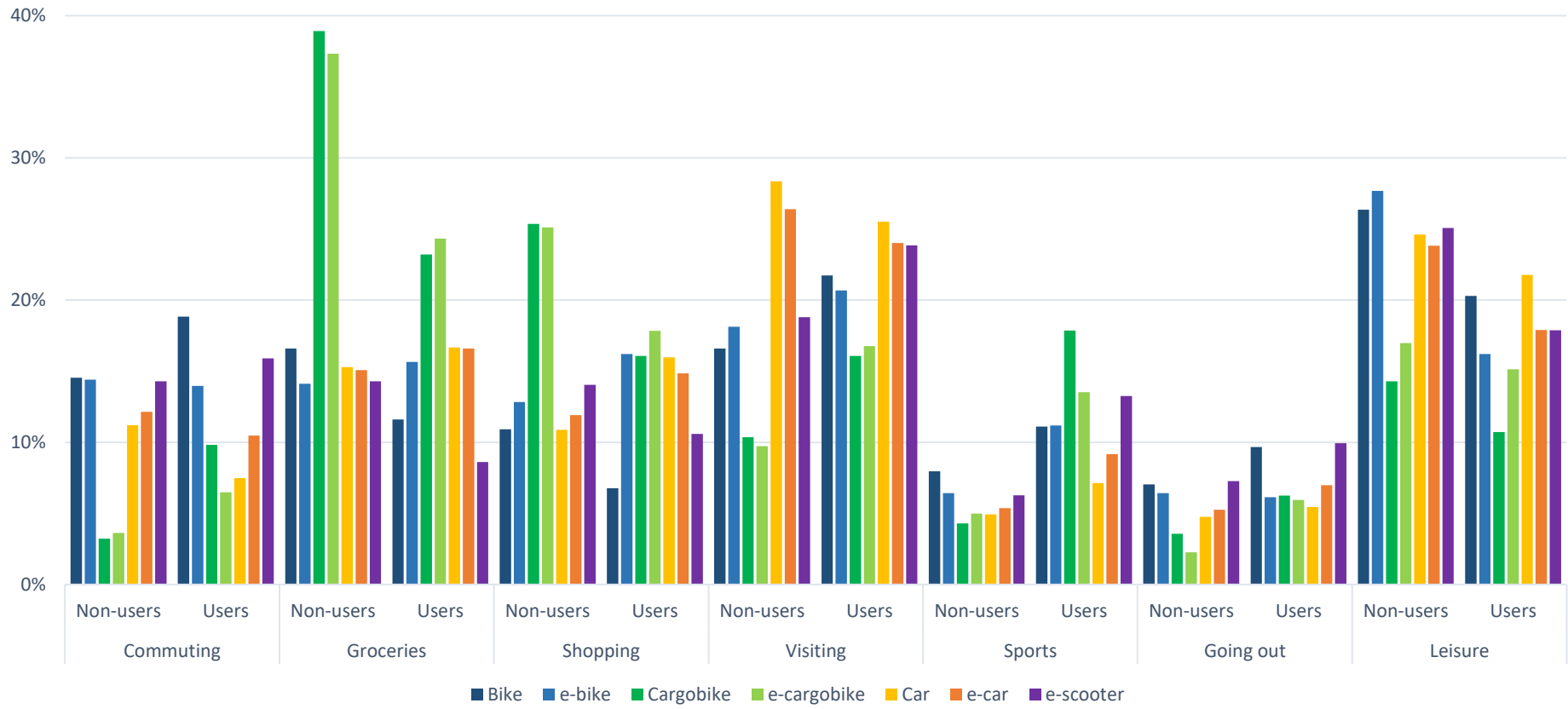

Figure 23. Intended (non-users) and actual (users) use of different shared (electric) vehicle types for different trip purposes

As shown in **Figure 23**, shared mobility users' and non-users' (intended) use of shared vehicles was very similar. Shared (e-)bikes, for instance, were considered as a commute alternative by non-users, yet this was also reflected in the actual use by shared mobility users. Similarly, shared (e-)cargobikes were considered as an alternative for grocery shopping by non-users, again, reflecting actual usage behaviour. Non-users also regarded (e-)cargobikes as the preferred alternative for shopping in general, although current shared mobility users showed no mode preference in this case. Finally, shared mobility users appeared to use shared vehicles more often for sports activities than non-users intended to.

4.2. Respondents' intention to use shared vehicles by demographic variables

In terms of **gender**, no statistically significant differences in the intention to adopt shared electric vehicles from eHUBs emerged (see **Figure 24**).

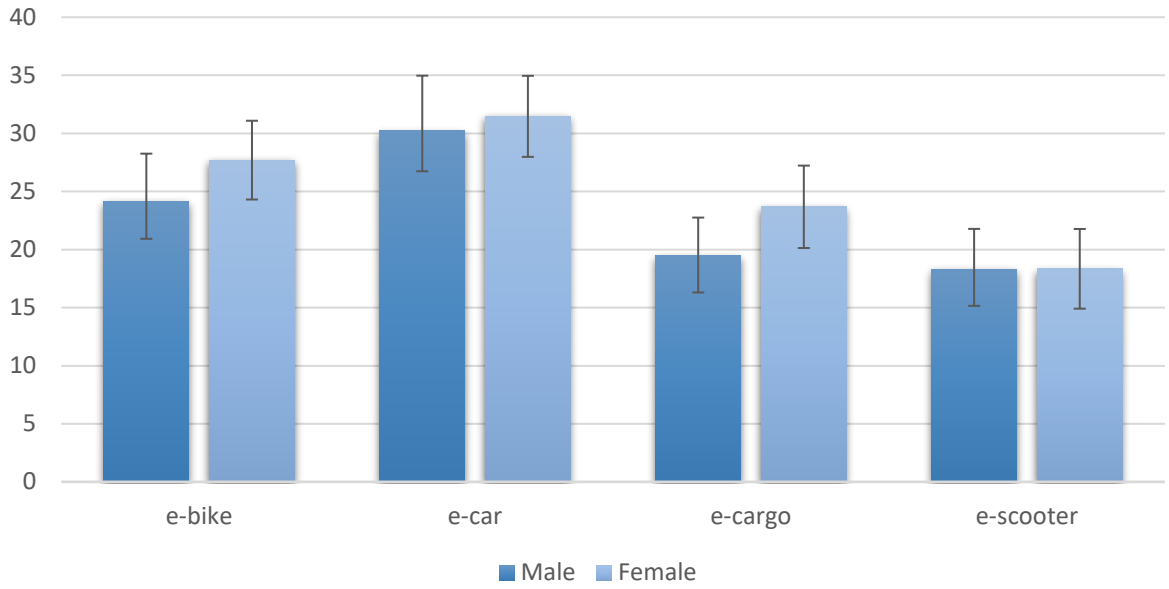

Figure 24. Mean (95% CIs) of respondents' intention to use shared vehicles by gender (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)

Significant differences in the intention to adopt shared electric vehicles did emerge between the different **age groups** for all four vehicle types under scrutiny including shared electric bikes[20], electric cars[21], electric cargobikes[22], and electric scooters[23] (see **Figure 25**).

Similar to the first survey, the general interest in using shared electric vehicles **decreased** with respondent age (i.e., older respondents considered themselves less likely to use eHUBS) and respondents, especially older ones, generally showed a greater interest in using shared electric cars or bicycles compared to electric cargobikes or e-scooters. **Shared electric cars** were the preferred mode among all age groups (except 18 to 24), supporting earlier findings.

Overall, statistically significant differences were mostly observed between the younger age groups (18 to 44 years) and all older age groups (45 to 75 years or older), as is also illustrated by the non-overlapping confidence intervals seen in **Figure 25**. Confidence intervals are

[20] One-way Analysis of Variance (ANOVA) – $F_{6,662} = 7.72$, $p < .001$
[21] One-way Analysis of Variance (ANOVA) – $F_{6,632} = 6.56$, $p < .001$
[22] One-way Analysis of Variance (ANOVA) – $F_{6,601} = 17.63$, $p < .001$
[23] One-way Analysis of Variance (ANOVA) – $F_{6,567} = 19.05$, $p < .001$

widest for the youngest age group, due to small sample size (*n* = 27), although the group shows similar levels of interest in shared vehicles as the 25 to 34 and 35 to 44 age groups.

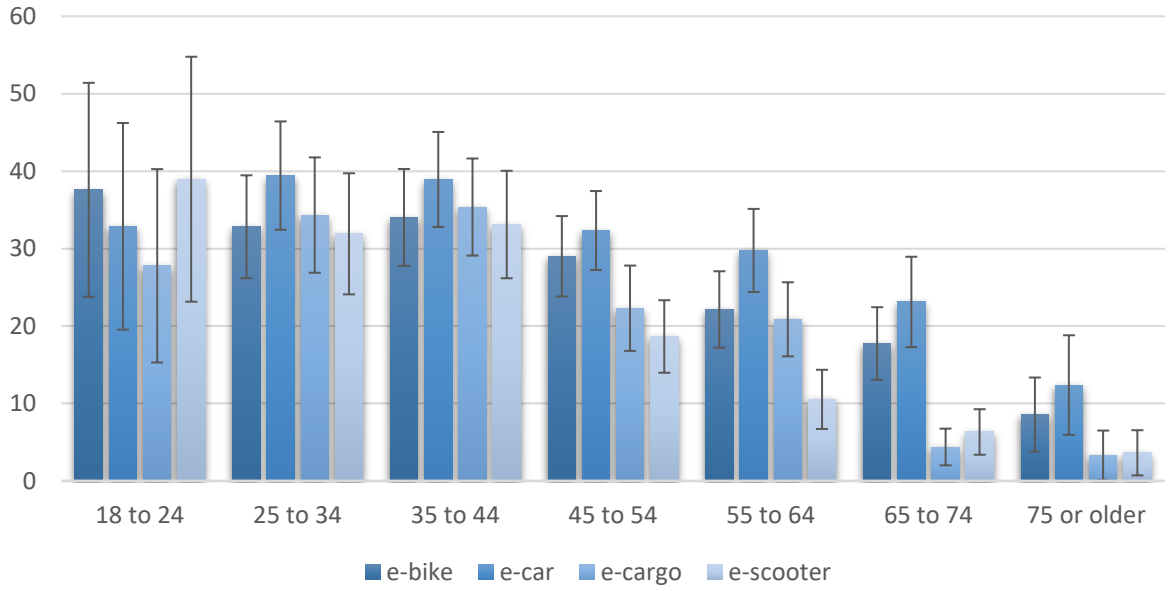

Figure 25. Mean (95% CIs) of respondents' intention to use shared vehicles by age (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)

The intention to use shared electric vehicles also varied with the **number of adults** and **number of children** in the household, as shown in **Figure 26** and **Figure 27**.

Although not all differences achieved statistical significance, the interest in using any shared electric vehicle type from an eHUB tended to be greater in households with two or more adults compared to single-person households. In particular, this was the case for shared electric cars[24], cargobikes[25], and e-scooters[26], albeit not for shared electric bicycles (*ns*).

[24] One-way Analysis of Variance (ANOVA) – $F_{3,630} = 5.74$, $p < .01$
[25] One-way Analysis of Variance (ANOVA) – $F_{3,599} = 3.68$, $p < .05$
[26] One-way Analysis of Variance (ANOVA) – $F_{3,566} = 5.30$, $p < .01$

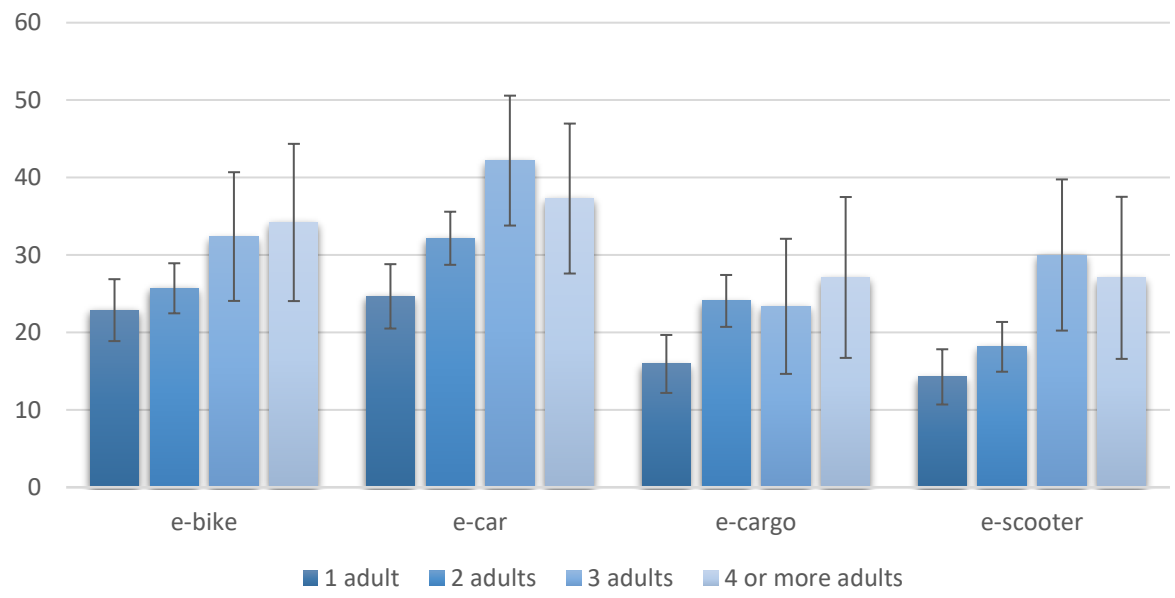

Figure 26. Mean intention to use shared vehicles (95% CIs) by number of adults (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)

In terms of the number of children in the household, respondents without children showed significantly less interest in shared electric bikes[27], cars[28], cargobikes[29], and e-scooters[30], compared to households with either one or two children.

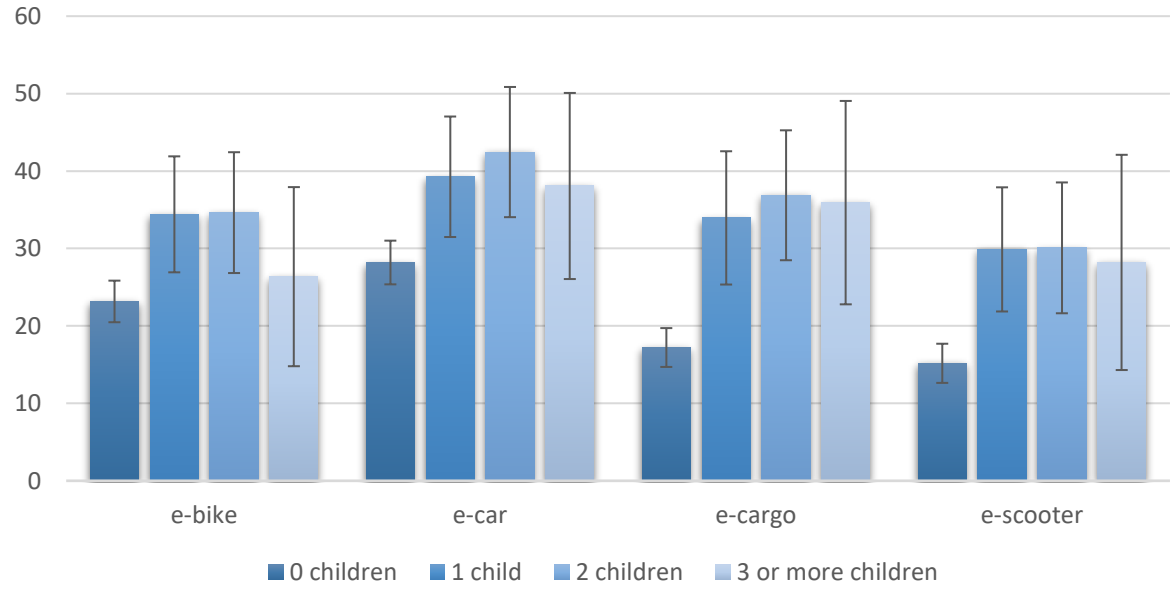

Figure 27. Mean intention to use shared vehicles (95% CIs) by number of children (Likert-scale from 0 – Extremely unlikely to 100 – Extremely likely)

[27] One-way Analysis of Variance (ANOVA) – $F_{3,643} = 4.96$, $p < .01$
[28] One-way Analysis of Variance (ANOVA) – $F_{3,616} = 5.68$, $p < .01$
[29] One-way Analysis of Variance (ANOVA) – $F_{3,588} = 14.99$, $p < .001$
[30] One-way Analysis of Variance (ANOVA) – $F_{3,555} = 8.91$, $p < .001$

In terms of **education level**, statistically significant differences were observed for all shared modes including electric bicycles[31], cars[32], cargobikes[33], and e-scooters[34] (see **Figure 28**).

In all cases, this was due to respondents with school education, who reported a significantly lower willingness to use shared electric vehicles compared to those with a higher educational background. Remaining groups did not differ significantly with regard to their interest in using shared electric vehicles.

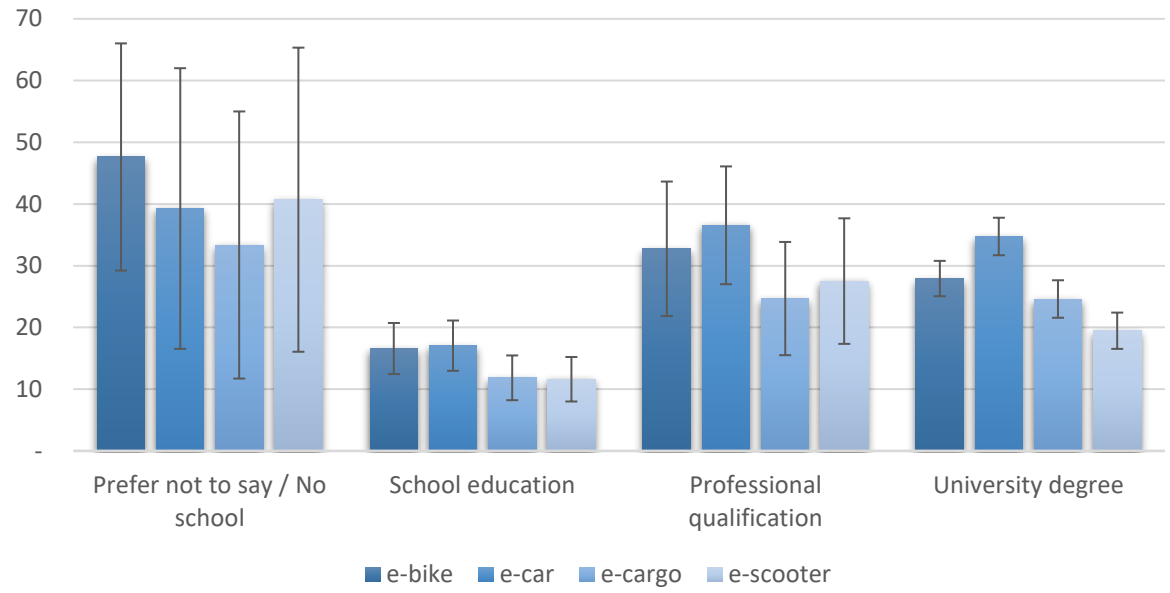

Figure 28. Mean intention to use shared vehicles (95% CIs) by education level (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)

Finally, with regard to respondents' **income**, significant differences emerged between different income groups for shared electric cars[35] and cargobikes[36] (see **Figure 29**).

For shared electric cars, the lowest income group (i.e., <£20,000) showed significantly less interest than all but the highest income group. Overall, the £80,000-£99,999 income group expressed the greatest interest in shared electric cars, although the mean value differed significantly only from the 'Prefer not to say' and lowest income groups.

For shared e-cargobikes, the mid-range £40,000-£59,999 income group reported a significantly greater interest compared to the £20,000-£39,999 and 'Prefer not to say' groups.

[31] One-way Analysis of Variance (ANOVA) – $F_{3,665} = 8.54$, $p < .001$
[32] One-way Analysis of Variance (ANOVA) – $F_{3,635} = 13.22$, $p < .001$
[33] One-way Analysis of Variance (ANOVA) – $F_{3,604} = 7.82$, $p < .001$
[34] One-way Analysis of Variance (ANOVA) – $F_{3,570} = 6.71$, $p < .001$
[35] One-way Analysis of Variance (ANOVA) – $F_{6,631} = 5.83$, $p < .001$
[36] One-way Analysis of Variance (ANOVA) – $F_{6,600} = 2.55$, $p = .02$

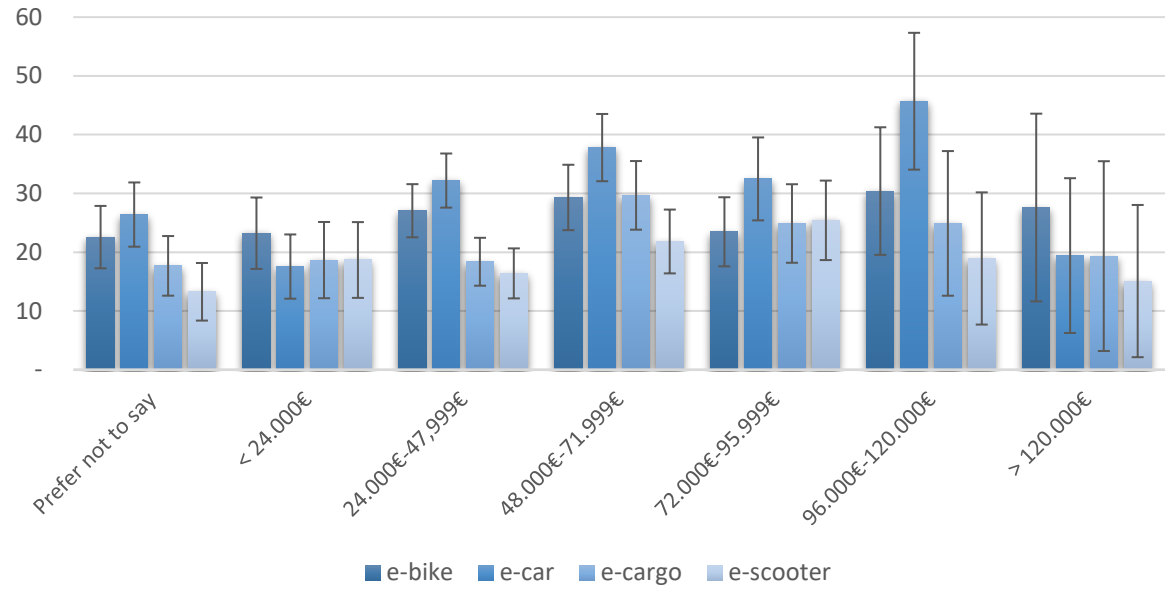

Figure 29. Mean intention to use shared vehicles (95% CIs) by income level (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)

4.3. Respondents' intention to use shared vehicles by traveller identity

To learn more about the potential target groups of eHUBS, we compared the intention to use shared electric vehicles from an eHUB between different **traveller identities** (**Figure 30**).

Indeed, significant differences between individuals holding different traveller identities could be determined for the intention to use shared electric cars[37], cargobikes[38], and e-scooters[39], respectively.

Cyclists, in particular, reported a significantly greater interest in using shared electric cars than either car drivers, pedestrians, or public transport users.

Cyclists also reported a significantly greater interest in the use of shared electric cargobikes than all other traveller identities, except those who considered themselves to be multimodal travellers.

Finally, a one-way analysis of variance suggested the presence of at least one significant difference for the intention to use e-scooters. In particular, **car drivers** indicated a stronger intention to use shared e-scooters than pedestrians, although pairwise comparisons revealed that this difference in mean values did not achieve statistical significance.

[37] One-way Analysis of Variance (ANOVA) – $F_{5,634} = 6.01$, $p < .001$
[38] One-way Analysis of Variance (ANOVA) – $F_{5,603} = 9.65$, $p < .001$
[39] One-way Analysis of Variance (ANOVA) – $F_{5,569} = 2.25$, $p = .05$

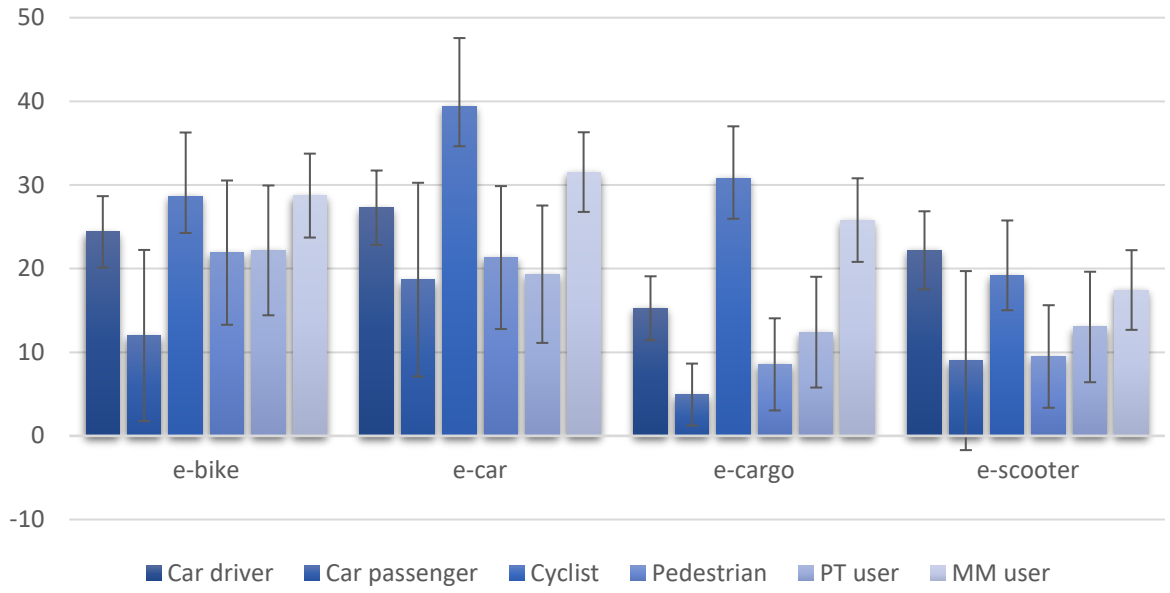

Figure 30. Mean intention to use shared vehicles (95% CIs) by traveller identity (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)

4.4. Respondents' intention to use shared vehicles by frequency of short trips

A particular point of interest for the eHUBS project, cities, policy makers and shared mobility providers, is the potential to replace trips made by private car with more sustainable modes.

Hence, we compared car users' interest in using shared electric vehicles based on the **frequency of short trips** (i.e., trips shorter than 6 miles or 10 kilometres, respectively) they complete by car in a typical week (see **Figure 31**).

Here, significant differences in mean values emerged only for shared e-scooters[40], with those using their car for short trips on six days per week or more, expressing a significantly greater interest than those who use their car for short trips either never or rarely (i.e., once per week).

[40] One-way Analysis of Variance (ANOVA) – $F_{4,482} = 2.58$, $p = .04$

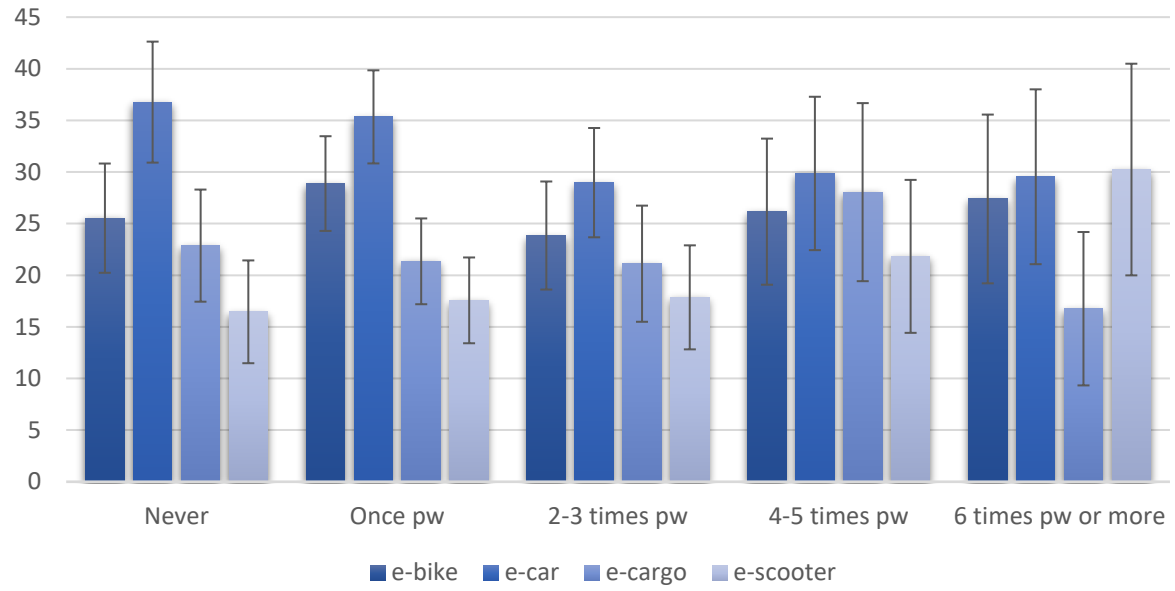

Figure 31. Mean intention to use shared vehicles (95% CIs) by short trip frequency (Likert-scale ranging from 0 – Extremely unlikely to 100 – Extremely likely)

4.5. Respondents' intention to use shared vehicles by trip purpose

In addition to asking current non-users of shared mobility about their general intention to use different types of shared electric vehicles, we also asked respondents what **type** of shared (electric or non-electric) vehicle they would consider using for which **trip purpose** (**Figure 32**).

This analysis revealed that shared (electric) cars in particular were favoured for visiting friends or family (*n* = 167/226, 23%/31%) and leisure or tourism (*n* = 145/204, 20%/28%). Similar to shared (electric) cars, shared (electric) bicycles also were considered as an alternative for leisure or tourism (*n* = 116/194, 16%/26%), above all other trip purposes.

From the above results, it is noteworthy that shared **electric** cars and bicycles were preferred over conventional (i.e., non-electric) shared cars and bicycles. This was also the case for commuting, where shared electric cars and bicycles emerged as the two preferred modes (*n* = 105, 14%, and *n* = 101, 14%, respectively).

As expected, shared cargobikes and e-cargobikes were mostly considered for grocery shopping (*n* = 110, 15%, and *n* = 166, 23%) or shopping in general (*n* = 71, 10%, and *n* = 111, 15%), again revealing an advantage for the shared electric alternative.

The primary purpose of e-scooters was seen in leisure or tourism (*n* = 100, 14%), followed by visiting friends or family (*n* = 75, 10%).

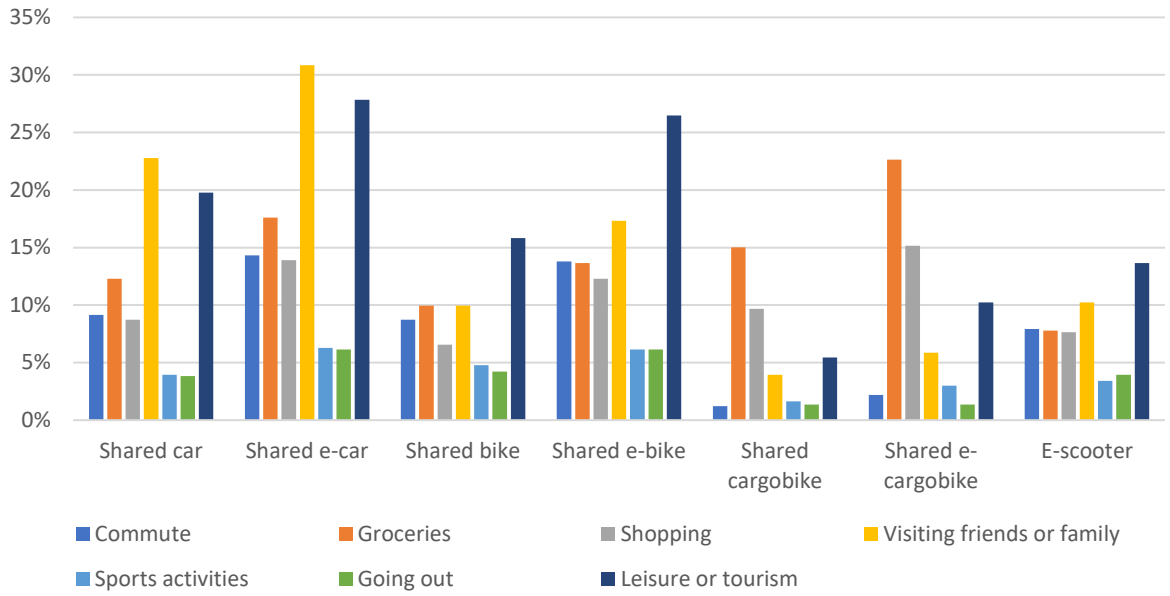

Figure 32. Respondents' intention to use shared vehicles by trip purpose (*N* = 733)

4.6. Perceived barriers to shared mobility use

In order to learn more about people's interest in and intentions to use shared mobility options, we asked respondents to select, from a list of potential barriers, those **barriers** that prevented them from using shared mobility options (see **Figure 33**). In addition, respondents could name their own barriers via a comment function.

A major deterrent from using shared electric vehicles that emerged included people's **preference for their own travel mode(s)**. More specifically, approximately two out of five respondents who are not currently using shared mobility services, indicated that they prefer using their own car (*n* = 305, 42%), prefer walking or using their own bicycle (*n* = 297, 41%), or prefer using existing public transport (*n* = 145, 20%).

Yet, more specific barriers related to the use of shared mobility were cited as well. In particular, other (perceived) barriers included concerns about the availability of shared vehicles (*n* = 228, 31%), the cost of renting vehicles (*n* = 199, 27%), the distance of shared vehicle locations (*n* = 177, 24%), and being unable to leave vehicles where desired (*n* = 173, 23%), as in free-floating shared vehicle systems.

Some respondents also regarded the process of renting shared vehicles to be too complicated (*n* = 147, 20%) or suggested that they were not seeing the added value of shared mobility (*n* = 87, 12%). Other perceived barriers, such as the maintenance and cleanliness of shared vehicles (*n* = 57, 8%) or privacy concerns (*n* = 50, 7%), were mentioned with lesser frequency.

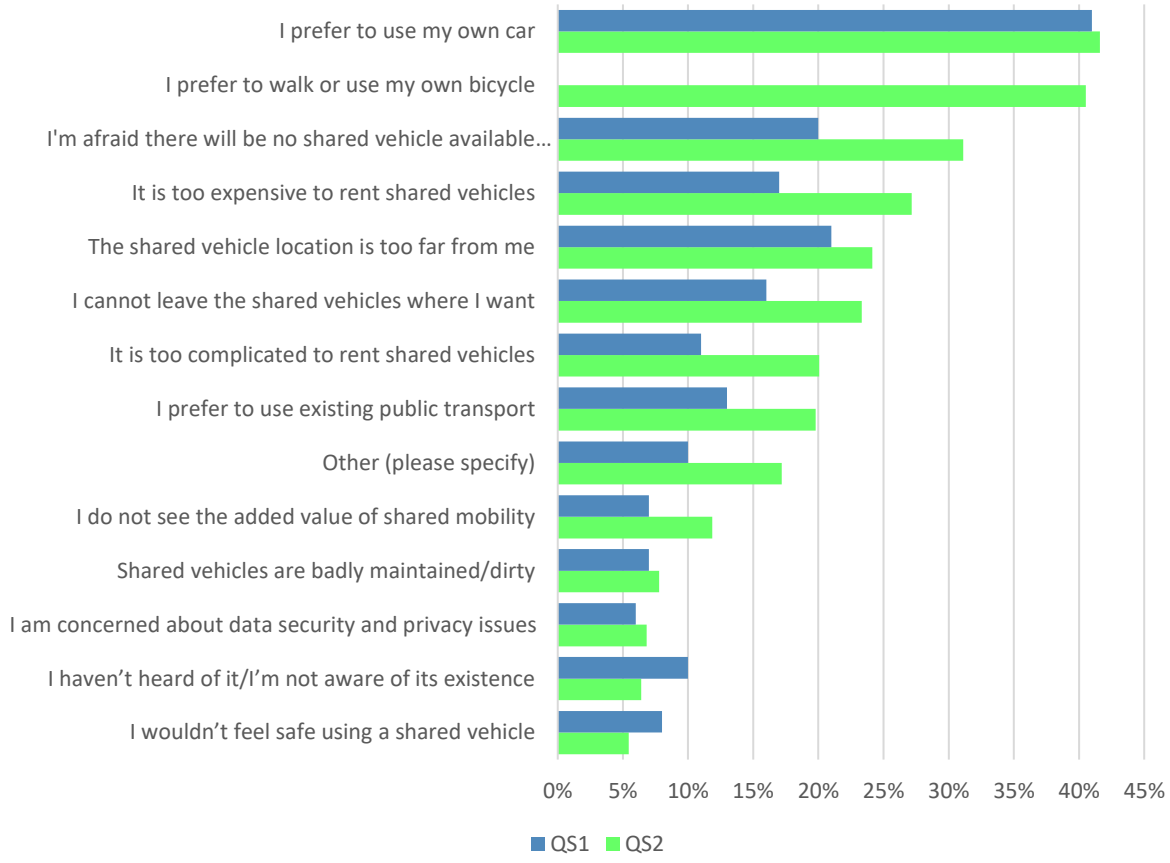

Figure 33. Perceived barriers to shared mobility use (*N* = 733; see also Table A11)

When compared to the first questionnaire, most (perceived) barriers were cited with greater frequency. However, the hierarchy of reported barriers hardly changed. That is, in both surveys, respondents' preference for their own travel mode was the most cited barrier, followed by concerns about the cost, distance, and availability of shared vehicles.

Most of these perceived barriers can be directly addressed by shared mobility providers through competitive and affordable pricing, ensuring sufficient vehicle availability at all times, creating a large number of accessible shared vehicle locations, and offering users the possibility to leave vehicles where desired (or at an eHUB station for a possible discount). Worthy of note is the increased awareness of non-users of the shared mobility which suggests the visual presence of the eHUBS and marketing are having an impact.

5. SHARED MOBILITY USE AND EXPERIENCES

If respondents indicated that they are (or have recently been) using shared mobility options, they were questioned about their **shared mobility use** and experiences.

In the current study sample, a quarter of respondents indicated using shared mobility at least once a month (*N* = 247, 25%). The specification of using shared mobility at least once a month was introduced so as to limit the analysis to current regular, rather than past or occasional, shared mobility users. **Table A14** in the appendix provides general information on respondents' shared mobility use by city of residence.

In terms of the **frequency of shared mobility use**, shared cars were the most frequently used modes (see **Figure 34**), with more than half of users reporting use at least once per month or less (*n* = 134, 57%). In contrast, shared cargobikes were the least frequently used mode, with a quarter of respondents using them once per month or less (*n* = 60, 26%). Shared electric cars (*n* = 116, 50%) and shared bikes (*n* = 113, 49%) showed similar usage patterns.

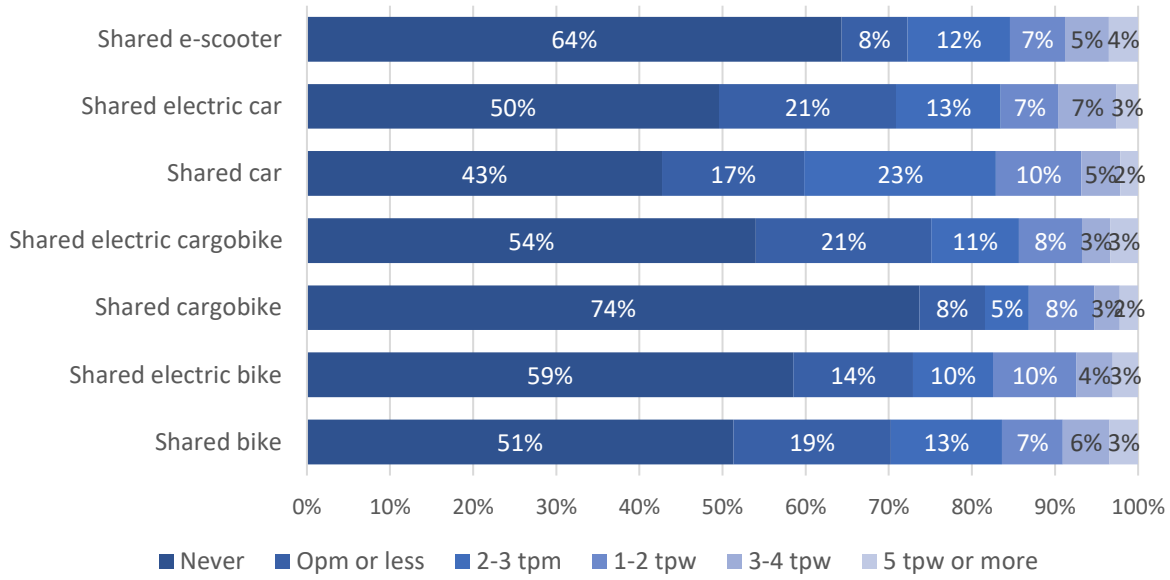

Figure 34. Respondents' frequency of use of different shared modes (*N* = 227-237)

Respondents reported using shared vehicles for a variety of **trip purposes** (see **Figure 35**). Notably, shared cars dominated use for visiting friends or family (*n* = 75, 30%), leisure or tourism (*n* = 64, 26%), and shopping in general (*n* = 47, 19%).

Shared bicycles stood out as an alternative for commuting to work (*n* = 39, 16%) and going out at night (*n* = 20, 8%), whereas shared e-cargobikes (*n* = 45, 18%) were almost on par with shared cars (*n* = 49, 20%) for grocery shopping.

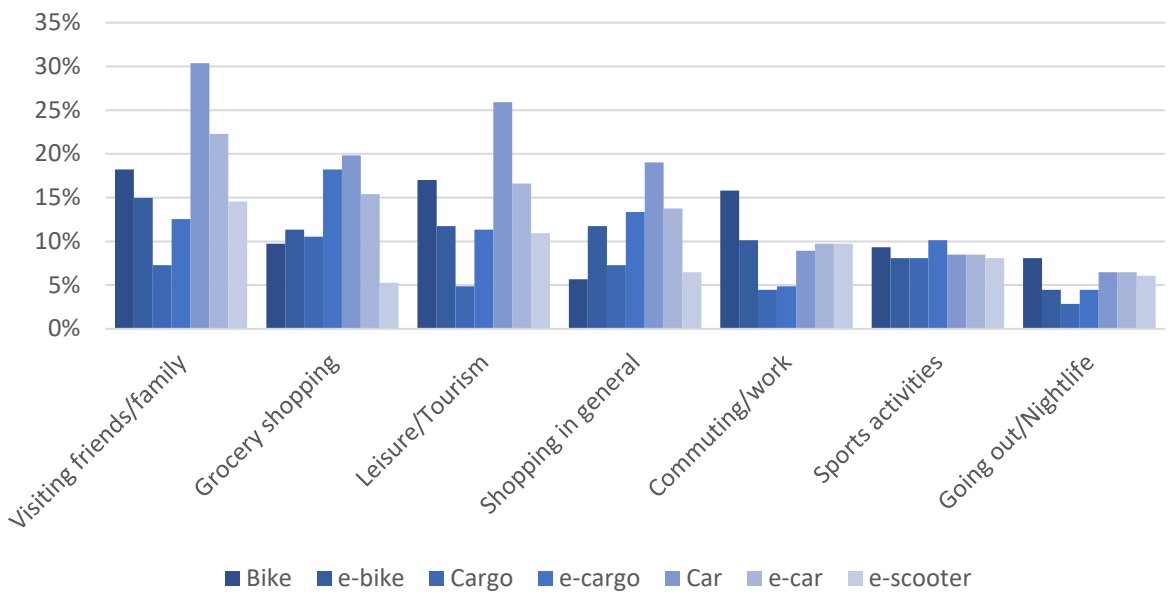

Figure 35. Respondents' use of different shared vehicle types by trip purpose

Regarding the nature of respondents' shared mobility trips, more than two thirds of respondents indicated that they used shared vehicles primarily for **roundtrips** (*n* = 167, 70%), as shown in **Figure 36**.

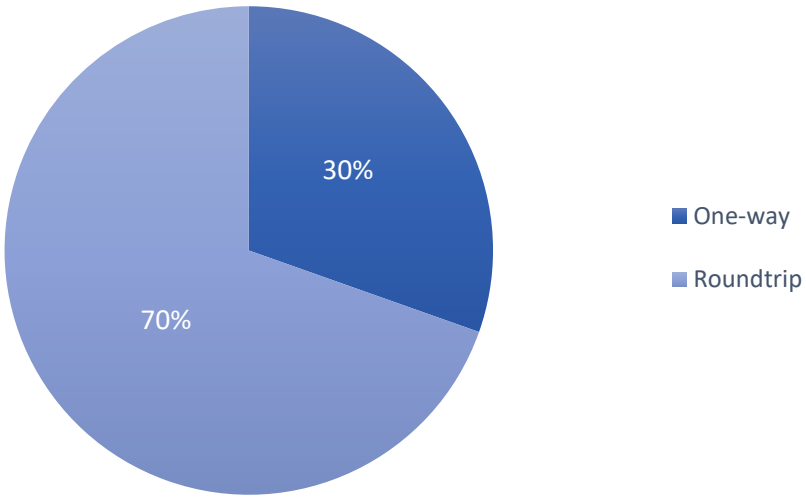

Figure 36. Nature of respondents' shared mobility trips (*N* = 240)

Furthermore, half of respondents indicated that they use shared vehicles in combination with **public transport** (*n* = 121, 50%), suggesting potential extension of shared (electric) vehicles as a first- or last-mile alternative (see **Figure 37**).

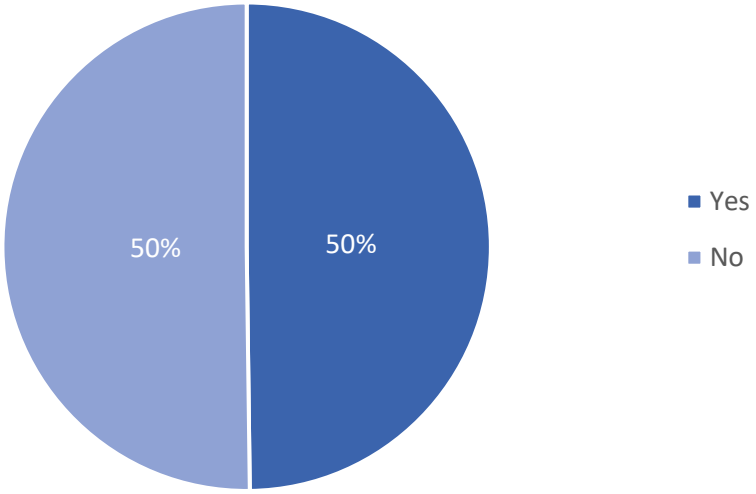

Figure 37. Shared mobility use in combination with public transport (*N* = 243)

As can be seen in **Figure 38**, the typical length of respondents' shared mobility trips (one-way) tended to be 6 miles (10 km) or less (*n* = 141, 58%), suggesting that shared vehicles were mainly used for short to medium range trips.

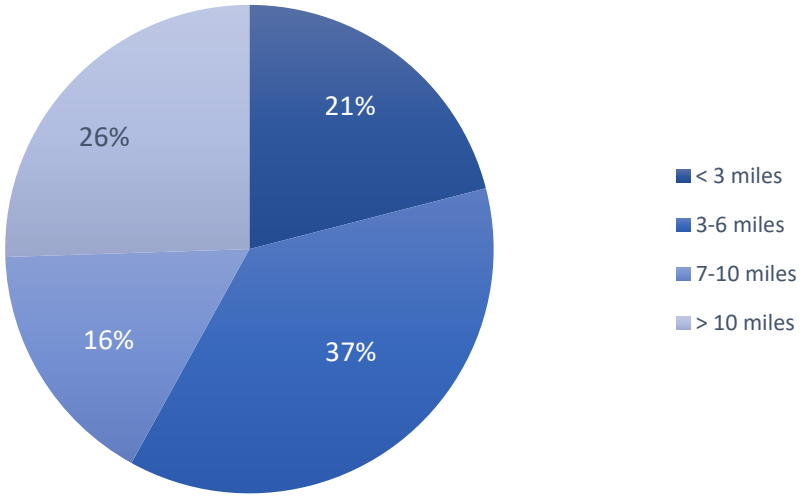

Figure 38. Typical length of respondents' shared mobility trips one-way (*N* = 243)

5.1. Respondents' future shared mobility use and importance

When being asked about the **importance of shared mobility** to their daily trip making, a third of respondents indicated that shared mobility is an integral part of their daily mobility (*n* =81, 33%). The majority of respondents, however, reported using shared mobility only on an as-needed basis (*n* = 144, 60%), as shown in **Figure 39**.

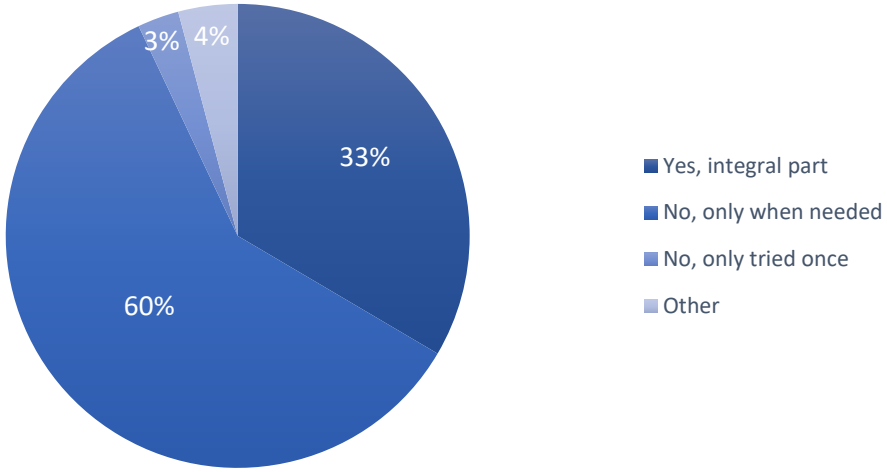

Figure 39. Importance of shared mobility to respondents' daily mobility (*N* = 242)

Despite less than half of respondents reporting that shared mobility is an essential part of their daily mobility, most respondents indicated that it is likely they will **increase** their shared mobility use via eHUBs or other shared mobility providers in the future (*n* = 183, 78%), as illustrated in **Figure 40**.

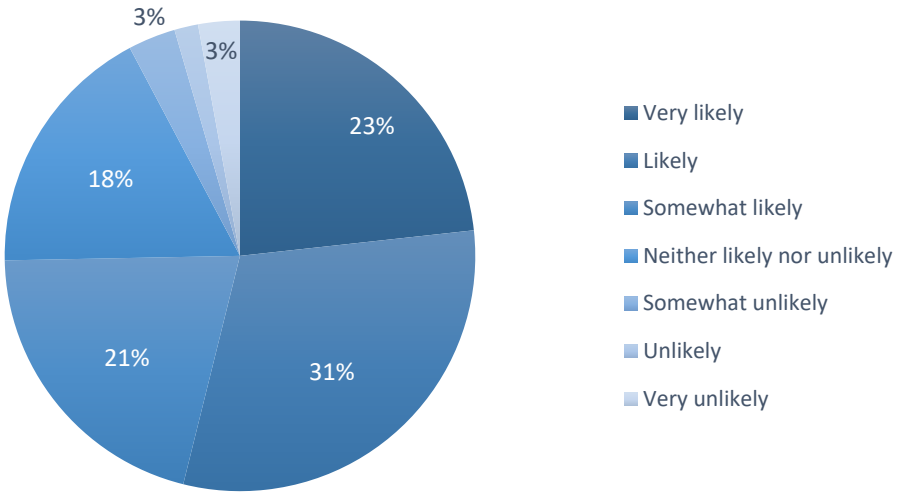

Figure 40. Likelihood of increasing shared mobility use in the future (*N* = 245)

5.2. Respondents' shared mobility use by degree of importance

Given the importance of shared mobility (integral to the daily mobility of 33% of respondents previous section), it is likely that these respondents' shared mobility use differs from those who only use shared vehicles on an as-needed basis or out of curiosity. Hence, in this section, we compare shared mobility use among different user groups.

As can be seen in **Figure 41**, those for whom shared mobility represents an integral part of their daily mobility, are more likely to use shared vehicles for **one-way trips** (*n* = 33, 41%). In contrast, these proportions are lower for those who only use shared mobility when needed (*n* = 37, 26%), or those who only tried it once (*n* = 1, 20%).

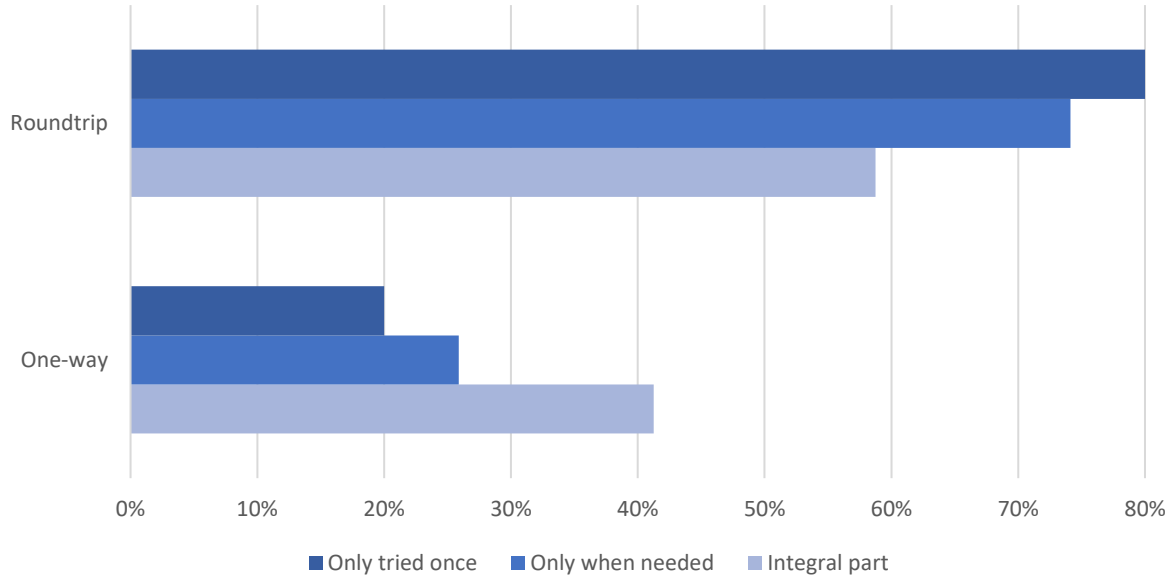

Figure 41. Nature of respondents' shared mobility trips by usage (*N* = 228)

A similar pattern in observed for the combined use of shared mobility and **public transport** (see **Figure 42**). That is, those who rely more heavily on shared mobility are also more likely to use it in combination with public transport (*n* = 51, 63%), compared to those using shared mobility either on an as-needed basis (*n* = 62, 43%) or out of curiosity (*n* = 1, 14%).

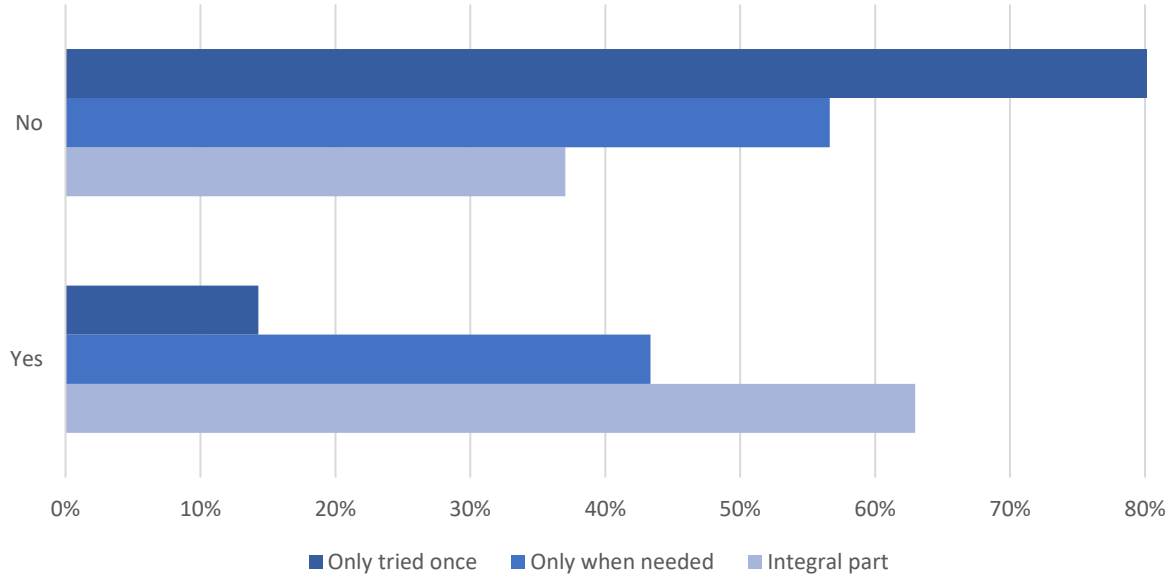

Figure 42. Shared mobility use in combination with public transport by usage (*N* = 231)

In terms of **trip distance**, no major differences could be observed (see **Figure 43**), except for long distance trips (i.e., > 10 miles), which were more common among those for whom shared mobility is an essential part of their daily mobility (*n* = 26, 32%). A possible explanation is that more regular users tend to make longer trips because they are more experienced with the use of shared vehicles and rental conditions compared to occasional users.

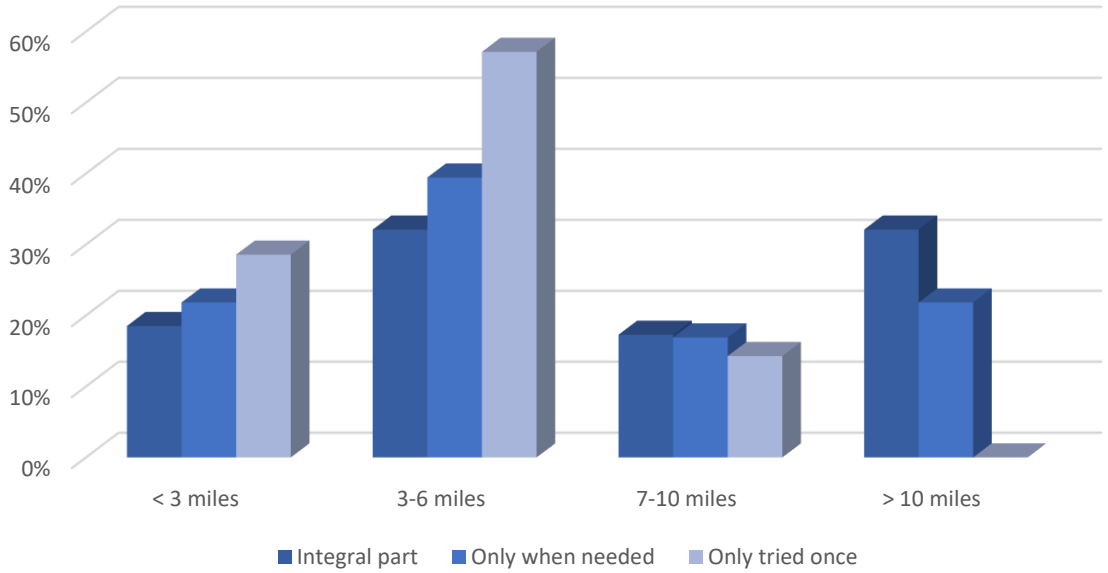

Figure 43. Typical length of respondents' shared mobility trips one-way by usage (*N* = 230)

Finally, when asked whether they would **increase** their shared mobility use in the future, those who considered shared mobility to be an integral part of their daily mobility (see **Figure 44**), were more inclined to increase their shared mobility use (i.e., at least 'Somewhat likely', *n* = 74, 91%) than occasional shared mobility users *(n* = 101, 70%).

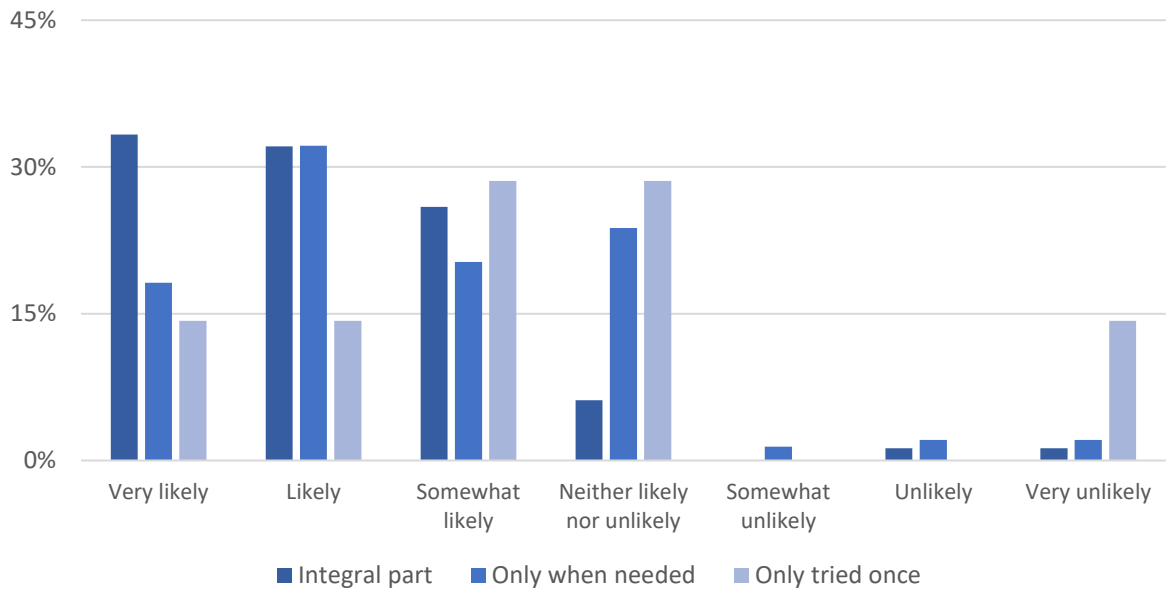

Figure 44. Likelihood of increasing shared mobility use in the future by usage (*N* = 231)

5.3. Respondent satisfaction and ease of use

On average, shared mobility providers appeared to be doing well (see **Figure 45**), with an average **satisfaction** score of approximately 8 out of 10 (*M* = 7.81, *SE* = 0.12, range 2 to 10).

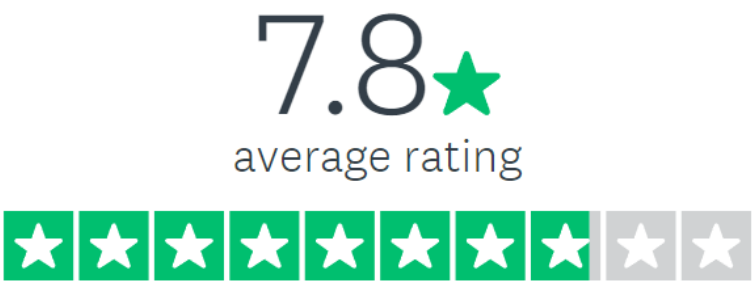

Figure 45. Average shared mobility provider satisfaction rating (*N* = 202)

With regard to the **ease of use** of shared electric vehicles (see **Figure 46)**, most respondents felt that it was easy for them to drive (*n* = 156, 69%), start (*n* = 144, 64%), and charge (*n* = 122, 55%) a shared electric vehicle. Similarly, making a reservation for a shared electric vehicle (*n* = 162, 69%), and planning a journey without the risk of the battery running out (*n* = 131, 58%), were perceived as easy by most.

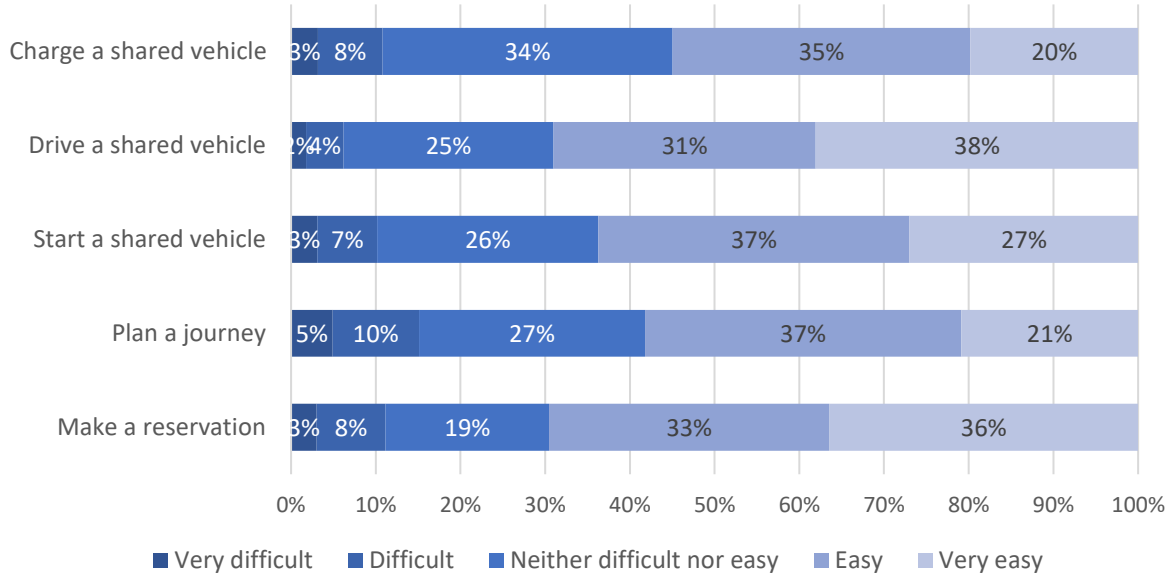

Figure 46. Respondents' perceived ease of use of shared electric vehicles

Comparing the mean of ease-of-use items among frequent (*n* = 78) and occasional users (*n* = 137) suggested no major differences. Respondents who only tried shared vehicles once (*n* = 7), however, showed less confidence in the use of shared electric vehicles, especially with regard to charging and driving shared electric vehicles, as illustrated in **Figure 47**.

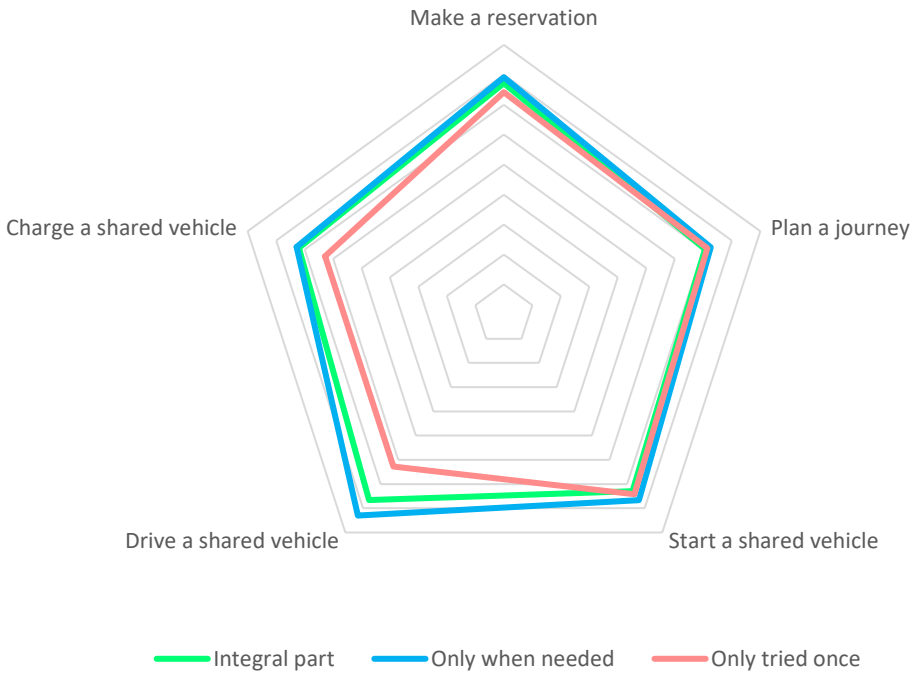

Figure 47. Respondents' perceived ease of use of shared electric vehicles (mean values) by usage (*N* = 4-48)

6. LAST TRIP DETAILS AND TRIP SUBSTITUTION

In order to explore mode substitution patterns, respondents were asked about their **last trip** using shared mobility. Below, the characteristics of respondents' last trip using shared mobility options are presented (see also **Table A15** for a breakdown by pilot city), along with an indication of mode substitution as a result of the availability of shared vehicles.

First, respondents were asked about the **trip purpose** of the last trip using shared mobility that they could recall (see **Figure 48**).

As for respondents' general travel behaviour, visiting friends or family (*n* = 58, 24%), and leisure or tourism (*n* = 52, 21%), dominated responses, followed by grocery shopping (*n* = 43, 17%) and commuting or other work-related purposes (*n* = 40, 16%).

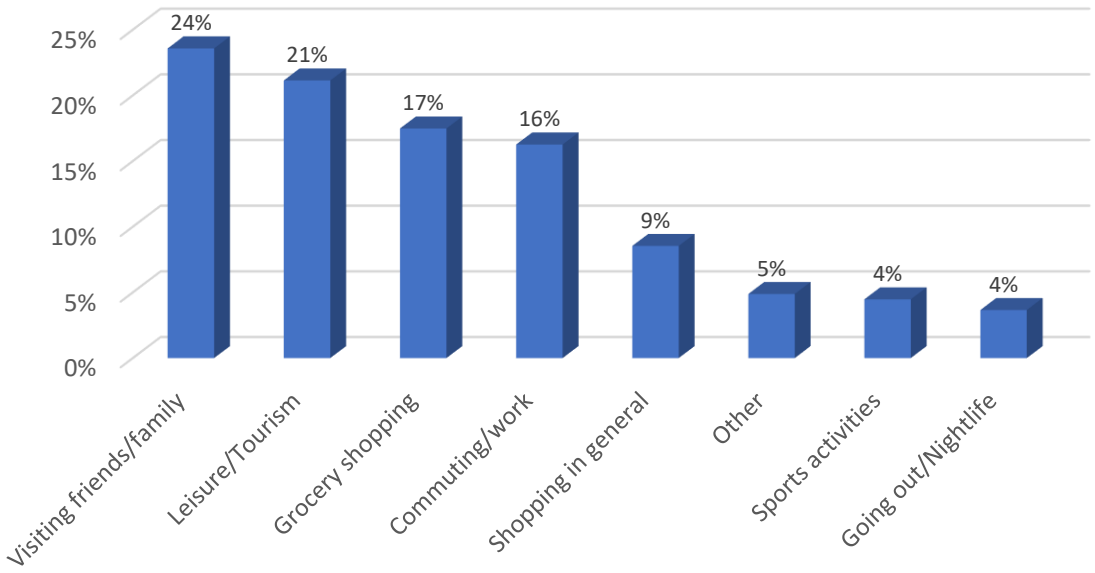

Figure 48. Respondents' last shared mobility trip purpose (*N* = 246)

In terms of the length of respondents' last trip, slightly more than half of respondents' last trips using shared mobility were six miles or shorter (*n* = 130, 54%), whereas the remainder were seven miles or longer (*n* = 112, 46%; see **Figure 49**).

In particular, about a quarter of respondents indicated a **typical trip length** of three miles or less (*n* = 62, 26%), whereas four in ten respondents reported a trip length of four to six miles (*n* = 68, 28%). Finally, as stated above, almost half of respondents indicated a typical trip length of seven miles or more (*n* = 112, 46%).

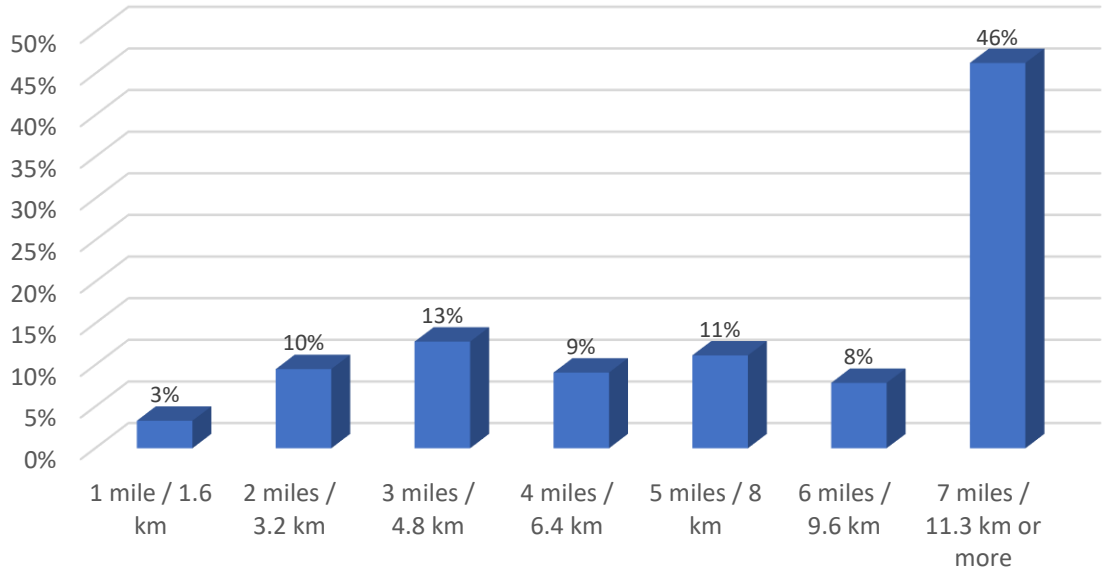

Figure 49. Respondents' last shared mobility trip length (*N* = 242)

In addition to the distance of their last trip using a shared vehicle, respondents were also asked about the **frequency** of said trip, so as to determine whether the trip is a regular or irregular one (see **Figure 50**).

The results suggested that the majority of respondents' shared mobility trips occur once per month or less (*n* = 124, 51%), whereas only a small proportion of trips occur three to four times per week or more (*n* = 11, 4%).

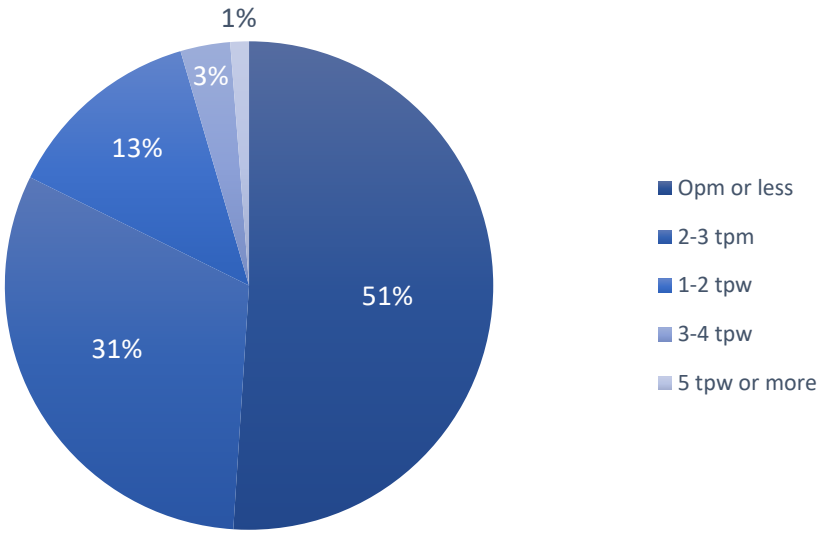

Figure 50. Respondents' last trip frequency (*N* = 243)

Finally, respondents were asked to indicate whether they would have undertaken their last trip using shared mobility even in the **absence** of the latter (see **Figure 51**).

The results suggested that most respondents would have undertaken their last trip regardless of whether or not shared mobility had been an option (*n* = 158, 64%). A minority of respondents indicated they might not have undertaken the trip (*n* = 55, 23%), suggesting that these trips were either enabled or induced through the availability of shared mobility.

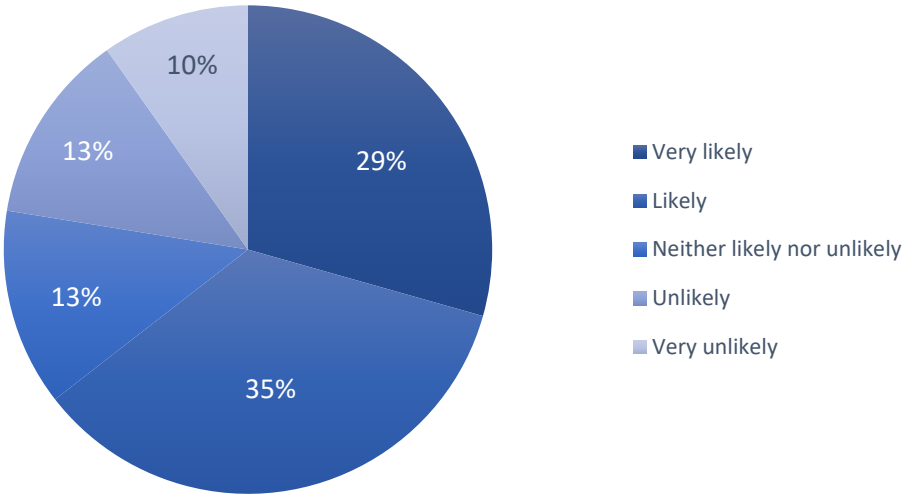

Figure 51. Respondents' likelihood of undertaking their last trip without the availability of shared mobility (*N* = 245)

6.1. Last trip substitution

A major point of interest regarding shared mobility use is the **substituted modes**, which gives an indication of the potential of shared mobility to contribute to the sustainable mobility agenda. Below, the findings for each shared (electric) mode are listed in turn (see **Figure 52**).

- **Shared (electric) cars** – Shared cars were found to primarily substitute the use of public transport (*n* = 25, 35%). Similarly, shared electric cars also substituted the use of public transport (*n* = 12, 31%), albeit they also substituted the use of respondents' private car (*n* = 14, 36%). Hence, for shared electric cars at least, there appears to be some potential to replace trips by (probably non-electric) private cars.
- **Shared (electric) bicycles** – Similar to shared cars, shared bicycles mainly acted as a substitute for respondents' own bicycles (*n* = 12, 24%), and this was particularly the case for e-bikes (*n* = 11, 35%). In addition, regular shared bicycles were also found to substitute public transport trips (*n* = 15, 29%). These findings suggest that shared

(electric) bicycles may only play a limited role in reducing private car use, although shared e-bikes were found to be more effective in replacing trips by private car (*n* = 6, 19%) than regular shared bicycles (*n* = 6, 12%).

- **Shared (electric) cargobikes** – For the use of shared cargobikes, there was an indication that the latter acted as a substitute for both cycling (*n* = 5, 25%) and trips by private car (n = 4, 20%), although the overall sample size for shared cargobike trips was low (*n* = 20). Some respondents suggested they would not have made the trip at all if there had been no shared cargobikes available (*n* = 4, 20%). While the sample size for shared e-cargobikes was similarly limited (*n* = 19), they showed the greatest potential to replace trips by private car (*n* = 11, 58%).
- **Shared e-scooters** – E-scooters were found to primarily replace public transport trips (*n* = 7, 47%), followed by private car trips (*n* = 3, 20%), thus offering a mixed picture with regard to their potential as a sustainable transport alternative.

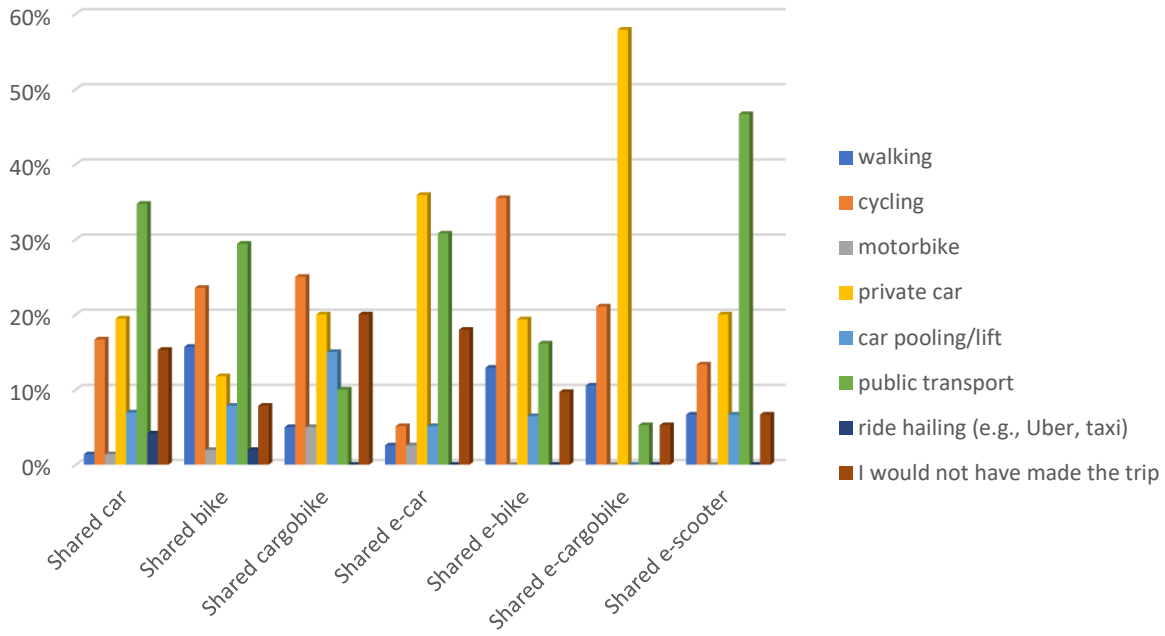

Figure 52. Respondents' chosen shared mode and substituted mode (*N* = 247)

Table A16 shows the full breakdown of mode substitutions, whereas **Table 2** provides more detail on some of the most frequent and most interesting mode substitutions, including:

- Substituted walking (7%) and cycling trips (19%)
- Substituted private car (23%) and carpool trips (7%)
- Substituted public transport trips (27%)
- Generated shared mobility trips (13%)

Please note that **Table 2** provides an indication of trends only due to small cell sizes.

Table 2. Last trip details for selected substituted modes

Last trip	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	Switch 6
Substituted mode	Walking	Cycling	Private car	Carpool	PT	No trip
Frequency / N	17	48	58	17	67	31
Trip purpose						
Commuting/work	2 / 12%	7 / 15%	9 / 16%	3 / 18%	16 / 24%	2 / 7%
Grocery shopping	5 / 29%	17 / 35%	10 / 17%	2 / 12%	1 / 2%	6 / 19%
Shopping general	2 / 12%	4 / 8%	5 / 9%	1 / 6%	3 / 5%	4 / 13%
Visiting others	1 / 6%	6 / 13%	11 / 19%	5 / 29%	29/ 43%	5 / 16%
Sports activities	-	2 / 4%	5 / 9%	1 / 6%	1 / 2%	-
Leisure / tourism	4 / 24%	7 / 15%	15 / 26%	3 / 18%	11 / 16%	12 / 39%
Going out / night	-	3 / 6%	2 / 3%	-	2 / 3%	-
Other (specify)	1 / 6%	2 / 4%	1 / 2%	2 / 12%	4 / 6%	2 / 7%
Trip distance						
1-3 miles	8 / 47%	15 / 32%	9 / 16%	7 / 41%	15 / 23%	4 / 13%
4-6 miles	6 / 35%	14 / 30%	24 / 41%	3 / 18%	13 / 20%	7 / 23%
7 miles or more	3 / 18%	18 / 38%	25 / 43%	7 / 41%	38 / 58%	20 / 65%
Trip frequency						
Opm or less	9 / 53%	21 / 44%	20 / 36%	10 / 59%	40 / 61%	22 / 71%
2-3 pm	5 / 29%	21 / 44%	18 / 32%	5 / 29%	18 / 27%	6 / 19%
1-2 pw	3 / 18%	5 / 10%	13 / 23%	1 / 6%	6 / 9%	2 / 7%
3-4 pw or more	-	1 / 2%	5 / 9%	1 / 6%	2 / 3%	1 / 3%
Trip likelihood						
Very likely	3 / 18%	18 / 38%	17 / 30%	8 / 47%	23 / 34%	2 / 7%
Likely	7 / 41%	19 / 40%	27 / 47%	4 / 24%	24 / 36%	2 / 7%
Neither	3 / 18%	3 / 6%	10 / 18%	1 / 6%	8 / 12%	5 / 16%
Unlikely	3 / 18%	6 / 13%	2 / 4%	3 / 18%	8 / 12%	8 / 26%
Very unlikely	1 / 6%	2 / 4%	1 / 2%	1 / 6%	4 / 6%	14 / 45%
General use						
One-way	6 / 38%	17 / 36%	19 / 33%	5 / 29%	18 / 28%	5 / 16%
Round trip	10 / 62%	30 / 64%	39 / 67%	12 / 71%	47 / 72%	26 / 84%
Combine with PT						
Yes	10 / 62%	17 / 35%	24 / 42%	9 / 56%	35 / 52%	21 / 68%
No	6 / 38%	31 / 65%	33 / 58%	7 / 44%	32 / 48%	10 / 32%
SM importance						
Integral part	3 / 19%	20 / 42%	19 / 33%	6 / 35%	19 / 29%	11 / 36%
Only as needed	13 / 81%	23 / 48%	34 / 60%	11 / 65%	40 / 62%	18 / 58%
Increase use						
Likely	14 / 82%	36 / 75%	48 / 84%	12 / 71%	45 / 67%	24 / 77%
Neither	2 / 12%	9 / 19%	8 / 14%	4 / 24%	12 / 18%	6 / 19%
Unlikely	1 / 6%	3 / 6%	1 / 2%	1 / 6%	10 / 15%	1 / 3%
Typical length						
6 miles or less	13 / 81%	29 / 60%	9 / 64%	10 / 59%	34 / 51%	10 / 20%
7-10 miles	1 / 6%	10 / 21%	4 / 29%	2 / 12%	7 / 10%	7 / 23%
> 10 miles	2 / 13%	9 / 19%	1 / 7%	5 / 29%	26 / 39%	13 / 43%
Chosen mode						
Shared car	1 / 6%	12 / 25%	14 / 24%	5 / 29%	25 / 37%	11 / 36%
Shared bike	8 / 44%	12 / 25%	6 / 10%	4 / 24%	15 / 22%	4 / 13%
Shared cargobike	1 / 6%	5 /10%	4 / 7%	3 / 18%	2 / 3%	4 / 13%
Shared e-car	1 / 6%	2 / 4%	14 / 24%	2 / 12%	12 / 18%	7 / 23%
Shared e-bike	4 / 22%	11 / 23%	6 / 10%	2 / 12%	5 / 8%	3 / 10%
Shared e-cargobike	2 / 11%	4 / 8%	11 / 19%	-	1 / 2%	1 / 3%
Shared e-scooter	1 / 6%	2 / 4%	3 / 5%	1 / 6%	7 / 10%	1 / 3%

7. ATTITUDES TOWARDS SHARED MOBILITY USE, SOCIAL NORMS, AND THE ENVIRONMENT

A particular set of 20 attitudinal statements was directed at shared mobility users only, asking them about their attitudes towards and experience with shared mobility, including perceived social norms regarding shared mobility use. All respondents, however, were asked about their environmental attitude and identity as well as the potential impact of shared mobility on the environment. Below, attitudes exploring shared mobility use, experiences, social norms etc., have been divided into relevant subsets and are discussed accordingly.

7.1. Shared mobility attitudes and competences (users only)

Overall, the agreement for each item was relatively high (35-79%), although a substantial proportion of respondents tended to give a neutral response (12-28%; see **Figure 53**).

In general, respondents felt they had sufficient competences to use shared electric vehicles (79% agree) and also appreciated that they could use a vehicle that suits their needs at any point in time (77% agree). In addition, respondents indicated that they enjoy using shared vehicles (70% agree).

On the other hand, respondents were split with regard to the speed of travelling with shared compared to their own vehicles. Some respondents suggested that travelling with shared vehicles, as opposed to their own, tends to be faster (35% agree). Remaining respondents were either neutral in this respect (28%) or disagreed (37%).

Furthermore, the majority of respondents disagreed that the use of shared electric mobility does not fit their image (67% disagree) and, at the same time, agreed that shared electric vehicles reduce the necessity to purchase and maintain private vehicles (67% agree), while also being cheaper (66% agree).

Finally, respondents tended to agree that the use of shared electric vehicles fits their personal standards and values (76% agree), that they know about the advantages and disadvantages of using shared electric instead of privately-owned vehicles (73% agree), and that they know how to use shared electric vehicles (70% agree).

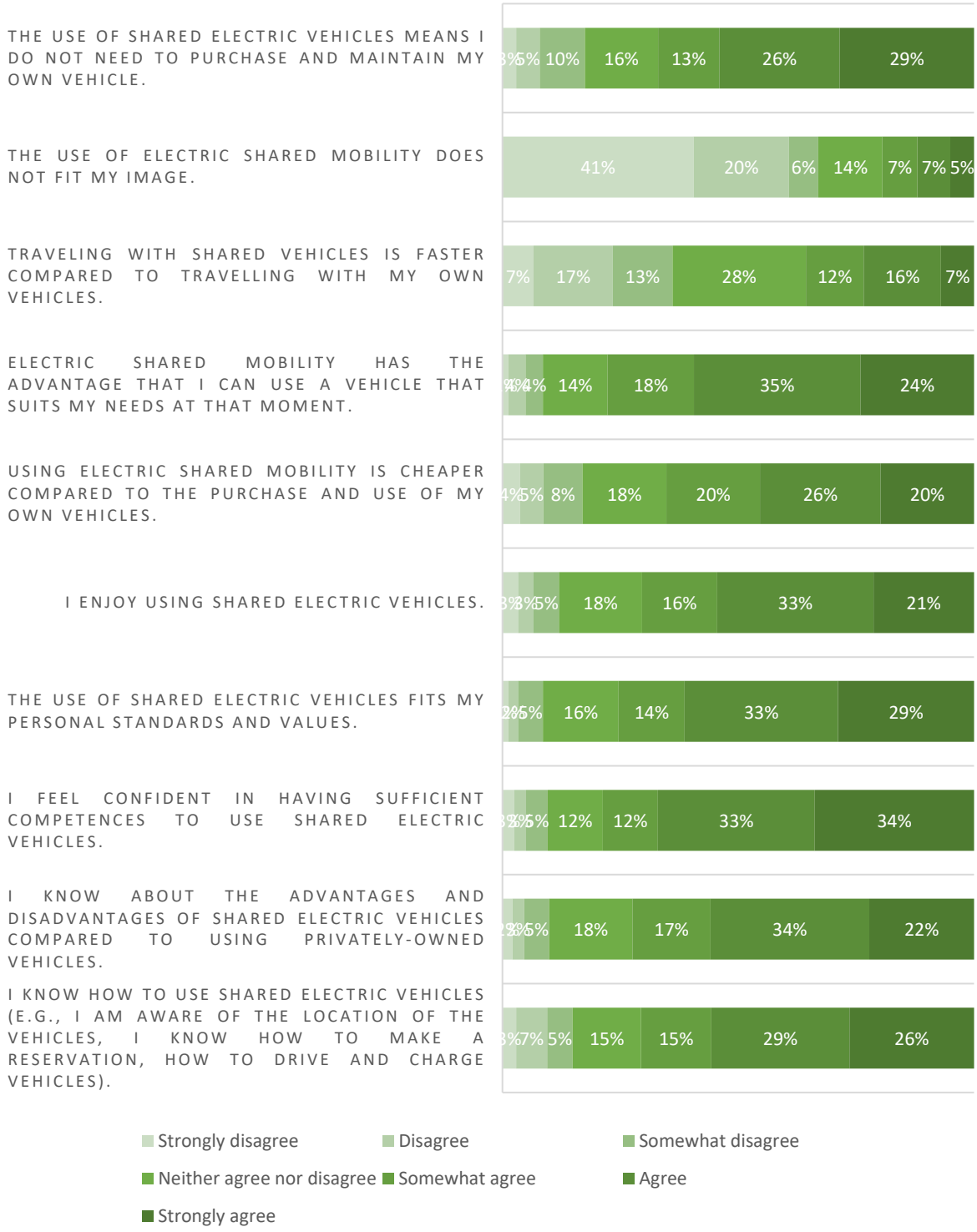

Figure 53. Respondents' attitudes towards shared mobility use (*N* = 239-244)

7.2. Shared mobility experience and satisfaction (users only)

In addition to their attitudes and competences regarding shared electric mobility, respondents who are currently using shared mobility services were also asked about their experience and satisfaction with shared mobility services (see **Figure 54**).

Overall, the majority of respondents were satisfied with the accessibility (i.e., ease of use) of shared mobility services (75% agree) and the proximity of shared vehicle locations (70% agree). Respondents also tended to agree that shared mobility providers offer good service (73% agree) and that the shared vehicles they used were of good quality (72% agree).

Furthermore, current shared mobility users also indicated that they were satisfied with the user-friendliness of the digital environment of shared mobility services (73% agree) and that they are confident that the providers handle their personal information well (64% agree).

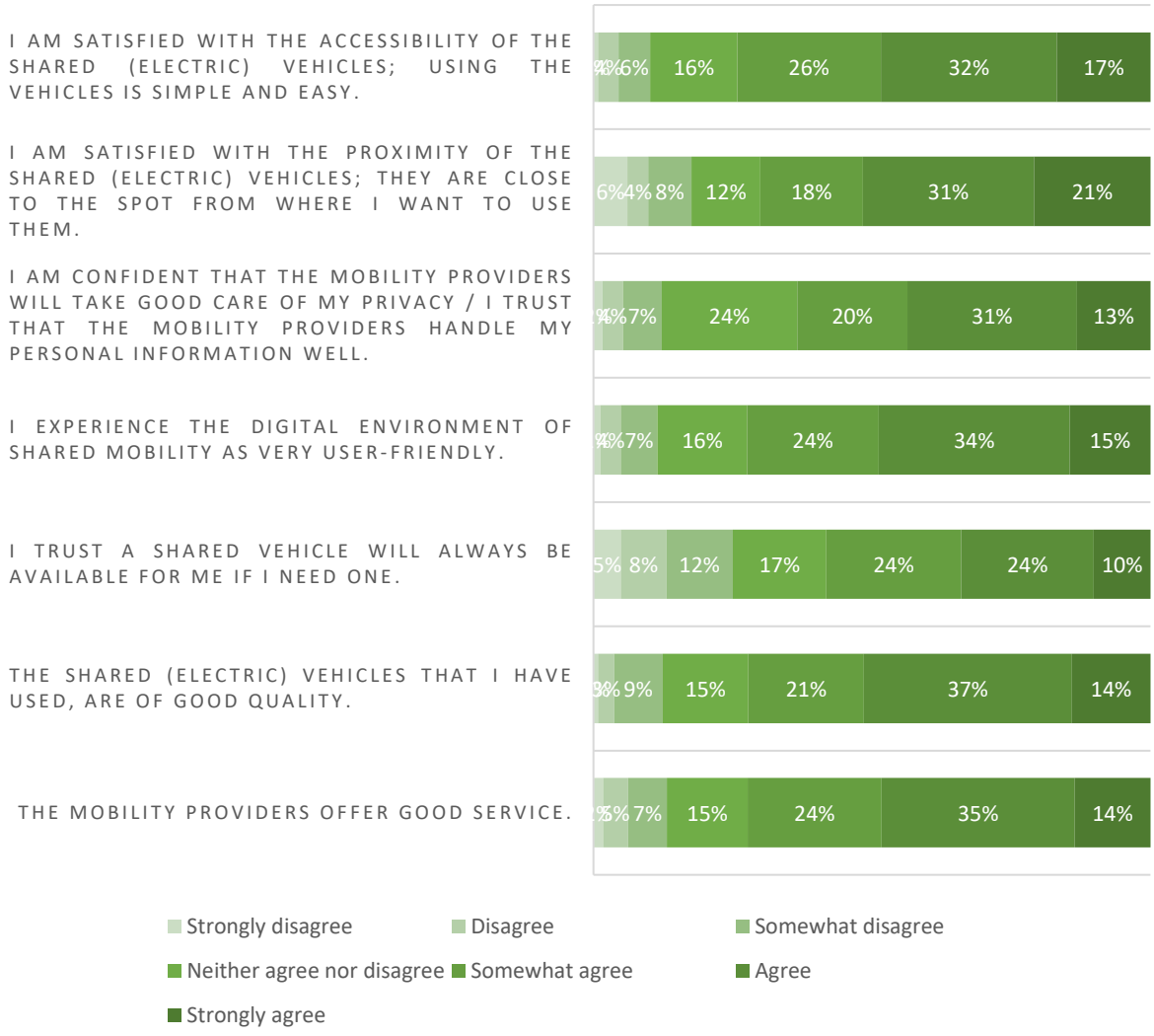

Figure 54. Respondents' experiences with shared mobility services (*N* = 241-244)

Finally, respondents showed some concern regarding the availability of shared vehicles, although the majority indicated they were confident that a shared vehicle will be available to them if needed (58% agree).

7.3. Perceived social norms regarding shared mobility (users only)

Exploring social norms surrounding shared mobility use (see **Figure 55**), the majority of respondents indicated that most people in their social circle/immediate environment hold a positive attitude towards the use of shared (electric) mobility (70% agree).

In addition, a substantial proportion of respondents also reported that those in their social circle had already tried out shared (electric) vehicles (42% agree), or are using shared (electric) vehicles (33% agree).

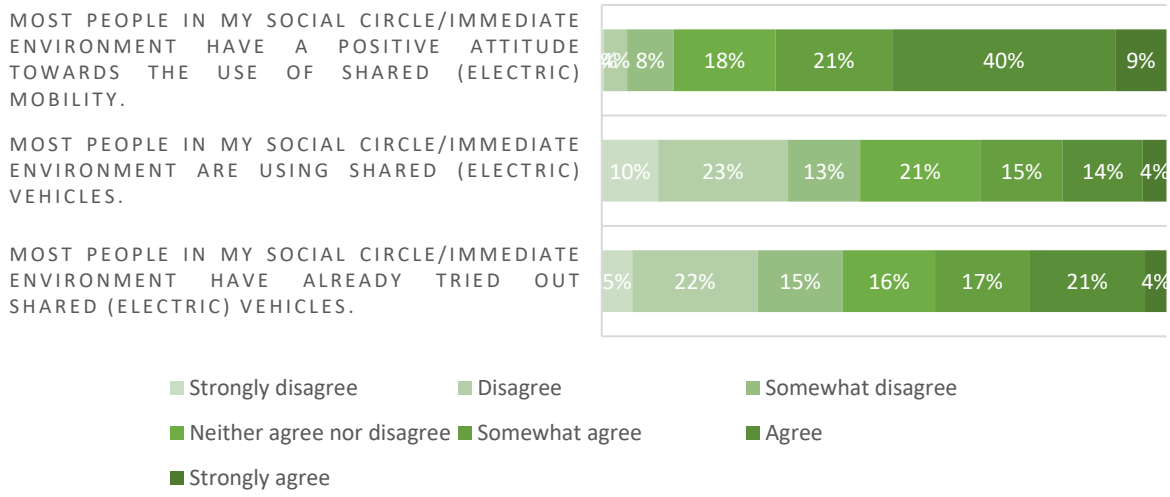

Figure 55. Perceived social norms regarding shared mobility use (*N* = 239-243)

7.4. Shared mobility and the environment

Concluding the attitudinal segment of the questionnaire, both current shared mobility users and non-users were questioned about their **environmental attitudes and identity** (see **Figure 56**), as well as the perceived environmental impact of shared mobility.

Taken together, most respondents reported they see themselves as an environmentally conscious person (75% agree) and try to reduce their environmental footprint (75% agree).

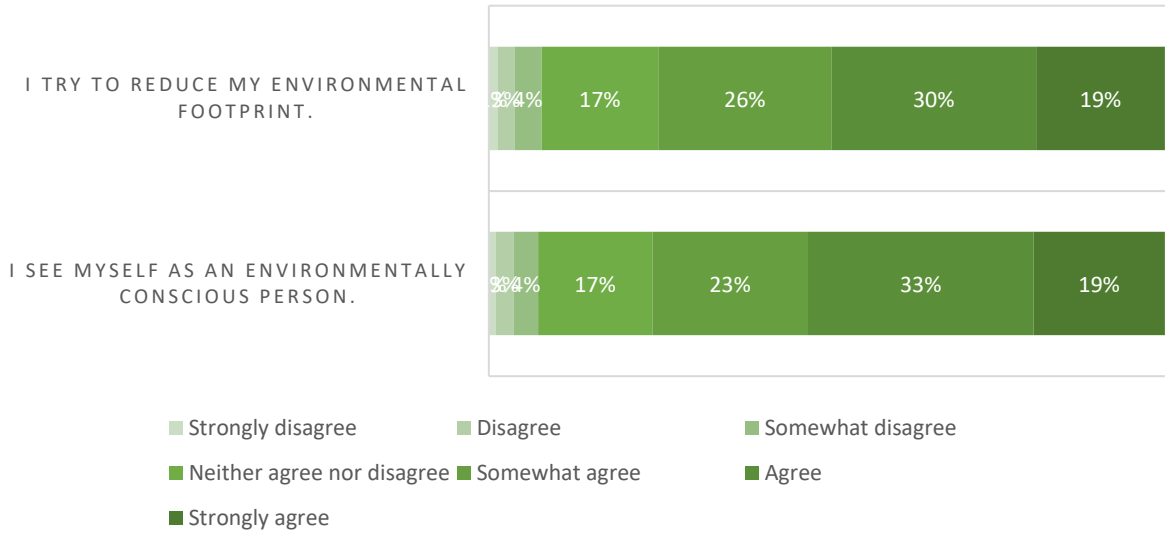

Figure 56. Respondents' environmental attitude and self-identity (*N* = 972-975)

With respect to the **perceived environmental impact** of shared electric mobility (**Figure 57**), the majority agreed that, if more people were to switch from their private cars to shared electric vehicles, the air would be cleaner (77% agree), it would help combat climate change (73% agree), and there would be less noise (70% agree).

Moreover, respondents also agreed that, by more people switching to shared electric mobility, there would be less traffic congestion (56% agree). About a quarter of respondents also indicated, however, that there would be more chaos in the public space (28% agree), while many held neutral views in this regard (26% neither agree nor disagree).

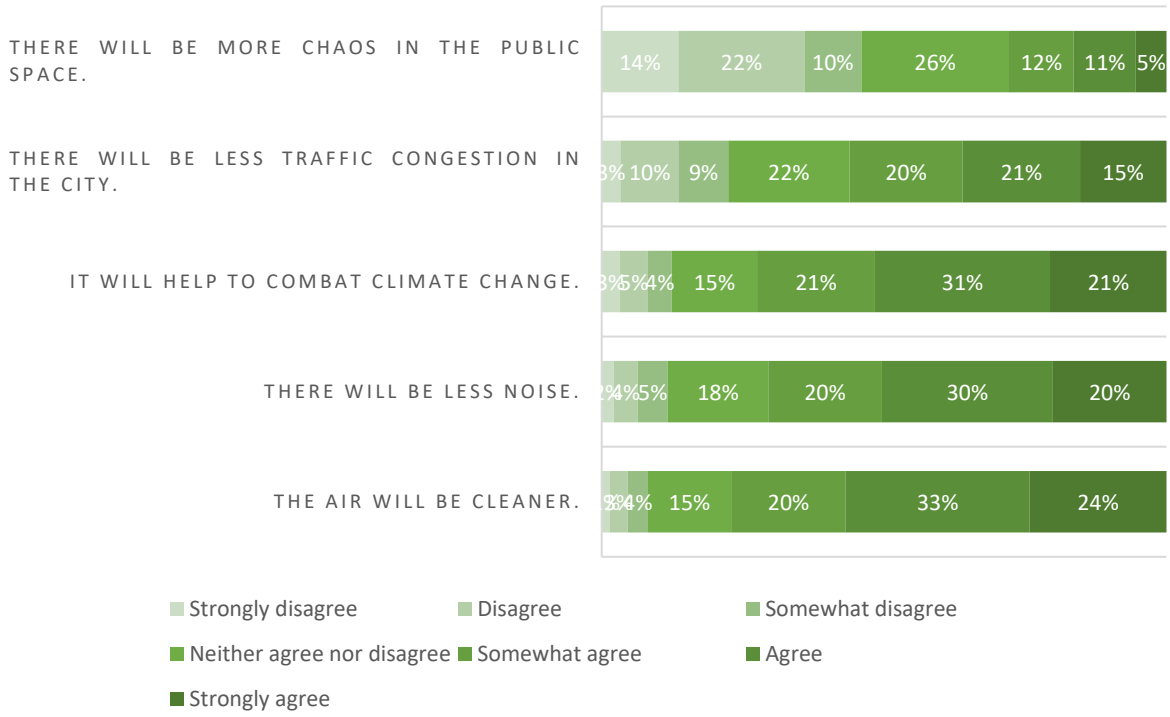

Figure 57. Respondents' perceived environmental impact of shared electric mobility (*N* = 968-972)

REFERENCES

Anderson-Hall, K., Bordenkircher, B., O'Neil, R., & Scott, S. C. (2019). Governing micro-mobility: A nationwide assessment of electric scooter regulations (No. 19-05267). *Transportation Research Board 98th Annual Meeting*. Washington DC, United States.

Chandler, J., Rosenzweig, C., Moss, A. J., Robinson, J., & Litman, L. (2019). Online panels in social science research: Expanding sampling methods beyond Mechanical Turk. *Behavior Research Methods*, *51*(5), 2022-2038.

Greenacre, Z. A. (2016). The importance of selection bias in internet surveys. *Open Journal of Statistics*, *6*(3), 397-404. DOI: 10.4236/ojs.2016.63035

Heinen, E. (2016). Identity and travel behaviour: A cross-sectional study on commute mode choice and intention to change. *Transportation Research Part F: Traffic Psychology and Behaviour*, *43*, 238-253.

Knief, U., & Forstmeier, W. (2021). Violating the normality assumption may be the lesser of two evils. *Behavior Research Methods*, 1-15.

Lutz, C., & Hoffmann, C. P. (2017). The dark side of online participation: exploring non-, passive and negative participation. *Information, Communication & Society*, *20*(6), 876-897.

APPENDIX

Table A1. Age distribution by gender for each city of residence (*N* = 977)

Age		ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
18-24	Male	1 / 7	11	2	1	0	0	22
	Female	2 / 4	14	5	-	3	2	30
25-34	Male	3 / 18	34	6	3	15	5	84
	Female	8 / 19	32	9	-	34	6	108
35-44	Male	4 / 21	38	4	2	27	8	104
	Female	6 / 19	27	4	2	25	8	91
45-54	Male	8 / 27	25	3	1	23	6	93
	Female	12 / 15	32	8	1	20	9	97
55-64	Male	5 / 15	38	3	-	10	10	81
	Female	6 / 18	30	2	-	17	6	79
65-74	Male	5 / 8	44	-	-	12	1	70
	Female	3 / 5	34	1	-	9	0	52
> 75	Male	- / 1	29	-	-	4	-	34
	Female	- / 2	20	-	-	0	-	22
Total	Male	26 / 97	219	18	7	91	30	488
	Female	37 / 82	189	29	3	108	31	479
	Other	- / 5	1	-	-	1	-	7
	Subtotal	63 / 184	409	47	10	200	61	974
	Missing	- / 1	2	-	-	-	-	3
	Total	63 / 185	411	47	10	200	61	977

Table A2. Number of adults per household by city of residence (*N* = 977)

# Adults	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
1	25 / 48	159	10	3	39	7	291
2	30 / 117	185	21	6	133	36	528
3	5 / 10	34	4	1	14	8	76
4/+	3 / 9	25	9	-	11	9	66
Missing	- / 1	8	3	-	3	1	16
Total	63 / 185	411	47	10	200	61	977

Table A3. Number of children per household by city of residence (*N* = 977)

# Children	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
0	42 / 124	301	21	6	125	35	654
1	9 / 23	52	8	1	21	8	122
2	6 / 28	38	8	1	31	14	126
3/+	1 / 5	9	6	2	19	1	43
Missing	5 / 5	11	4	-	4	3	32
Total	63 / 185	411	47	10	200	61	977

Table A4. Education level by city of residence (*N* = 977)

Education	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
No school	- / 1	3	-	-	-	-	4
Primary school	- / -	9	-	-	1	-	10
Secondary school	12 / 17	138	1	2	12	3	185
Professional qualification	1 / 12	24	1	1	8	9	56
Undergraduate degree	31 / 70	114	2	3	53	14	287
Postgraduate degree	18 / 82	117	39	3	124	34	417
Prefer not to say	1 / 3	5	4	1	2	1	17
Missing	- / -	1	-	-	-	-	1
Total	63 / 185	411	47	10	200	61	977

Table A5. Respondents' annual household income by city of residence (*N* = 977)

Income	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
< 24.000€	10 / 24	67	8	2	12	6	129
24.000€-47.999€	17 / 41	128	14	2	54	17	273
48.000€-71.999€	17 / 44	69	11	1	47	14	203
72.000€-95.999€	6 / 34	44	3	2	24	8	121
96.000€-120.000€	2 / 18	15	1	-	13	3	52
> 120.000€	2 / 4	11	-	-	7	1	25
Prefer not to say	9 / 19	76	10	3	41	11	169
Missing	- / 1	1	-	-	2	1	5
Total	63 / 185	411	47	10	200	61	977

Table A6. Respondents' employment status by city of residence (*N* = 977)

Income	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
FT employed	20 / 79	143	28	4	116	36	426
Retired from work	7 / 16	111	1	-	25	4	164
PT employed	16 / 36	40	5	3	25	5	130
Self-employed	11 / 18	32	3	-	15	5	84
FT student	2 / 11	10	1	1	2	2	29
Unemployed	1 / 7	14	-	-	6	-	28
Home/family	2 / 3	11	1	1	3	2	23
Apprentice/Trainee	1 / 2	3	5	-	-	-	11
Secondary school	- / -	3	1	-	-	-	4
PT student	- / -	5	-	-	-	-	5
Other	2 / 4	9	1	-	3	5	24
Missing	1 / 9	30	1	1	5	2	49
Total	63 / 185	411	47	10	200	61	977

Table A7. Availability of household vehicles by city of residence (*N* = 977)

Vehicle	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Cars (electric)							
0	19 (47) / 40 (142)	112 (300)	7 (40)	1 (8)	69 (186)	12 (51)	260 (774)
1	32 (5) / 110 (11)	231 (56)	19 (1)	7 (2)	109 (3)	29 (4)	537 (82)
2	8 (-) / 29 (-)	53 (3)	17 (1)	2 (-)	17 (1)	16 (-)	142 (5)
3 / +	1 (-) / 2 (-)	6 (1)	3 (-)	- (-)	3 (-)	4 (-)	19 (1)
Total	60 (52) / 181 (153)	402 (360)	46 (42)	10 (10)	198 (190)	61 (55)	958 (862)
Bicycles (electric)							
0	1 (30) / 3 (103)	48 (266)	6 (37)	- (6)	13 (112)	6 (37)	77 (591)
1	18 (21) / 32 (43)	142 (75)	14 (4)	2 (4)	22 (45)	6 (14)	236 (206)
2	20 (7) / 46 (13)	102 (23)	10 (1)	2 (-)	54 (31)	14 (4)	248 (79)
3 / +	23 (-) / 101 (1)	101 (5)	15 (1)	6 (-)	108 (2)	35 (1)	389 (10)
Total	62 (58) / 182 (160)	393 (369)	45 (43)	10 (10)	197 (190)	61 (56)	950 (886)
Cargo-bikes (electric)							
0	53 (52) / 152 (156)	354 (354)	44 (43)	10 (10)	175 (170)	56 (53)	844 (838)
1	2 (3) / 7 (3)	17 (16)	1 (1)	- (-)	15 (20)	1 (3)	43 (46)
2	- (-) / - (-)	4 (1)	- (-)	- (-)	- (3)	- (1)	4 (5)
3 / +	- (-) / - (-)	3 (1)	- (-)	- (-)	- (-)	- (-)	3 (1)
Total	55 (55) / 159 (159)	378 (372)	45 (44)	10 (10)	190 (193)	57 (57)	894 (890)
Motor-bikes (electric)							
0	48 (52) / 144 (156)	324 (344)	30 (40)	9 (10)	183 (186)	44 (53)	782 (841)
1	5 (2) / 15 (2)	50 (21)	11 (-)	- (-)	4 (4)	12 (2)	97 (31)
2	1 (-) / 3 (-)	7 (2)	2 (1)	- (-)	4 (-)	1 (-)	18 (3)
3 / +	- (-) / - (-)	2 (1)	- (-)	1 (-)	- (-)	- (-)	3 (1)
Total	54 (54) / 162 (158)	383 (368)	43 (41)	10 (10)	191 (190)	57 (55)	900 (876)

Table A8. Respondents' general use of the private car (*< 6mi/10km)

Variable	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Licence (Y)	56 / 174	332	42	10	187	59	860
Licence (N)	7 / 11	79	5	-	13	2	117
L + >= 1 car	40 / 142	278	37	9	127	48	681
Car type							
Petrol (P)	38 / 115	254	15	4	81	24	531
Diesel (D)	4 / 16	30	25	3	64	23	165
P Hybrid	6 / 13	24	1	1	8	4	57
D Hybrid	- / 1	5	-	-	1	-	7
Electric	3 / 9	20	2	1	5	2	42
Other	2 / 8	6	1	-	2	2	21
Role							
Driver	27 / 96	224	28	6	98	32	511
Passenger	9 / 21	69	7	1	26	9	142
Switching	18 / 48	47	11	3	43	15	185
Passengers							
1 (driver)	19 / 59	114	11	3	35	14	255
2 (d + 1p)	24 / 77	182	20	3	87	29	422
3+ (d + 2p)	11 / 27	43	15	3	43	13	155
Short trip (ST)*							
Never	12 / 36	61	6	2	51	9	177
Once/week	17 / 60	100	13	4	64	18	276
2-3 times	12 / 33	76	9	3	23	13	169
4-5 times	6 / 17	58	7	1	13	10	112
=/> 6 times	7 / 16	43	9	-	7	5	87
ST purpose							
Groceries	28 / 79	190	33	5	96	40	471
Visiting	22 / 73	162	17	4	67	20	365
Leisure	8 / 38	100	14	1	50	16	227
Commuting	13 / 38	112	17	1	17	17	215
Shopping	9 / 26	104	10	3	28	14	194
Sports	7 / 29	49	6	1	18	12	122
Going out	3 / 5	25	6	-	4	5	48
Other	5 / 19	14	4	1	22	5	70

Table A9. Respondents' general travel behaviour by city of residence (*N* = 977)

Mode	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Days PMT							
5+ pw	8 / 36	80	18	4	16	19	181
3-4 pw	19 / 36	85	6	1	27	9	183
1-2 pw	15 / 50	99	11	3	56	15	249
2-3 pm	7 / 29	31	6	-	38	8	119
< 1 pm	4 / 11	32	5	2	20	4	78
Never	10 / 23	80	1	-	42	5	161
Total	63 / 185	407	47	10	199	60	971
Days Walk							
5+ pw	12 / 43	138	23	3	64	15	298
3-4 pw	18 / 43	85	4	1	32	5	188
1-2 pw	21 / 55	84	7	2	40	19	228
2-3 pm	7 / 18	32	2	3	25	8	95
< 1 pm	4 / 10	29	2	1	27	6	79
Never	1 / 15	41	6	-	10	8	81
Total	63 / 184	409	44	10	198	61	969
Days Cycle							
5+ pw	20 / 72	84	9	5	102	18	310
3-4 pw	22 / 47	92	7	1	42	13	224
1-2 pw	5 / 40	84	5	1	25	10	170
2-3 pm	4 / 4	34	3	-	6	5	56
< 1 pm	7 / 14	42	6	3	10	2	84
Never	5 / 7	75	16	-	15	13	131
Total	63 / 184	411	46	10	200	61	975
Days PT							
5+ pw	4 / 4	51	6	-	7	1	73
3-4 pw	6 / 15	49	5	1	15	4	95
1-2 pw	10 / 28	83	1	2	40	7	171
2-3 pm	14 / 33	79	4	1	49	5	185
< 1 pm	20 / 69	84	4	6	70	21	274
Never	9 / 36	62	24	-	19	23	173
Total	63 / 185	408	44	10	200	61	971
Days RH							
5+ pw	- / -	13	-	-	-	-	13
3-4 pw	- / -	11	-	-	-	-	11
1-2 pw	- / 1	15	-	-	-	1	17
2-3 pm	- / 2	24	-	-	1	1	28
< 1 pm	11 / 23	119	6	1	48	10	218
Never	51 / 159	226	38	9	151	49	683
Total	62 / 185	408	44	10	200	61	970

Table A10. Respondents' public transport pass ownership and traveller identity, as well as respondents' shared mobility use and intentions (*includes 'Other')

Variable	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Owning							
PT pass	44 / 131	287	13	2	54	15	546
Rail card	26 / 72	136	9	2	54	17	316
RH app	6 / 9	65	4	-	9	7	100
None	12 / 38	73	24	7	98	30	282
Other	2 / 7	6	1	1	27	3	47
Identity							
Cyclist	23 / 67	73	4	4	104	20	295
Car driver	15 / 44	159	16	4	16	22	276
MM user	21 / 63	72	18	2	61	17	254
PT user	2 / 8	46	2	-	4	1	63
Walker	2 / 3	35	5	-	13	-	58
Car passenger	- / -	26	2	-	2	1	31
Shared use							
Not using	56 / 158	307	35	8	119	48	731
Shared car	1 / 5	30	-	-	53	3	92
Shared e-car	2 / 8	30	1	1	17	3	62
Shared bike	2 / 6	31	3	-	14	6	62
Shared e-bike	3 / 8	31	9	1	6	5	63
Shared cargo	- / -	16	-	-	5	-	21
Shared e-cargo	- / 9	19	4	-	26	4	62
E-scooters	2 / 1	22	3	1	3	3	35
Other	1 / 1	3	-	-	3	-	8
Intention							
e-bike	49.18 /						
Mean	30.69	18.63	43.32	59.86	20.64	28.55	25.96*
Median	48 / 19	3.50	43	72	6	12.50	10
e-car	47.42 /						
Mean	37.95	20.91	39.75	40.89	34.79	41.17	30.77*
Median	46 / 35.50	4	39.50	30	31	45	21
e-cargo	33.90 /						
Mean	28.40	11.68	42.89	63.56	28.68	21.91	21.55*
Median	18 / 15.50	2	23	67	13.50	12	5
e-scooter	44.74 /						
Mean	25.25	12.27	38.33	29.71	9.83	24.56	18.24*
Median	49 / 10	2	23	25	0.00	6.50	2

Table A11. Perceived barriers to the use of shared vehicles by city of residence

Barrier	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
I prefer to use my own car	17 / 62	153	17	1	36	18	304
I prefer to walk / use my own bicycle	17 / 59	135	13	5	55	13	297
I'm afraid there will be no shared vehicle available	27 / 69	65	7	3	41	16	228
It is too expensive to rent shared vehicles	25 / 61	55	8	4	34	11	198
The shared vehicle location is too far	22 / 49	32	15	7	29	21	175
Cannot leave the shared vehicles where I want	18 / 42	52	8	6	33	12	171
It is too complicated to rent shared vehicles	16 / 44	32	4	-	38	13	147
I prefer to use existing public transport	5 / 20	90	5	-	19	5	144
I do not see the added value of shared mobility	3 / 17	55	-	-	12	-	87
Shared vehicles are badly maintained/dirty	4 / 16	15	4	1	7	10	57
I am concerned about data/privacy issues	5 / 15	24	1	-	5	-	50
I haven't heard of it / am not aware	11 / 11	14	2	-	2	7	47
I wouldn't feel safe using shared vehicles	4 / 6	19	1	-	7	3	40
Other (please specify)	11 / 29	22	5	3	48	8	126

Table A12. Demographic profile of shared mobility users and non-users

Variable		Non-users (*N* = 733)	Users (*N* = 247)
Age	18 to 24	31 / 4%	21 / 9%
	25 to 34	108 / 15%	87 / 35%
	35 to 44	128 / 18%	69 / 28%
	45 to 54	157 / 22%	36 / 15%
	55 to 64	143 / 20%	17 / 7%
	65 to 74	109 / 15%	14 / 6%
	75 or older	54 / 7%	2 / 1%
Gender	Male	371 / 51%	116 / 47%
	Female	353 / 48%	126 / 51%
	Other	5 / 1%	2 / 1%
City	Arnhem	56 / 8%	7 / 3%
	Amsterdam	305 / 42%	104 / 42%
	Nijmegen	158 / 22%	27 / 11%
	Leuven	119 / 16%	81 / 33%
	Dreux	35 / 5%	12 / 5%
	Kempten	8 / 1%	2 / 1%
	Other	48 / 7%	13 / 5%
N Adults	1	226 / 31%	65 / 27%
	2	388 / 54%	141 / 60%
	3	60 / 8%	15 / 6%
	4 or more	50 / 7%	16 / 7%
N Children	0	521 / 74%	133 / 56%
	1	79 / 11%	43 / 18%
	2	74 / 11%	52 / 22%
	3 or more	32 / 5%	11 / 5%
Education	School	168 / 23%	26 / 11%
	Professional	42 / 6%	14 / 6%
	University	505 / 69%	200 / 81%
	Prefer not to say	15 / 2%	6 / 2%
Current status	School/Trainee	7 / 1%	8 / 3%
	Student	23 / 3%	11 / 5%
	Employed	446 / 65%	195 / 82%
	Not working	42 / 6%	9 / 4%
	Retired	150 / 22%	14 / 6%
	Other	22 / 3%	2 / 1%
Income	< 24.000€	99 / 14%	30 / 12%
	24.000€-47.999€	199 / 27%	75 / 31%
	48.000€-71.999€	151 / 27%	52 / 21%
	72.000€-95.999€	88 / 12%	33 / 14%
	96.000€-120.000€	39 / 5%	13 / 5%
	> 120.000€	16 / 2%	9 / 4%
	Prefer not to say	137 / 19%	31 / 13%

Table A13. General travel behaviour of shared mobility users and non-users

Variable		Non-users (*N* = 733)	Users (*N* = 247)
Licence	Yes	633 / 87%	227 / 92%
	No	98 / 13%	19 / 8%
PMT use	Never	101 / 14%	59 / 24%
	Opm or less	58 / 8%	20 / 8%
	2-3 tpm	83 / 11%	36 / 15%
	1-2 dpw	207 / 29%	42 / 17%
	3-4 dpw	136 / 19%	47 / 19%
	5 dpw or more	142 / 20%	40 / 16%
Walking	Never	73 / 10%	9 / 4%
	Opm or less	59 / 8%	20 / 8%
	2-3 tpm	73 / 10%	23 / 9%
	1-2 dpw	178 / 25%	50 / 20%
	3-4 dpw	127 / 18%	61 / 25%
	5 dpw or more	214 / 30%	82 / 34%
Cycling	Never	116 / 16%	15 / 6%
	Opm or less	68 / 9%	16 / 7%
	2-3 tpm	47 / 6%	10 / 4%
	1-2 dpw	131 / 18%	39 / 16%
	3-4 dpw	152 / 21%	71 / 29%
	5 dpw or more	215 / 30%	95 / 39%
PT use	Never	159 / 22%	12 / 5%
	Opm or less	228 / 31%	46 / 19%
	2-3 tpm	130 / 18%	55 / 22%
	1-2 dpw	118 / 16%	54 / 22%
	3-4 dpw	48 / 7%	47 / 19%
	5 dpw or more	43 / 6%	31 / 13%
Ride hailing	Never	543 / 75%	139 / 57%
	Opm or less	161 / 22%	57 / 23%
	2-3 tpm	15 / 2%	13 / 5%
	1-2 dpw	6 / 1%	11 / 5%
	3-4 dpw	-	11 / 5%
	5 dpw or more	-	13 / 5%
Identity	Car driver	222 / 30%	54 / 22%
	Car passenger	19 / 3%	12 / 5%
	Cyclist	210 / 29%	85 / 35%
	Pedestrian	45 / 6%	13 / 5%
	PT user	52 / 7%	12 / 5%
	Multi-modal	183 / 25%	70 / 29%
PT pass	Rail card	214 / 29%	103 / 42%
	PT pass (e.g., for bus, light rail or metro)	402 / 55%	145 / 59%
	Ride hailing app	65 / 9%	35 / 14%
	None of the above	233 / 32%	49 / 20%
	Other	27 / 4%	20 / 8%

Table A14. Respondents' shared mobility use by city of residence (*N* = 247)

Variable	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Increase use							
Very likely	2 / 4	24	5	1	17	4	57
Likely	4 / 9	33	3	-	22	4	75
Somewhat likely	- / 7	23	2	-	17	2	51
Neither nor	- / 4	16	2	1	17	3	43
Somewhat unlikely	- / 1	2	-	-	5	-	8
Unlikely	1 / 1	1	-	-	1	-	4
Very unlikely	- / 1	4	-	-	2	-	7
Usual trip type							
One-way	- / 2	64	2	-	1	4	73
Round trip	7 / 25	35	10	2	79	9	167
Shared mobility is essential to me							
Yes, integral part	2 / 8	39	3	-	26	3	81
No, only as needed	5 / 19	57	8	2	43	10	144
No, only tried once	- / -	4	-	-	3	-	7
Other	- / -	2	-	-	8	-	10
Use in combination with public transport							
Yes	5 / 12	65	4	1	26	8	121
No	2 / 15	39	7	1	53	5	122
Typical trip length							
< 3 miles	- / 4	18	6	2	14	7	51
3-6 miles	4 / 9	48	4	-	24	1	90
7-10 miles	1 / 5	22	-	-	11	1	40
> 10 miles	2 / 9	14	2	-	31	4	62

Table A15. Respondents' last shared mobility trip details by city of residence

Willingness	ARN/NIJ	AMS	DRE	KEM	LEU	Other	Total
Purpose							
Visiting	- / 7	24	2	1	23	1	58
Leisure	2 / 10	17	4	-	14	5	52
Groceries	- / -	18	1	-	22	1	42
Commuting	2 / 5	19	-	1	9	4	40
Shopping	2 / 2	11	1	-	4	1	21
Sports	- / 1	6	1	-	3	-	11
Going out	1 / -	7	1	-	-	-	9
Other	- / 2	2	2	-	5	1	12
Trip length							
1-3 miles	1 / 5	31	7	1	10	6	61
4-6 miles	- / 2	39	2	-	23	2	68
7 miles or more	6 / 19	31	3	1	47	5	112
Trip frequency							
< 1 pm	5 / 21	32	6	1	48	11	124
2-3 pm	1 / 6	41	4	-	23	1	76
1-2 pw	1 / -	19	2	1	7	1	31
3-4 pw	- / -	6	-	-	2	-	8
5+ pw	- / -	3	-	-	-	-	3
Trip likelihood if no SM available							
Very likely	4 / 10	22	5	2	25	4	72
Likely	- / 5	47	5	-	25	3	85
Neither nor	1 / 3	19	-	-	9	-	32
Unlikely	- / 7	9	-	-	12	3	31
Very unlikely	2 / 2	6	2	-	9	3	24

Table A16. Respondents' chosen shared mode and substituted mode (*N* = 247)

Substituted mode	Shared car	Shared bike	Shared cargo-bike	Shared e-car	Shared e-bike	Shared e-cargo-bike	Shared e-scooter	Total
Walking	1	8	1	1	4	2	1	18
	1%	16%	5%	3%	13%	11%	7%	7%
Cycling	12	12	5	2	11	4	2	48
	17%	24%	25%	5%	35%	21%	13%	19%
Motorbike	1	1	1	1	0	0	0	4
	1%	2%	5%	3%	0%	0%	0%	2%
Private car	14	6	4	14	6	11	3	58
	19%	12%	20%	36%	19%	58%	20%	23%
Carpooling/lift	5	4	3	2	2	0	1	17
	7%	8%	15%	5%	6%	0%	7%	7%
Public transport	25	15	2	12	5	1	7	67
	35%	29%	10%	31%	16%	5%	47%	27%
Ride hailing (e.g., Uber, taxi)	3	1	0	0	0	0	0	4
	4%	2%	0%	0%	0%	0%	0%	2%
I would not have made the trip	11	4	4	7	3	1	1	31
	15%	8%	20%	18%	10%	5%	7%	13%
Total	72	51	20	39	31	19	15	247